

Co-creating democracy

Conceptualizing co-creative media to facilitate democratic engagement in society

Montathar Faraon

Academic dissertation for the Degree of Doctor of Philosophy in Information Society at Stockholm University to be publicly defended on Thursday 24 May 2018 at 13.00 in Lilla hörsalen, NOD-huset, Borgarfjordsgatan 12.

Abstract

Internet-based information and communication technology (ICT) have increasingly been used to facilitate and support democratic engagement in society. A growing body of research has demonstrated that the Internet and, in particular, social media have given citizens the opportunity to participate, interact, network, collaborate, and mobilize themselves within communities. While these media have broadened the means of exercising citizenship in many forms of participatory democracy, the technological prerequisites exist to go beyond the standard uses of social media (e.g., social networking, entertainment) and towards proactive and co-creative democratic engagement. Such engagement includes, but is not limited to, participatory activities for democratic purposes. Further, some researchers have argued that representative democracy is in decline and has several limitations related to citizens' trust in politicians and engagement with representative institutions. There is a recognition among scholars to infuse representative democracy with participatory bottom-up processes by employing ICT in an attempt to bridge these limitations. In order to further facilitate and support participatory as well as co-creative processes, this thesis elaborates a concept of co-creative media.

The process of this work was guided by the following question: *How can co-creative media be theoretically anchored and conceptualized in order to facilitate and support citizen engagement within democratic processes?* A concept-driven design research approach was adopted to address this research question, and this resulted in five interconnected articles. Firstly, based on the results from each article, four design guidelines were formulated to further guide the design of co-creative media for democratic engagement. These design guidelines may support future participatory design processes in which stakeholders collectively contribute to the development and evaluation of co-creative media. The guidelines constitute a resource that stakeholders may use to develop adaptations of co-creative media for the purposes of facilitating democratic engagement. Secondly, the results from each article were fed forward into the concept-driven research process as theoretical and empirical insights, which were used to inform and elaborate the main contribution of this thesis, namely the concept of co-creative media.

The concept of co-creative media in its form outlined by this thesis seeks to broaden citizens' democratic engagement by means of creating virtual spaces in which new ideas, initiatives, knowledge, solutions, and digital tools could emerge. The implications of co-creative media could be to create, develop, and strengthen partnerships between communities and local services, extend digital skills in society through community-engaged practitioners, and propagate as well as coordinate large-scale co-creative practices.

Keywords: *co-creative media, democracy, concept-driven design research, socio-technical systems, consensus-seeking, internet voting, mobilization, open so.*

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*To my parents,
Sahar Faraon and Lamia Ahmed*

*"An educated, enlightened, and informed population
is one of the surest ways of promoting
the health of a democracy."*

— Nelson Mandela
St John's College, Johannesburg, South Africa
6 October 2003

Abstract

Internet-based information and communication technology (ICT) have increasingly been used to facilitate and support democratic engagement in society. A growing body of research has demonstrated that the Internet and, in particular, social media have given citizens the opportunity to participate, interact, network, collaborate, and mobilize themselves within communities. While these media have broadened the means of exercising citizenship in many forms of participatory democracy, the technological prerequisites exist to go beyond the standard uses of social media (e.g., social networking, entertainment) and towards proactive and co-creative democratic engagement. Such engagement includes, but is not limited to, participatory activities for democratic purposes. Further, some researchers have argued that representative democracy is in decline and has several limitations related to citizens' trust in politicians and engagement with representative institutions. There is a recognition among scholars to infuse representative democracy with participatory bottom-up processes by employing ICT in an attempt to bridge these limitations. In order to further facilitate and support participatory as well as co-creative processes, this thesis elaborates a concept of co-creative media.

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Keywords: *co-creative media, democracy, concept-driven design research, socio-technical systems, consensus-seeking, internet voting, mobilization, open source*

Sammanfattning

Internetbaserad informations- och kommunikationsteknik (IKT) har i allt högre grad använts för att främja och stödja demokratiskt engagemang i samhället. Forskning har visat att internet och i synnerhet sociala medier har skapat potential för medborgare att delta, interagera, nätverka, samarbeta och mobilisera sig i gemenskaper. Fastän dessa medier har vidgat medborgarnas möjligheter till inflytande i demokratiska processer finns det tekniska förutsättningar att gå bortom den förekommande användningen av sociala medier, exempelvis socialt nätverkande och underhållning, mot ett proaktivt och demokratiskt samskapande engagemang. Vidare har vissa forskare påpekat att tilltron till representativ demokrati har sjunkit och i samband med detta även förtroendet för politiker och myndigheter. Med hänsyn tagen till föregående har forskare identifierat ett behov av att erbjuda medborgare möjligheter att delta i demokratiska processer med stöd av IKT. För att stödja demokratiskt deltagande och samskapande processer elaborerar denna avhandling ett koncept för samskapande medier.

Forskningsprocessen i föreliggande avhandling har väglett av frågeställningen: *Hur kan samskapande medier teoretiskt förankras och konceptualiseras för att främja och stödja medborgarengagemang i demokratiska processer?* Frågeställningen besvarades genom att tillämpa ansatsen konceptdriven designforskning vilket mynnade ut i fem sammanhängande artiklar. Baserat på resultaten i respektive artikel formulerades fyra designprinciper för att vägleda och informera design av samskapande medier. Designprinciperna kan vara ett stöd för framtida deltagande designprocesser där medverkande aktörer gemensamt bidrar till utveckling och utvärdering av samskapande medier. Vidare utgör designprinciperna en resurs för intresserade aktörer som kan använda dessa för att utveckla egna anpassningar av samskapande medier i syfte att stödja demokratiskt engagemang. Utöver föregående användes teoretiska och empiriska insikter från varje artikel för att informera den konceptdrivna forskningsprocessen som elaborerade det huvudsakliga bidraget i avhandlingen, nämligen konceptet för samskapande medier.

Konceptet för samskapande medier i den form som presenteras i avhandlingen syftar till att bredda medborgarnas demokratiska engagemang genom att skapa virtuella miljöer där nya idéer, initiativ, kunskaper, lösningar och digitala verktyg kan ta sig uttryck. Möjliga följder av samskapande medier

kan vara att skapa, utveckla och stärka samverkan mellan intressegrupper och näringslivet, sprida digitala färdigheter i samhället via deltagare som engagerar sig i gemenskaper och organisera en praktik av storskaligt samskapande.

Nyckelord: *samskapande medier, demokrati, konceptdriven designforskning, sociotekniska system, konsensussökande, internetröstning, mobilisering, öppen källkod*

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It is a great privilege to write this section in order to recognize the people who have given me their time, help, and understanding during this exercise in sustained suffering. This may be the last good opportunity to express my gratitude to those who have played a key role in making this dissertation possible.

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To my brother Sadid, I wish to say: Investigate, but not alone. Lastly, and most importantly, I wish to give my deepest and heartfelt thanks to my parents Sahar Faraon and Lamia Ahmed. They are, beyond a shadow of a doubt, the strongest people I know and have sacrificed everything for me and my siblings. They bore me in a time of great uncertainty, devotedly raised me in five countries, and above all else taught me the importance of education. I dedicate this dissertation to them.

Malmö, Sweden, April 2018

Montathar Faraon

List of articles

The following articles are included in this thesis.

ARTICLE 1

Faraon, M., Villavicencio, V., Ramberg, R., & Kaipainen, M. (2013). From mobilization to consensus: Innovating cross-media services to organize crowds into collaborative communities. In P. Parycek & N. Edelmann (Eds.), *CeDEM13: Conference for E-Democracy and Open Government* (pp. 215-227). Krens: Edition Donau-Universität Krens.

ARTICLE 2

Faraon, M., Stenberg, G., Budurushi, J., & Kaipainen, M. (2015). Positive but skeptical: A study of attitudes towards Internet voting in Sweden. In P. Parycek, M. Sachs & M. M. Skoric (Eds.), *CeDEM-Asia 2014: Conference for E-Democracy and Open Government* (pp. 191–205). Münster: Edition Donau-Universität Krens.

ARTICLE 3

Faraon, M., Stenberg, G., & Kaipainen, M. (2014). Political campaigning 2.0: The influence of online news and social networking sites on attitudes and behavior. *eJournal of eDemocracy and Open Government*, 6(3), pp. 231-247.

ARTICLE 4

Faraon, M., Atashi, S., Kaipainen, M., & Gustafsson, N. (2011). Using circumventing media to counteract authoritarian regimes. In G. Bradley, D. Whitehouse, & G. Singh (Eds.), *IADIS International Conference on ICT, Society and Human Beings 2011* (pp. 251-254). Rome: IADIS Press.

ARTICLE 5

Faraon, M. (2018). Concept-driven design for democracy: Advancing co-creative media to support citizen participation and democratic engagement. *eJournal of eDemocracy and Open Government* (accepted).

All articles are available online as open access.

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Abbreviations

ANT	Actor-Network Theory
ARPANET	Advanced Research Projects Agency Network
BBS	Bulletin Board System
CSE	Cognitive Systems Engineering
CWA	Cognitive Work Analysis
ECF	European Cultural Foundation
HCI	Human-Computer Interaction
IAT	Implicit Association Test
ICT	Information- and Communication Technology
ISP	Internet Service Provider
OPP	Obligatory Passage Point
SCOT	Social Construction of Technology
SSM	Soft Systems Methodology
STSD	Socio-Technical Systems Design
STs	Socio-Technical Systems

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1. Introduction

Media constitute an important driver of democracy, by its virtue of allowing citizens to form communities and empowering them to create, disseminate, and consume information to raise and amplify their voices within democratic processes. In particular, the Internet has given individuals the opportunity to integrate, interact, network and participate within wider communities for democratic purposes (Naughton, 2012). It has been argued that "the widespread use of the Internet for social networking, blogging, video-sharing, and tweeting has an elective affinity with participatory democracy" (Loader & Mercea, 2012, p. x). Such applications, popularly referred to as social media, have not only been successfully used by political candidates to rally crowds in political campaigns, but they have also shown their usefulness in large-scale mobilization of crowds behind political issues (Castells, Caraca, & Cardoso, 2012; Mason, 2012). The mentioned mobilization has been demonstrated by movements in the United Kingdom (i.e., London riots), the Indignados in Spain, Tahrir Square in Egypt, the Sunflower in Taiwan, Occupy Wall Street in New York, and the subsequent global Occupy Together. While these media have broadened the means to exercise democratic engagement in forms approaching participatory democracy, the technical prerequisites exist to go beyond reactive mobilization as well as standard uses of social media (e.g., social networking, entertainment) towards proactive and co-creative democratic engagement. Such include, but is not limited to, participatory activities for democratic purposes (Erikson & Vogt, 2013; Faraon, Villavicencio, Ramberg, & Kaipainen, 2013; Paulin, 2014).

Moreover, acting together and communicating via networks (e.g., studying, working, coding), independently of geographical location or time, have become common practices among citizens. This has enabled the co-creation of solutions based on the collective contributions from everyone involved (Malone, Laubacher, & Dellarocas, 2010). Examples of existing bottom-up processes and co-creation applied in democratic contexts include the Icelandic constitution (Fillmore-Patrick, 2013), participatory budgeting for the municipality of Porto Alegre in Brazil (Baiocchi, 2005), and a European Cultural Foundation (ECF) initiative entitled Build the City, which aims to tackle urban challenges (Cremer & Mullenger, 2016).

In order to facilitate and further support both bottom-up processes and co-creation, this thesis examines media aiming at democratic engagement,

which will be referred to here as *co-creative media*. The current thesis aims to contribute to participatory democracy by *theoretically anchoring* and *conceptualizing* co-creative media. This work presents a concept of co-creative media that aims to facilitate and support the democratic engagement of citizens in participatory and co-creative processes.

This concept originates from the idea of facilitating citizen participation in bottom-up processes, as presented in the first article in this thesis (Faraon et al., 2013). The idea of co-creative media is built around the prefix of "co-," which refers to the notion of acting together. In the context of this thesis, co-creative media are defined as: *socio-technical systems that integrate and adapt existing information- and communication technologies (ICTs) with the aim of facilitating democratic engagement in terms of proactive, collective contributions, and consensus-seeking towards common interests.*

Following the methodological recommendations of Stolterman and Wiberg (2010), the concept of co-creative media has been further elaborated through a concept-driven design process. Research conducted and reported in the appended articles has identified and investigated questions that have generated results informing the concept. This concept has been guided by the theoretical framework of actor-network theory (ANT) (Lea, O'Shea, & Fung, 1995; Rossi, 2010), informed by bottom-up processes of participation (Finger, 1994; Panda, 2007), and is built on an analysis of existing socio-technical systems for democratic engagement (Faraon, 2018).

ANT has contributed with concepts and characteristics that have furthered and theoretically underpinned the concept of co-creative media, showing, for instance, that the context of engagement varies, its content is evaluated and reconsidered through negotiation, and that users and technological artifacts are embedded in a situated process of co-evolution and co-production. The concept has also been informed by bottom-up processes of participation, which refer to "community participation, grassroots movements and local decision-making" (Finger, 1994, p. 32). Top-down processes of representation, on the other hand, can broadly be characterized as procedures in which "a political elite devises a policy that is then implemented through a strict, sequential, and stable chain of command via bureaucrats and service providers" (Donovan, 2007, p. 971). Finally, the concept was built on an analysis of existing socio-technical systems for democratic engagement, identifying a set of criteria that the concept of co-creative media aims to fulfill in order to facilitate and support participatory, proactive, and co-creative possibilities for citizens (Faraon, 2018).

In the following, the scope and the research objective of the thesis will be introduced. At the end of the chapter, an overview of the thesis will be presented by describing its structure.

1.1 Scope and research objective

The scope of this thesis covers what could be broadly referred to as the study of information society, which comprises both theory building within computer and systems sciences and the practical and theoretical domain applications that are dependent on various ICTs. Within this field, the thesis is primarily associated with the area of media technology. Given the scope and the definition of co-creative media, the two areas of investigation on which the current thesis will focus are technology and democracy. The research objective of this thesis is to *theoretically anchor* and *conceptualize* co-creative media within these areas. At the core of the thesis is the *idea* of co-creative media, as covered by the union of the two areas of investigation and each of the appended articles, see Figure 1.1.

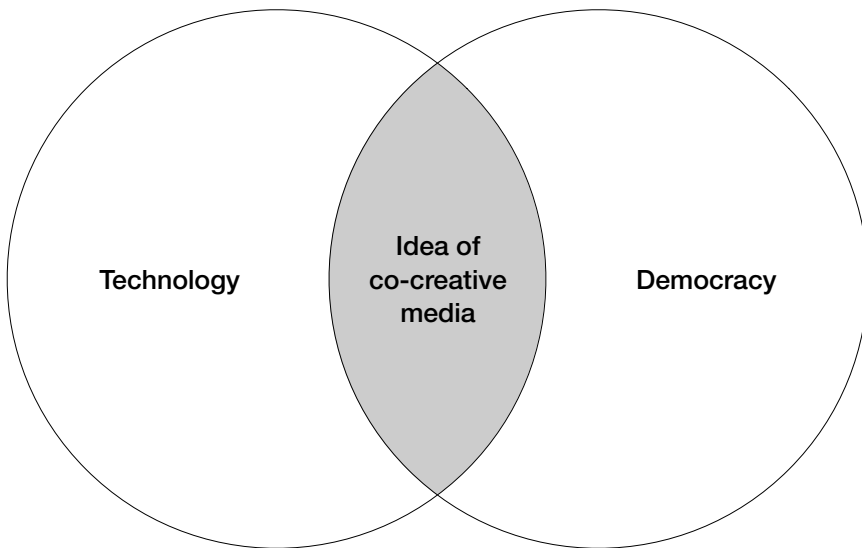


Figure 1.1: The core and scope of this thesis is the *idea* of co-creative media, which is described and elaborated in the first article (Faraon et al., 2013).

Based on the scope and research objective of this thesis and the definition of co-creative media, the research question considered in this work is: *How can co-creative media be theoretically anchored and conceptualized in order to facilitate and support citizen engagement within democratic processes?* This research question is addressed by adopting a methodological approach put forward by Stolterman and Wiberg (2010) called concept-driven design research; this is described in Chapter 3, and includes a process involving three steps (Stolterman & Wiberg, 2010, p. 98).

The *first* step is to *theoretically/conceptually anchor* the concept of co-creative media, since "a good concept design is both conceptually and historically grounded, bearing signs of intended theoretical considerations" (Stolterman & Wiberg, 2010, p. 95). The *second* step is to further conceptual and theoretical explorations through hands-on design and the development of artifacts. The *third* step is the final design, which is optimized in relation to a specific idea, concept, or theory. This process was not perfectly linear, since the theoretical anchoring of the concept has been a process that was initiated early on in the work of the thesis, when the initial concept was proposed, and was further elaborated through theoretical and empirical investigations.

The point of departure in concept-driven design research is theoretical/conceptual, and two orienting questions were therefore formulated in order to guide and determine these considerations: (1) which theoretical characteristics and applications of digital technology could further the concept of co-creative media; and (2) which theoretical perspectives of democracy could inform the concept of co-creative media? The theoretical background, described in Chapter 2, was informed and further explored using these two questions.

1.1.1 Delimitations

Certain aspects of the areas of investigation, i.e., technology and democracy, fall outside the scope of the current thesis and have not been examined. Following Stolterman and Wiberg's (2010) concept-driven design research approach, no technical systems were implemented; instead, these were conceptualized from a theoretical point of view and were informed by empirical studies, resulting in the concept of co-creative media described in Chapter 4. In addition, this thesis does not cover the technical aspects of security and privacy issues related to co-creative media.

1.1.2 Target audience

The target audience for this thesis includes researchers, teachers, students, designers, practitioners, political representatives, civil servants, and citizens who are interested in the potential of co-creative media and want to contribute to participatory forms of democracy, beyond the customary use of social media.

1.2 Definitions

The content of this thesis and the studies conducted here apply key concept related to co-creative media. In the following, each of these concepts is defined

with regard to how they are used in the current thesis.

- *Artifact*. An artificial object, as opposed to something that occurs naturally, which is created or modified by human craftsmanship (Gregor & Jones, 2007).
- *Attitudes*. An explicit or implicit disposition of favor or disfavor towards a political candidate (Allport, 1935; Kahle & Valette-Florence, 2012).
- *Censorship*. The active monitoring by governments and regulatory authorities of online traffic and the practices of Internet filtering, making websites inaccessible, and imposing restrictions that block specific online content and the free flow of information (Dutton, Dopatka, Law, & Nash, 2011).
- *Circumvention media*. Technical solutions for robust media that secure information and network communications under conditions of censorship (Faraon, Atashi, Kaipainen, & Gustafsson, 2011).
- *Co-creative media*. Socio-technical systems that integrate and adapt existing information- and communication technologies (ICTs) with the aim of facilitating democratic engagement in terms of proactive, collective contributions, and consensus-seeking towards common interests (Faraon et al., 2013).
- *Concept*. An abstract or generic idea, notion or object of thought formed by mental representations and related observations (Blackstone, 2012; Margolis & Laurence, 2011). In the context of concept-driven design research, a concept carries signs of intended theoretical considerations (Stolterman & Wiberg, 2010).
- *Concept-driven design research*. An approach to interaction design research, which has a specific focus on both theoretical advancements and futuristic use scenarios (Stolterman & Wiberg, 2010).
- *Deliberation*. The act or process whereby citizens and their representatives deliberate about public problems and solutions, under conditions that are conducive to reasoned reflection, and reframe their interests and perspectives in the light of a joint search for common interests and mutually acceptable solutions (Bohman & Rehg, 1997; Gutmann & Thompson, 2002; Network, 2015).
- *Impression formation*. The process by which individuals perceive, organize, and ultimately integrate information to form unified and coherent situated impressions of others (Moore, 2006).

- *Information- and communication technology (ICT)*. Technology, such as hardware, networks, systems, and software, which facilitates the exchange of information between people and machines (Breidne, 2005).
- *Internet voting*. Remote electronic voting via the Internet, carried out under the sole influence of the voter. This procedure is not physically supervised by any governmental representatives or restricted to a specific location (Buchsbaum, 2004).
- *Mobilization*. A process in which the masses are gathered for involvement in common interests and goals within democratic issues (Bealey, 1999).
- *Social media*. Internet-based applications built on the ideological and technological foundations of Web 2.0, which allow for the creation and exchange of user-generated content (Kaplan & Haenlein, 2010).
- *Socio-technical systems (STSs)*. Systems that involve and emphasize the match and complex interaction between humans, social needs, and technology, based on bottom-up processes (Baxter & Sommerville, 2010; Emery & Trist, 1960; Taveira & Smith, 2012). Existing examples include Facebook, Twitter, and online news outlets that integrate social characteristics (e.g., commenting, sharing, liking).
- *Voting behavior*. A form of political behavior or action that is influenced by factors such as social class, geography, age, issue voting, emotions, and media, and which describes how individuals tend to vote during elections, on political candidates, or on issues (Brader, 2006).

1.3 Publications

With the support of the concept-driven design research approach, the process of the current work can be described as an evolution, departing from the mere idea of co-creative media and progressing towards the elaborated concept of co-creative media. The completed work of this thesis is the *theoretically* and *empirically* grounded concept of co-creative media presented in Chapter 4. In the following, each of the five appended articles will be summarized.

Article 1

Faraon, M., Villavicencio, V., Ramberg, R., & Kaipainen, M. (2013). From mobilization to consensus: Innovating cross-media services to organize crowds into collaborative communities. In P. Parycek & N. Edelman (Eds.), *CeDEM13: Conference for E-Democracy and Open Government* (pp. 215-227). Krems: Edition Donau-Universität Krems.

This article proposes a concept of co-creative media that is scalable from everyday democratic practices to massive political movements. The problem is that while social media appear to have contributed to the mobilization of crowds, as illustrated by various protests (e.g., the London riots in the United Kingdom, the Indignados in Spain, Occupy Wall Street in New York), the prerequisites already exist for the design of technology that facilitates proactive and co-creative citizenship beyond mobilization. This article approaches the mentioned problem from the perspective of media technology research. The author's contribution to this article was to review related work, partially propose a concept design for co-creative media, and lead the writing process of the final publication.

Article 2

Faraon, M., Stenberg, G., Budurushi, J., & Kaipainen, M. (2015). Positive but skeptical: A study of attitudes towards Internet voting in Sweden. In P. Parycek, M. Sachs & M. M. Skoric (Eds.), *CeDEM14-Asia: Conference for E-Democracy and Open Government* (pp. 191-205). Münster: Edition Donau-Universität Krems.

This article reports on a case study concerning the potential contribution of Internet voting to participation in democratic processes. The problem examined in this article was a determination of the disposition of Swedish voters towards Internet voting and of the role that security and demographic variables (e.g., age, gender, education, employment, and political background) play when engaging with Internet voting. The primary motivation for this article was to obtain a better understanding of whether Internet voting could be used as a form of democratic engagement and of the role of demographic variables and security concerns within Internet voting. A secondary motivation was the lack of independent scientific data examining the attitudes of Swedish voters towards Internet voting and its potential introduction to the Swedish general election of 2018 (Ström, SOU 2013:24). The article approaches the motivations described above from the perspectives of technology, democracy, and social psychology research using a quantitative methodology. A large-scale questionnaire was used, and a total of 5683 participants completed a set of questions regarding participation and security-related aspects of Internet voting. The author's contribution to this article was to review related work, develop the questionnaire, collect the data, partially analyze the results, and lead the writing process.

Article 3

Faraon, M., Stenberg, G., & Kaipainen, M. (2014). Political campaigning 2.0: The influence of online news and social networking sites on attitudes and behavior. *eJournal of eDemocracy and Open Government*, 6(3), pp. 231-247.

This article examines the differences in the influence of content between online news platforms (e.g., the New York Times) and social networking sites (e.g., Facebook, Twitter) on explicit and implicit attitudes and voting behavior. Much of the prior research on this topic has also been limited in scope, focusing only on explicit attitudes that are susceptible to social desirability bias. This article approaches the problem from the perspective of social psychology research using a quantitative methodology. An experiment was conducted to assess the differences in the influence of content between online news platforms and social networking sites on participants' explicit and implicit attitudes and voting behavior using a self-report questionnaire and the Implicit Association Test (IAT). The author's contribution to this article was to review related work, construct and distribute the experiment for online participation, collect the data, partially analyze the results, and lead the writing process.

Article 4

Faraon, M., Atashi, S., Kaipainen, M., & Gustafsson, N. (2011). Using circumventing media to counteract authoritarian regimes. In G. Bradley, D. Whitehouse, & G. Singh (Eds.), *IADIS International Conference on ICT, Society and Human Beings 2011* (pp. 251-254). Rome: IADIS Press.

This article examines the technical aspects of existing developments in securing network communication under conditions of censorship. The problem examined in this article was that of how the flow of information can be made available, under conditions where access to the Internet or mobile networks is unavailable or filtering mechanisms are being used. The article approaches this problem from the perspective of media technology research, and contributes with an integrative literature review and a discussion of circumventing technology that could be used to secure network communication for co-creative media under conditions of censorship. The author's contribution to this article was to review related work and lead the writing process.

Article 5

Faraon, M. (2018). Concept-driven design for democracy: Advancing co-creative media to support citizen participation and democratic engagement. *eJournal of eDemocracy and Open Government* (accepted).

This article further elaborates the concept of co-creative media beyond that presented in the first article. This elaborated concept builds on a concept-driven design research approach and adopts theoretical resources from the framework of ANT, identifying criteria in an analysis of existing socio-technical systems for democratic engagement, and building on the results from the previous four research articles. The main contribution of this article is a theoretically and empirically grounded concept of co-creative media, which aims to facilitate and support the democratic engagement of citizens in participatory and co-creative processes. This article was independently written and has been accepted for publication.

1.4 Research contributions

The contributions of this thesis can be summarized in four parts: the concept of co-creative media, a methodological contribution, results from articles, and design guidelines.

The concept of co-creative media. The overall contribution of this thesis is the *theoretically* and *empirically* grounded concept of co-creative media. Each of the five articles was written as an integral part of the concept-driven design research approach.

Methodological contribution. Using the concept-driven design research approach proposed by Stolterman and Wiberg (2010), this thesis contributes to the discussion of how empirical research and external design critique in the form of theoretical and empirical studies can *inform* and *further* a concept design, rather than by applying more traditional user-centric methods such as usability evaluation.

Research results. The *first* article proposes the idea of co-creative media in the form of a concept design. This concept served as a starting point for the development of co-creative media that can be used by relevant stakeholders for discussing, designing, and reflecting on participatory tools (Faraon et al., 2013). The *second* article explored the use of Internet voting and how this may be useful in supporting democratic engagement and aiding in the mobilization of crowds behind political issues and campaigns (Faraon, Stenberg, Budurushi, & Kaipainen, 2015). The study contributed empirical insights concerning the potential use of Internet voting in democratic contexts, and the results indicated that although the majority of participants were positive in their attitudes towards using Internet voting for participation in democratic processes, they were skeptical about the possibility of solving the related security issues. The *third* article investigated the influence of on-line content conveyed by online news platforms versus social networking sites on explicit and implicit attitudes and voting behavior (Faraon, Stenberg, &

Kaipainen, 2014). The article contributes empirically based knowledge concerning the influence of valenced information emanating from different online channels on attitudes and voting behavior. More specifically, the results showed that online news had a significant influence on both explicit and implicit attitudes, while social networking sites did not. In terms of the influence of positive or negative information from online news or social networking sites, the data suggest that unfavorable information, independent of media and when mediated through explicit attitudes, increases the chance of switching sides. The *fourth* article reviewed research on circumvention media, and contributed new knowledge on how different technologies could be repurposed to develop novel cross-media services to support the free flow of information under conditions of censorship (Faraon et al., 2011). The *fifth* article further elaborated this concept, based partially on the results from previous articles, which resulted in the theoretically and empirically grounded concept of co-creative media (Faraon, 2018). This concept contributes an understanding of how existing social, collaborative, and decision-making tools could be adapted, redesigned, and integrated in order to promote and facilitate democratic engagement by citizens.

Design guidelines. Based on the research conducted above, four design guidelines were formulated to guide the design of co-creative media for democratic engagement. These were motivated by the results reported in the appended articles, and were formulated as follows: *support the mobilization of crowds, facilitate Internet voting for continuous participation, integrate online content, and support open source for democratic engagement.*

1.5 Thesis structure

This thesis is a compilation of five articles, and is composed of six chapters and five research articles, see Figure 1.2 for an overview. The *first* chapter gives an introduction to the thesis regarding its scope, research objective, and thematic orienting questions. The *second* chapter presents the background, including the following sections: an overview of the theoretical perspectives of technology and democracy, top-down and bottom-up processes within democracy, and media technology as a component of democracy. This chapter builds on and further elaborates the thematic questions discussed in Chapter 1. The *third* chapter describes the research questions and the methodological approach used here, namely the concept-driven design research of Stolterman and Wiberg (2010). The *fourth* chapter presents the results of the research articles attached to this thesis. The results from the research reported in these articles were fed forward into the concept-driven research process as theoretical and empirical insights, and these were elaborated into the concept

of co-creative media. The chapter concludes by proposing four design guidelines that can guide the design of co-creative media for democratic engagement. The *fifth* chapter presents a discussion of the research findings, and the *sixth* chapter identifies future work and concludes the thesis. The five articles are appended at the end of this thesis.

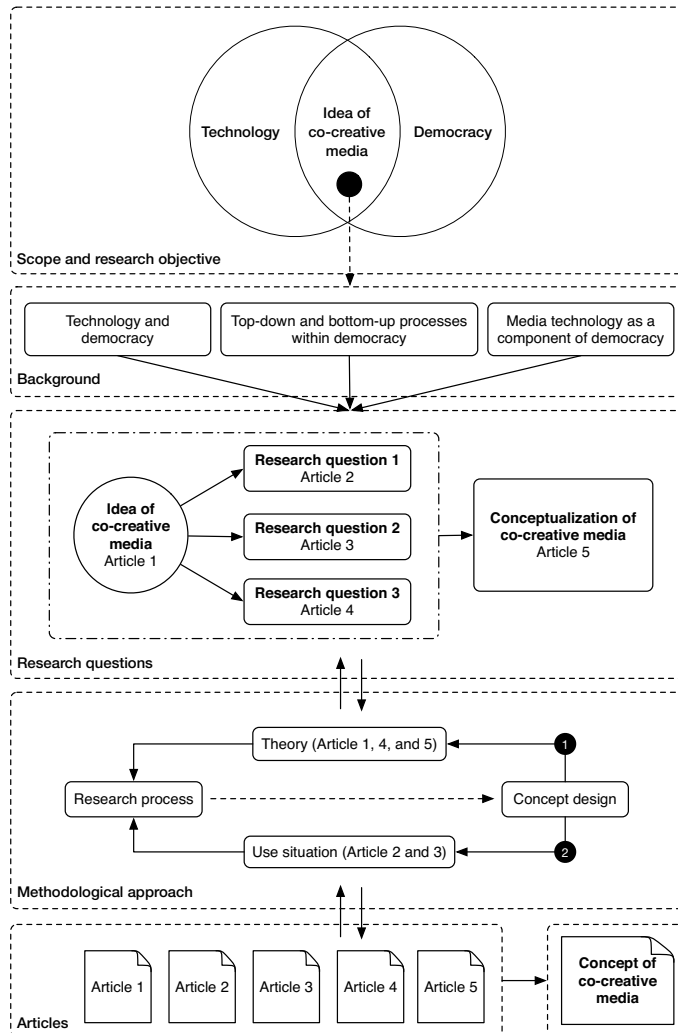


Figure 1.2: Overview of the thesis showing the relationships between the scope and research objective, background, research questions, methodological approach, and five appended articles. These articles were written as an integral part of the concept-driven design research approach of Stolterman and Wiberg (2010). The result of this thesis is a theoretically and empirically grounded concept of co-creative media.

2. Background

In the previous chapter, the scope and research objective were described. In the current chapter, the theoretical considerations that have contributed to a theoretical anchoring and underpinning of the concept of co-creative media will be presented. Guided by the thematic and orienting questions, the concept of co-creative media is positioned by examining the relationship between two areas of investigation: *technology* and *democracy*. An elaboration is also presented of the two main traditional distinctions within science and technology studies, actor-network theory (ANT) and the social construction of technology (SCOT), in order to provide a theoretical guide and underpinning for the concept. Since the concept aims to facilitate and support new methods of democratic engagement, the current chapter distinguishes between two main processes related to democracy, namely top-down and bottom-up, when examining and positioning the concept. Finally, because co-creative media contribute to STSs for democratic engagement, a theoretical overview and analysis will also be offered of STSs in democratic contexts, see Figure 2.1 for an overview.

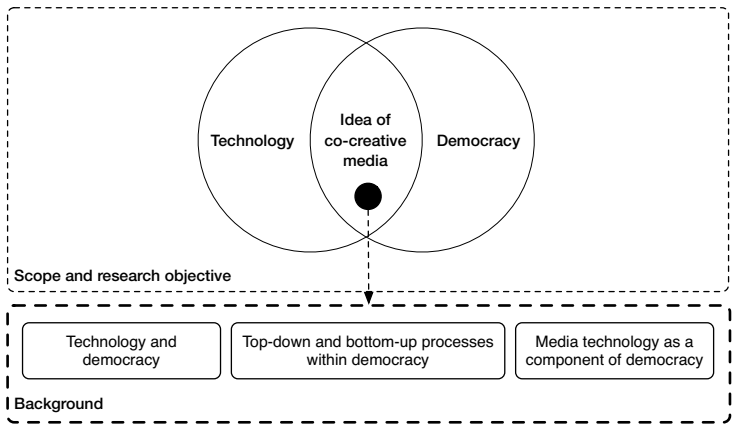


Figure 2.1: The section marked with bold-dashed lines illustrates the areas of investigation: technology and democracy, top-down and bottom-up processes within democracy, and media technology as a component of democracy. The areas of investigation elaborate on the two thematic questions presented in the first chapter.

2.1 Technology and democracy

Technology plays an important role in contemporary democratic societies. The word technology is derived from two Greek words, transliterated as *techne* (craftsmanship) and *logos* (thought), this representing the craftsmanship of thought. Technology has been defined in numerous ways, each with a different focus. For instance, Solomon (2000, p. 5) focuses on knowledge, and defines technology as "the systematic application of *all* sources of organized knowledge (e.g., literature, science, the arts), suggesting that art, craft, and science all have roles to play in technology application". Another definition has been offered by Mesthene (1990), namely that technology can be perceived as "the organization of knowledge for practical purposes". Other scholars, such as Hughes (2004) and Pitt (2000), provide human-centered definitions of technology. While the former defines technology as "a creativity process involving human ingenuity" (Hughes, 2004, p. 3), the latter defines it as "the activity of humans and their deliberate use of tools" (Pitt, 2000, p. 11). Adapting Mitcham's (1994, p. 153) definition of technology as "the making and using of artifacts", Pearson and Young (2002, p. 3) expand the definition of technology as an "entire system of people and organizations, knowledge, processes, and devices that go into creating and operating technological artifacts, as well as the artifacts themselves". Overall, the main thrust of the definitions above, with which the current thesis is aligned, is that technology is "a means for achieving human practical ends, i.e., that technology is initially a human instrument for achieving certain goals" (Gomez, 2010, p. 48).

Democracy, in turn, originates from the Greek word *dēmokratía*, formed from *demos* (people) and *kratos* (power), meaning that the people hold power (Morris, Raaflaub, & Castriota, 1998, p. 34). Democracy has been defined in a variety of ways. One definition that has been widely used focuses on electoral institutions and democratic governance (Collier & Levitsky, 1997; Dahl, 1971). Other definitions focus on free elections and multiparty competition (Fuchs & Roller, 2006), freedom, liberty, and equality (Diamond, 1999), and social rights and needs (McIntosh & Abele, 1993). The most basic elements of contemporary democracy, and the associated principles that underlie them and on which this thesis relies, have been summarized by Sorensen (1993, p. 13) as follows:

- Meaningful and extensive *competition* among individuals and organized groups (especially political parties) for all effective positions of government power, at regular intervals and excluding the use of force.

- A highly inclusive level of *political participation* in the selection of leaders and policies, at least through regular and fair elections, such that no major adult group is excluded.
- A level of *civil and political liberties*—freedom of expression, freedom of the press, freedom to form and join organizations—that is sufficient to ensure the integrity of political competition and participation.

The previous definitions share similarities with that of Dalton, Shin and Jou (2007, pp. 143-144), who define democracy as "institutions and procedures of democratic governance [through which] citizens can participate in free and fair elections, [emphasizing] freedom, liberty, social rights, and social services, providing for those in need, and ensuring the general welfare of others".

The concept of co-creative media aims to facilitate democratic engagement through the interaction between people and technology. This perspective is often referred to as involving STSs and will be examined in Section 2.3.2. Moreover, the term 'technologies' is used in this thesis to refer to ICTs, which are defined as hardware, networks, systems, and software that facilitate the exchange of information between different people and machines (Braidne, 2005). This concept recognizes the importance of interaction within STSs between people, technologies, and contexts. In the following, the relationship between technology and democracy will be further elaborated in relation to the concept of co-creative media.

2.1.1 Relationship between technology and democracy

Nahuis and van Lente (2008) have categorized various traditions concerning the relationship between technology and democracy. For the sake of clarity, these traditions have been divided into five groups: *intentionalist*, *proceduralist*, *ANT*, *interpretivist*, and *performativist*. In the following, this taxonomy will be examined and discussed in relation to the concept of co-creative media. Following this, and building on the rationale that social media have shown their usefulness in political campaigns, collaboration in democratic processes, and mobilization of crowds behind political issues (Castells et al., 2012; Mason, 2012), a meta-analysis by Boulianne (2009) will be discussed in terms of the effects that technologies such as the Internet have on civic and political participation. Similarly, the use and characteristics of social media, in particular for democratic purposes, will be examined as a motivation for their adoption in the concept of co-creative media.

The first perspective, the *intentionalist*, was initially discussed by Calder (1969), who effectively developed the idea that technology is neither innocent nor neutral in terms of its social consequences. Instead, these consequences

are considered to be directed by privileged technological actors; hence the label "intentionalist". This author pointed out that society is constantly being changed by technology, and rather than fearing these often dramatic changes, the focus should be on understanding the underlying mechanisms that are responsible for them. Furthermore, it was argued by Boyle, Elliot, and Roy (1977) that the intentionalist perspective draws attention to the hierarchy of power and social control of the technology that developers manifest in design processes and realize in artifacts.

While the intentionalist perspective considers *criteria* for design, the *proceduralist* perspective focuses on *procedures* for involvement. According to the proceduralist perspective, democracy is defined in terms of participation, deliberation, and consensus-seeking (Bijker, 1999; Hamlett, 2003). Bijker (1999) argues that human action shapes technology, and that this occurs when a heterogeneous group of actors engages in complex interactions in which different interests are brought forward, normative beliefs are negotiated, and power relations are constructed. The assumptions are that artifacts are interpreted flexibly and are attributed distinctive meanings by different social groups (Pinch & Bijker, 1987). Based on these assumptions, it becomes difficult to predict which meanings will come to dominate others. Closure arises when preferences, interests, and solutions are shared, mutually listened to, and agreed by stakeholders through an aggregation process (Hamlett, 2003); this is assumed to lead to solutions that are acceptable by everyone who is mutually connected by the democratic principles of accountability (for further reading, see Castiglione, 2007), representativeness (for an overview of representation, see Anderson, 2007), and influence (see further Gabriel, 2007).

The next perspective, *ANT*, aims to explain how material (things) and semiotics (concepts) *act* as a whole by exploring socio-technical processes, relational ties, and new divisions of power within networks (Latour, 2004). A significant factor in forming networks is *translation*, that is, how to enroll others into a network and act on their behalf by translating one's own interests, purposes, and definitions into those of others (Callon & Latour, 1981). Technology and politics are, as (Latour, 1991) argues, the outcomes of a struggle between competing forces and networks consisting of *actors*, namely both humans and non-humans (machines, texts, and hybrids). Within these networks, ANT requires actors to perform constantly in order to keep the network flowing. While the intentionalist perspective views technological artifacts as the realization of developers' values, the actor-network perspective sees the politics of artifacts as an essential component in the competition of networks.

A similar approach to ANT is the *interpretive* perspective. This perspective involves the addition of a discursive dimension and a call for reflexivity

(Joerges, 1999; Pfaffenberger, 1992). The guiding principle of this perspective is interpretive flexibility: artifacts, technology, and democracy are like texts, and their meaning relies on the discursive contexts. Texts are not only interpreted by readers; texts also configure them. The interpretive challenge is to "unravel the discursive conditions and circumstances by which a political/innovation process both leads to particular outcomes *and* is claimed to be democratic" (Nahuis & van Lente, 2008, p. 569). Since researchers contribute to the discourse that represents technology, it is important that they show a sense of reflexivity.

The last perspective outlined is the *performative* one. This focuses on the function of the discourse that creates legitimacy for the settings that promote the meaning of technology, democracy, and participation. The core of this perspective lies within the bias of the setting, meaning that it highlights the actions and conditions that can either enable or constrain the setting. The setting is based on a group of activities and concepts that are active and fulfill a purpose (Gomart & Hajer, 2003). The activities and concepts *do* something; they are performative. The performative perspective therefore aims to address the question "*What enables participants to act the way they do?*" rather than "*Who participates?*" (Nahuis & van Lente, 2008, p. 570).

These five groups, as suggested by Nahuis and van Lente (2008), have been useful in orientating scholars. However, they could, as Rossi (2010, p. 79) argues, "alternatively be expressed as the more traditional distinctions within Science and Technology Studies," namely ANT and SCOT. As Nahuis and van Lente (2008) themselves affirm, the *intentionalist* and the *proceduralist* perspectives draw directly from the SCOT approach, while the remaining three are more or less connected to the ANT approach. The last two perspectives, the *interpretive* and the *performative* approaches, are "amendments to the *actor-network perspective* rather than perspectives in the sense of being shared by broad research communities" (Nahuis & van Lente, 2008, p. 573) and focus on particular aspects, that is, discursive practices and settings.

The difference between the ANT and SCOT approaches is that the former considers both technical and social determinism (i.e., technology shapes society and society shapes technology) (Latour, 2005), while the latter follows social determinism (i.e., technology emerges from the interaction of social groups) (Klein & Kleinman, 2002). Furthermore, the ANT approach, in contrast to SCOT, makes it possible to study both living and nonliving entities, which in the case of co-creative media aim to support people's use of technology within democratic processes. The ANT approach contributes with characteristics and viewpoints that theoretically guide the concept of co-creative media, which will be elaborated in the next section.

2.1.2 Actor-network theory

Actor-network theory (ANT) is usually intended to be used as a conceptual approach for examining, analyzing, and describing socio-technical systems (Figueiredo, 2008). Socio-technical systems are characterized by the interactions between *actors*; these are also referred to as actants, to overcome the human connotation of the former, and include for example humans, technology, and social entities (Damodaran, Nicholls, Henney, Land, & Farbey, 2005). In this sense, ANT could be seen as a conceptual frame for exploring *collective* socio-technical processes in heterogeneous and *relational* networks (Ritzer, 2005).

As described by Callon (1986), ANT was conceptually built on the three overarching principles of *agnosticism*, *generalized symmetry*, and *free association*. The first, *agnosticism*, proposes that any *a priori* assumptions about networks should be abandoned, whether these relate to the nature of networks (e.g., as channels for information) or causal conditions (e.g., improvements in information flow lead to a better quality of care in healthcare). ANT imposes impartiality, and as Callon (1986, p. 200) puts it: "no point of view is privileged and no interpretation is censored". Creating predefined goals diverts focus from the complex interactions that emerge and evolve in collective processes. Agnosticism suggests that such *a priori* assumptions should be abandoned in order not to hinder the understanding of the dynamic nature of *translation* trajectories. The concept of a trajectory could be defined in two ways, namely: "(1) the course of any experienced phenomenon as it evolves over time (an engineering project, a chronic illness, dying, a social revolution, or national problems attending mass or 'uncontrollable' immigration) and (2) the actions and interactions contributing to its evolution. That is, phenomena do not just automatically unfold nor are they straightforwardly determined by social, economic, political, cultural, or other circumstances; rather, they are in part shaped by the interactions of concerned actors" (Strauss, 2010, pp. 53-54).

Translation is necessary to create stability in a network, since at the outset, actants have diverse and non-aligned interests (Monteiro, 2000). Translation could in this sense be perceived as a process in which new relationships are created between actors to form an actor-network. As Monteiro (2000, p. 77) describes it: "In ANT terms, design is translation: users' and others' interests may, according to typical ideal models, be translated into specific 'needs'; the specific needs are further translated into more general and unified needs, so that these needs can be translated into one and the same solution. When the solution (system) is running, it will be adopted by the users who translated the system into the context of their specific work tasks and situations". Translation

involves the four phases of *problematization*, *interessement*, *enrolment*, and *mobilization* (Callon, 1986, p. 196).

The first phase, *problematization*, is concerned with describing the arrangement of relationships or alliances between actants and in this way determining the identities and goals of those involved. In terms of the concept of co-creative media, citizens are offered the possibility of organizing and coordinating with others by means of cooperation to determine shared goals, via social media and collaborative applications. This phase is recursive in nature and may take place more than once, given the dynamic practices that constitute *problematization* (Broer, Nieboer, & Bal, 2010).

The second, *interessement*, focuses on including and excluding actants (e.g., citizens, technology, devices) from a network by negotiating the terms or roles of their involvement (Papadopoulos & Wongkaew, 2008). Within the concept of co-creative media, this phase is perceived as a path that leads to the formation of a network, in order to achieve common goals with those involved. This phase supports the structure of the network and strengthens the associations between the actants included, for example in the form of a community.

The third phase, that of *enrolment*, could be described as a process that involves a set of "negotiations, trials of strength and tricks that accompany the *interessements* and enable them to succeed" through the *alignment* of their interests (Callon, 1986, p. 212). Upon successful negotiations between actants, an *inscription* (e.g., media, procedures, routines, rules, work plans) emerges to prescribe a framework for possible action (Akrich, 1992). In the context of co-creative media, this corresponds to the collaborative and consensus-seeking processes that take place in order to reach agreement among stakeholders. This could be achieved through the use of collaborative applications and a process of negotiation.

The fourth, *mobilization*, refers to one or more actant(s) enrolling others into a network and representing them by translating their own interests, purposes, and definitions into those of others. Callon's idea of mobilization has been articulated differently by Stanforth (2007, p. 40), who describes mobilization as a process in which "the principal actors borrow the force of their passive agent allies and turn themselves into their representatives or spokespeople". This process makes them, in ANT terminology, an *obligatory passage point (OPP)* through which all interactions must pass. The concept of mobilization, as defined by Callon (1986) and subsequently articulated differently by Stanforth (2007), asserts a view that is related to representative democracy and points in the direction of a governance approach. The concept of co-creative media builds upon a participatory, bottom-up approach and, in contrast to previous considerations, defines mobilization as follows: *a*

process by which the masses are gathered for involvement towards common interests and goals in issues or initiatives, without assuming a leader. Examples of such processes include various protests, as described earlier.

The second principle, *generalized symmetry*, aims to explain the conflicting viewpoints of different actants, whether these are social, technical, material, or immaterial. They are treated equally and are described using the same analytic framework and vocabulary Callon (1986). By engaging in processes such as collaboration and consensus-seeking within co-creative media, the involved stakeholders have the opportunity to put forward their views, interests, and needs in negotiations with each other, with the aim of reaching joint agreements that represent the values of all involved. ANT also attributes equal agency to both humans and non-human actants. This attribution may be criticized because non-human actants lack intention, which forms a distinction between human beings and inanimate objects; however, as McLuhan (1966, p. 19) postulates, technology can be perceived as an extension of humanity in which "we have already extended our senses and our nerves by the various media". McLuhan advances the notion that technological devices are intertwined within people's daily lives, enabling them to express their beliefs, values, and attitudes across time and space. Thus, non-human actants, for instance, digital technology such as computers, the Internet, and smartphones, can be said to have intention, since individuals use them as an extension of themselves to express their intentions. Further, as Mol (2010) has suggested, a network of associations may not emerge without non-human actants, which consequently could lead to things not being enacted and produced.

The third, *free association*, calls for the elimination of all *a priori* distinctions between social and technical phenomena (Callon, 1986), since these are the effects of networked activity (Ritzer, 2005). They cannot be divided *a priori*, and thus there cannot be a boundary between them; they may be separated, but only as a result, outcome, or effect (Law, 1999). In the same vein, Callon (1999, p. 183) stated that "ANT was developed to analyze situations in which it is difficult to separate human and non-humans, and in which actors have variable forms and competencies". An example of this principle is day-to-day life, in which people are influenced by several factors, whether social, technical, political, and historical. For instance, the driver of a vehicle is influenced by various traffic regulations, prior driving experience, road conditions, and the characteristics of the vehicle (Monteiro, 2000). To acquire an understanding of driving a car, all of these factors need to be considered as a composition. Similarly, in the context of co-creative media, both human and non-human actants including the hardware, software, and associated communication technologies, must be jointly considered, as they will influence the implementation, evaluation, and outcome.

The ANT approach has been explicitly highlighted by Lea et al. (1995, p. 466) as being useful for researchers studying actors in networked organizations by following their "interactions as they construct and elaborate the technology, the context, themselves, and each other". ANT recognizes and takes into consideration the fact that context varies and is continuously being evaluated and re-evaluated through negotiations between the actors involved (Mol, 2010). ANT theoretically prescribes the concept of co-creative media, in which the context is characterized by democratic engagement. This context is revised through negotiations in the form of consensus-seeking, and is based on the needs, interests, and wishes of a community, which in the current work refers to a community of citizens engaged in democratic processes. Further, within ANT, actors are open to reconsidering content and accepting new ideas (Tatnall & Gilding, 1999); in the present case, this refers to the processes of collaboration and consensus-seeking in a community, for example, when citizens draft a proposal or collaborate with others on an initiative. ANT also considers "users and technological artifacts as embedded in a situated process of co-evolution and co-production" (Rossi, 2010, p. 74). The concept of co-creative media builds on this consideration by facilitating collaboration and collective contributions towards common pursuits and interests in democratic contexts.

In summary, the ANT approach, unlike the SCOT approach, provides structure and explanatory value to the concept of co-creative media. ANT contributes with principles, concepts, views, and characteristics that theoretically underpin and prescribe the aims of the concept of co-creative media. In the following, a further theoretical distinction will be made between two processes related to democratic engagement, namely top-down and bottom-up.

2.2 Processes within democracy

This section distinguishes the theoretical underpinnings of two processes related to democracy, namely the ones directed top-down and bottom-up. The top-down process is grounded in conventional conceptions of representative democracy in which decision-making is centralized (Pülzl & Treib, 2006). The bottom-up process is often referred to as participatory democracy, and is rooted in support for grassroots activism, decentralization of decision-making, and citizen participation in the processes of empowerment, learning, and action (Bradley & Schneider, 2004; Panda, 2007). The top-down and the bottom-up processes can be summarized as shown in Table 2.1.

	Top-down processes	Bottom-up processes
Underlying model	Representative democracy	Participatory democracy
Power	Power flows top-down: elected representatives and institutions monopolize the right to make decisions.	Power flows bottom-up: citizens and representatives have an equal right to make decisions.
Democratic engagement	From political decisions to administrative executions.	From civil servants to networks of communities.
Role of citizens	Elector, passive citizen, outsider to politics.	Elector, voter, and occasional representative.
Role of representatives	Active citizen and decision-maker. Governing on behalf of voters.	Active citizen and decision-maker. Governing together with other citizens.
Participation	Doing for and to citizens. Top-down control, hierarchical guidance.	Acting with others. Voluntary and self-motivated. Proactive initiatives and decentralized problem-solving.

Table 2.1: Comparison between top-down and bottom-up processes, inspired by Bradley and Schneider (2004, p. 8), Panda (2007, p. 261), and Buechi (2012).

Top-down processes of representation will be discussed in the next section, and bottom-up processes of participation in the subsequent section.

2.2.1 Top-down processes of representation

Top-down processes can broadly be defined as those that are "characterized by a powerful, hierarchical state where a political elite devises a policy that is then implemented through a strict, sequential, and stable chain of command via bureaucrats and service providers" (Donovan, 2007, p. 971). These processes are deeply rooted in conventional conceptions of representative democracy, where elected representatives are given legitimacy through elections to make decisions on behalf of the whole citizenry (Pülzl & Treib, 2006, p. 94).

Furthermore, top-down processes can be characterized by the formation of policies and initiation of decisions at the "top" of the political system, which are then hierarchically delegated "down" and implemented in practice by lower-level actors within society. These processes are also characterized by what has been referred to as the "textbook conception of policy process"

(Nakamura, 1987, p. 142). This refers to a view in which the policy process is based on a set of stages; each stage includes a certain activity that acts as a gatekeeper before the next stage can be started, and each stage is expected to produce results that are used in the policy process. Although top-down processes in a representative democracy are praised for their advantages by their proponents, such as an efficient executive-legislative body, well-balanced decisions by various people, and practical efficiency, they also have certain limitations, for example:

- They only allow people who are contented or discontented with decisions to vote their representatives either 'up' or 'down', which remains as of today (Hirst, 2011, p. 202).
- Representatives are elected on a short-term basis, which discourages the development of long-term public policy solutions to existing issues and the interests of future generations (Crick, 2002, p. 11).
- Voters can only accept presented manifestos as a whole, and are not permitted to express preferences within these, which leads to decisions being imposed on them without their consultation (Lang & Warren, 2012, p. 293).

Other scholars argue that this division between citizens and decision-making bodies is due to the following factors (Rachel, Wainer, & Stephen, 2008, p. 113):

- Declining citizen knowledge of and interest in representative politics.
- Declining levels of trust in politicians and representative institutions.
- Declining levels of efficacy amongst citizens: the public's belief that they can influence government is falling.
- Declining levels of public identification and engagement with representative institutions, notably through electoral engagement or political activity through mainstream organizations such as political parties. This in turn erodes the overall legitimacy of representative institutions.
- Increasing participation divides: the problems of connection are exacerbated in areas of social deprivation and inequality. Hence, trust, knowledge, and engagement are falling most amongst the poorest. Additionally, many of these problems are more acute amongst younger people, raising fears of a generational switch-off from mainstream politics.

The factors raised by Rachel et al. (2008) hint of a possible shift away from representation and representative politics, towards modes of politics that are characterized by the direct engagement of concerned active citizens. By harnessing state-of-the-art media, citizens seek to make their views, anger, and discomfort known by engaging in activities such as flash protests, occupations, Facebook- and Twitter-led campaigns, boycotts, and hacking (Tormey, 2015). in 't Veld (2010, pp. 3-4) argued that representation has gradually become "the predominant mechanism by which the population at large, through elections, provides a body with a general authorization to take decisions in all public domains for a certain period of time". At the same time, the author signaled that current political frameworks appear deficient in contemporary society. According to in 't Veld (2010), this is influenced by factors that occur at three different levels: *micro*, *meso*, and *macro*.

At the *micro* level, individual values are disconnected from a body of ideological principles, which consequently leads to the impossibility of being represented by a single representative in political contexts. At the *meso* level, political parties do not follow a consistent path of developing general political strategies, but rather adopt marketing techniques to influence potential voters towards their standpoints on different issues. At the *macro* level, politics have turned into media-politics, as Castells (2009) and Dahrendorf (2002) show, where politicians utilize the mass media to "sell" personalities. This, in turn, develops a dependence between mass media and politicians, which creates a foundation that leaves room for only short-term agendas.

Furthermore, while there are bottom-up processes in top-down societies, such as "funding non-statutory groups, sending delegations to neighbourhoods/ community groups, referendums, citizen ballots" Pal (2008, p. 20), there is a recognition among scholars, with which the current thesis aligns, that bottom-up processes need to be extended by infusing representative democracy with participatory democracy (e.g., Mitlin, 2004; Pal, 2008). The concept of co-creative media aims to support bottom-up processes by means of state-of-the-art technology that is designed for democratic purposes. Bottom-up processes will be described in the next section.

2.2.2 Bottom-up processes of participation

In the context of this thesis, bottom-up processes refer to "community participation, grassroots movements and local decision-making" (Finger, 1994, p. 32). They aim to identify stakeholders (e.g., citizens, non-government organizations, local bureaucrats) that are engaged in citizen activism and democratic processes, or that are involved in policy change and delivery. In such processes, engagement is directed "upwards" to identify stakeholders and networks to be

included in the problem-solving, formulation, and implementation processes (Pülzl & Treib, 2006).

The bottom-up direction assumes that the procedure for the formulation of policy cannot be isolated from the mechanism of its implementation. Instead, these aspects should be considered as continuous and integrated (Donovan, 2007). This approach is not without challenges related to complexity, time-consumption, and the digital divide. Complexity means that when a high number of citizens are involved, decisions are usually processed more slowly since decision-making processes often become more complex and prolonged. In regard to time-consumption, issues cannot be resolved promptly if a large number of citizens need to be involved in the decision-making process. The digital divide means that inequality of access to digital technology and digital literacy could discourage a segment of citizens from engaging in online democratic processes (Avril, 2015), which would not be an inclusive and democratic process to pursue.

Furthermore, democratic engagement in bottom-up processes is directed upwards by individuals at the local level (e.g., citizens, non-government organizations, bureaucrats). Existing examples of bottom-up processes and co-creation in democratic contexts include: (1) the preparation of the Icelandic constitution (Fillmore-Patrick, 2013); (2) the participatory budgeting of the municipality of Porto Alegre in Brazil (Baiocchi, 2005); and (3) the European Cultural Foundation (ECF) initiative entitled Build the City, which aims to tackle urban challenges (Cremer & Mullenger, 2016). In what follows, these three examples will be further described in the context of democratic engagement.

Firstly, the financial crisis of 2008 sparked massive protests in the country of Iceland, and these came to be known as the Kitchenware Revolution. The outcome of Icelandic parliamentary elections of 2009 resulted in the formation of a national forum consisting of 950 people on November 6, 2010. The forum was tasked with "identifying broadly what Icelanders wanted from a new constitution, identifying those values that should form the basis of the new constitution, and providing specific recommendations to the constitutional assembly" (Fillmore-Patrick, 2013, p. 9). Due to the difficulty in generating enthusiasm for the November elections, the government prepared constitutional assembly elections for November 27, 2010, in which 25 people were elected by voters in Iceland. The constitutional assembly utilized various forms of social media (e.g., Facebook, YouTube, Twitter) and their own website (stjornlagarad.is) to engage public participation in the formation of a new constitution. Icelanders responded with enthusiasm, by posting 3000 suggestions on the Facebook page of the constitutional assembly, prompting news organizations to dub the draft constitution as "the world's first crowd-

sourced constitution." Many of these suggestions were related to core values, which were in turn discussed by the assembly, such as morality, human rights, justice, equality, democracy, transparency, and responsibility. Although the new constitution has been suspended by its opponents, who won the 2013 parliamentary election, it serves as a working example of large-scale co-creation in practice (Fillmore-Patrick, 2013).

The second example is the participatory budgeting of the Brazilian municipality of Porto Alegre, which provides valuable insights into the implications of co-creation and urban innovation. Growing income gaps and extreme disparities in quality of life posed a challenge, and to overcome this the government suggested the introduction of participatory budgeting in which a wide spectrum of citizens would formulate the budget in a collaborative way (Baiocchi, 2005). Citizens were given the opportunity to participate in and allocate budgets for investments, for example, in education and utility services. In a report by Wagle and Shah (2003, p. 3), it was concluded that between "1989 and 1996, the number of households with access to water services rose from 80% to 98%; percentage of the population served by the municipal sewage system rose from 46% to 85%; the number of children enrolled in public schools doubled".

The third and final example involves a current ECF initiative called Build the City, which aims to tackle urban challenges (Cremer & Mullenger, 2016). These challenges include creating jobs and skills in the local economy, fighting urban poverty, improving housing, the inclusion of migrants and refugees, sustainable use of land and nature-based solutions, climate adaptation, energy transition, air quality, urban mobility, digital transition, and responsible public procurement. Examples of these challenges include the Bologna Regulation in Bologna (Italy), Public Space Tools in Barcelona (Spain), and Subtopia in Botkyrka (Sweden). The Bologna Regulation is a local regulation on civic collaboration, where the municipal government works together with citizens. The project applied a 30-page regulatory framework as a method of outlining how local authorities and citizens can manage public spaces together. The outcome of this project was a set of 165 collaborative and co-created schemes that have been adopted in Italy and which involve more than 20 000 people (Cremer & Mullenger, 2016, p. 7). Public Space Tools is an online platform that was co-created by the local authorities of Barcelona and its citizens. The platform allows users within the community to generate feedback, report abuses, publish how-to's, and produce knowledge online in collaboration with each other. The outcome of Public Space Tools increased participatory public space practice by allowing participants to connect, make visible, and report on good practices as well as preventing bad ones (Cremer & Mullenger, 2016, p. 15). Finally, Subtopia is a collaborative

and community-based project that aims to bring together creators, entrepreneurs, and civil society in the development and co-creation of businesses. It is conducted by creating activities with the aim of facilitating participatory workshops and do-it-together projects. The outcome of this project has influenced the development of the new city plan for the municipal area of Alby. Art and experience were prioritized over roads and sewage systems, which created a sense of belonging and optimism (Cremer & Mullenger, 2016, p. 21).

In the light of ANT and the examples mentioned above, bottom-up processes have informed the concept of co-creative media in terms of their characteristics and democratic view. In the following, they are referred to in the context of democratic engagement. They can be associated with the principles of ANT, namely *agnosticism*, *generalized symmetry*, and *free association*. In the following, these three assumptions are discussed in relation to the bottom-up processes.

The first principle of ANT, *agnosticism*, proposes that any *a priori* assumptions about networks should be abandoned (Callon, 1986, p. 200). In the context of co-creative media, this means that those engaged in bottom-up processes are encouraged to present their views without judgment, whether this concerns proactive initiatives or decentralized problem-solving. The second, *generalized symmetry*, aims to explain the conflicting viewpoints of different actants, whether these are social, technical, material, or immaterial. This principle is prescribed by the division of power in bottom-up processes, where citizens and their representatives have equal rights to make decisions following consensus-seeking and negotiation processes. These processes allow the stakeholders involved to put forth their views and interests with the intention of reaching joint agreements. The third principle, *free association*, calls for the elimination of all *a priori* distinctions between social and technical phenomena (Callon, 1986), since these are the effects of networked activity (Ritzer, 2005). This principle is coherent with the characteristics of participation and democratic engagement in bottom-up processes, which involve actants (human or non-human) working together in communities and networks on issues or initiatives. Solutions are not predetermined at the outset of bottom-up processes, but emerge as a community becomes established and works together towards common goals.

In summary, representative democracy has several limitations, and there is a recognition among scholars that representative democracy should be infused with participatory democracy (e.g., Mitlin, 2004; Pal, 2008). Co-creative media, as it is conceived of in this thesis, aims to support participatory democracy by facilitating bottom-up processes using technology that is designed for democratic purposes. In the following, media technology as a component

of democracy will be examined and discussed in relation to the use of social media and socio-technical systems for democratic engagement.

2.3 Media technology as a component of democracy

Producing, conveying, and sharing information is one of the basic human skills of communication. How people communicate and interact has been greatly advanced by the field of media technology. The term 'media technology' is widely used in the growing body of research connected to this field, but although the terms media and technology have been defined separately, they have more seldom been defined as a combined concept. Friedman and Friedman (2008, p. 1) defined media technology as "a wide variety of web-related communication technologies, such as blogs, wikis, online social networking, virtual worlds, and other social media forms." Another definition, provided by Kruschwitz (2011, p. 6), is "television, film, paperback books, magazines, smartphones, computers, and video games." These definitions are limited in scope, since they focus specifically on a particular set of technologies while they, from the point of view of this thesis, they do not address the crucial aspects of collaboration and interaction. Thus, in this thesis, media technology is defined more broadly as: *a field of interdisciplinary research with its core in information technology that involves studying established information paradigms and developing novel ways to create, organize, mediate, and disseminate information by means of interactive technologies in order to support human communication and collaboration over time and space.*

Media technology describes technology in various mediating roles, for example, mediating humans (socio-technology) or information (information- and communication technology) in different contexts such as finance (e.g., online banking, exchange markets), trade (e.g., online marketplaces, communities), and education (e.g., online learning systems). While the core of media technology is in information technology, the field draws on influences from a range of other disciplines such as interaction design, computer science, informatics, media and communication science, economy, education, and psychology.

One early example of media technology was the papyrus rolls used by the Romans as a tool to create and circulate information in the exchange of letters. Papyrus rolls could be considered to be the first true one-to-many communication medium; people commented on these and shared them with others who could read, write, and further distribute information. However, it is important to note that not everyone had access to papyrus rolls or had the skills to read and write. In addition, the technology for reproducing information among the Romans was time-consuming in terms of copying. It took

until the mid-15th century until a new type of technology was developed, namely the printing press, that allowed for the effective reproduction of information.

The printing press was invented by the German printer Johannes Gutenberg, and allowed for the written word to be spread to millions. The arrival of this new media technology facilitated the era of mass communication, which markedly altered the structure of society and had significant effects on European civilization. For instance, one direct effect was that information and ideas could spread quickly and accurately, and this in turn acted as an "agent of change" (Eisenstein, 1982). While the printing press fostered the creation of a wider literate reading public, it came at the cost of reducing the ratio of writers to readers. In other words, the ideas of only a handful of people were spread to millions of readers. Individuals could only agree or disagree privately with the ideas of a published book, and there were unable to counter these ideas with their own due to their limited access to the printing technology. This limitation created an unequal ratio between producers and consumers, which continued to escalate with the commercialization of broadcast media such as newspapers (Straubhaar, Larose, & Davenport, 2012, p. 128), radio (Nebeker, 2009, pp. 37-39), and television (Diggs-Brown, 2011, p. 48). Analogously to the printing press, these media are also characterized by one-way communication; this continued to make it difficult for people to put forth their ideas and opinions in public discourse, which consequently allowed the ratio between producers and consumers to remain imbalanced.

At the beginning of the 1970s, the introduction of the Advanced Research Projects Agency Network (ARPANET) created a number of opportunities for inter-organizational communication, and this would become the first network to adopt the Internet Protocol. By the late 1970s, digital communication platforms such as Bulletin Board Systems (BBS) and USENET became popular but not yet widely adopted. It was not until the emergence of commercial Internet service providers (ISPs) in the mid-1980s that broadcast media and individuals were provided with a way of channeling their information to the public through the global network of networks known as the Internet. Individuals started to create static personal web pages to share information, ideas, and thoughts at the beginning of the 1990s, using free hosting services such as Geocities, Angelfire, and Tripod. Today's social media functionality existed back then in the form of guest books, where visitors could publish comments and receive feedback. However, the concept of a static web page was later replaced by dynamic content. Flew (2008, p. 19) describes this switch as a "move from personal websites to blogs and blog site aggregation, from publishing to participation, from web content as the outcome of large up-front investment to an ongoing and interactive process, and from content manage-

ment systems to links based on tagging (folksonomy)". In other words, the web moved from static content to a dynamic distribution of information featuring user-generated content, user-moderated content, user and mass participation, and social networking, consequently giving rise to various STSs, popularly referred to as social media (e.g., Facebook, Twitter, YouTube, Snapchat).

Social media allowed citizens to become the drivers of democratic progression in society by connecting with others and forming networks for democratic purposes (Papacharissi, 2010). Social media has made contributions to democratic participation, such as creating a sense of belonging for citizens in online communities and mobilizing people behind both for online and offline political activities (e.g., protests and petitions). However, their political usefulness can still be described as marginal and overshadowed by other uses such as social networking and entertainment (Loader & Mercea, 2012, p. 222). The concept of co-creative media takes into account the characteristics, usefulness, functionality, and universal connectivity of social media to further the development of democratic engagement. This could be done by allowing citizens to utilize social media for mobilization purposes, repurpose their functionalities for collaboration and consensus-seeking processes, and employ cross-media services to exploit their connectivity to share information with others and thus circumvent potential censorship.

In the following, the focus will shift to the widespread technology of the Internet, social media, and their relationship to democracy. When examining the growing body of research into these relationships, it is clear that there is a lack of consensus among scholars about the types of impact of these technologies have on democratic engagement.

2.3.1 Social media for democratic engagement

The characteristics of social media have brought some fundamental changes to citizens in particular and society in general. They have altered the ratio between producers and consumers by allowing those who have the knowledge, financial resources, and cognitive ability to read (consume) and write (produce) to do so. Unlike previous forms of media (printing press, radio, TV, and the early stages of the Internet), social media platforms have contributed to a communication paradigm shift in communication from one-to-many to many-to-many. Through the power of networks, this shift ignited an enthusiasm for deliberation between citizens and their elected representatives by means of ICTs (Loader, 2005; Tsagarousianou, Tambini, & Bryan, 1998). In this sense, social media constitute essential tools, not only for disseminating information but also for creating awareness, promoting accountability, and informing the public on issues that advance the democratic development of a society.

A meta-analysis by Boulianne (2009) covering 38 studies sheds some light on the discrepancy discussed above, in terms of whether technologies such as the Internet and, in particular, social media have an impact on democratic engagement. While some researchers have contended that the Internet does not have an impact on civic and political participation (Norris, 2001; Putnam, 2000), mainly because the Internet is used for entertainment, social interaction, and information-searching, others have argued the opposite. Proponents of the Internet for democratic engagement have shown that the Internet activates those who are already interested in politics by reducing cost (e.g., time, effort) of accessing information and offers alternatives for engaging in civic and political processes (e.g., online petitions) (DiMaggio, Hargittai, Celeste, & Shafer, 2004; Polat, 2005). Other scholars have maintained that the Internet could act as a catalyst to mobilize inactive individuals through improved access to information and new online opportunities to find like-minded citizens across diverse populations (Ward, Gibson, & Lusoli, 2003; Weber, Loumakis, & Bergman, 2003).

It may be wise not to emphasize that the Internet *per se* leads to increased democratic engagement as this would indicate a tendency towards technological determinism. Instead, it is the information and communication capabilities of the Internet, that is, as an information source, as a medium for communication, and as a virtual public sphere, that may affect levels of engagement (Polat, 2005). Boulianne's meta-analysis provides systematic evidence refuting the notion that the Internet contributes to civic decline, and establishes that the overall effect of Internet use on democratic engagement is positive. The findings of this the meta-analysis showed that the impact of the Internet on democratic engagement is greater in more recent studies (Boulianne, 2009).

One likely explanation for this might be that the rise of social media (e.g., Facebook, Twitter) in the early 21st century has further developed the relationship between technology and democracy. Looking at the largest social media platform, Facebook has attracted over two billion monthly active users (Facebook, 2018). Data from 62 000 American adults and 47 000 adult Internet users by Perrin (2015) at the Pew Research Center show an increase in social media usage from 11% in 2006 to 65% in 2015 for adults and from 11% in 2006 to 75% in 2015 for adult Internet users. Social media use is also undeniably popular in countries outside of the U.S., for instance in the Netherlands (65%), the United Kingdom (57%), and Sweden (54%) (Office for National Statistics, 2013). Globally, social media users have grown from 2 billion users in 2014 (29% worldwide penetration) to 2.2 billion users in 2015 (31% worldwide penetration). The number of social media users is estimated to reach 2.72 billion users by year-end 2019 (36% worldwide penetration) (Kawasaki, 2015).

In the meta-analysis by Boulianne (2015), it was described that the relationship between social media use and participation in civic and political life. This meta-analysis identifies four streams within this relationship, namely:

- Using social media as forums to gather information or news from relatives, friends or traditional news outlets.
- Using social media to create social networking ties that could be used for mobilization purposes.
- Using social media to develop ties to political or activist organizations or to form and sustain online groups.
- Using social media to encourage others to participate in civic and political life.

The meta-analysis examined a set of 36 studies using 170 coefficients related to the general use of social media (e.g., frequency of logging onto social media), online news or political information (e.g., learning about current events and political information), social networking building (e.g., friending, following or liking political candidates), and other measurements (e.g., measures that do not fit into the aforementioned categories). The results demonstrated a positive relationship between use of social media and participation in civic and political life. Social media coefficients were clustered into general use (hours, use/no use) ($p = .548$), building social networks ($p = .018$), online news or political information ($p = .241$), and other measures ($p = .382$). Participation coefficients were clustered into campaigns (voting, persuading others to vote) ($p = .023$), protests (petitions, marches or demonstrations, boycotts) ($p = .037$), civic engagement (volunteering, donating, participation in civic group or neighborhood meetings) ($p = 1.00$), and other measures ($p = .886$). A total of 82% of all the coefficients were positive, and 49% of all coefficients were statistically significant at the .05 level. Hence, the results showed that social media play an increasing role in both civic and political life by providing opportunities for citizens to create and participate in dynamic environments with the purpose of mobilizing, collaborating, and acting together based on their needs, interests, and wishes.

Although social media platforms have been able to generate social value, the fact remains that most of them are privately owned companies, which introduces issues related to transparency, trust, privacy, data ownership, and the monetization of personal data. In particular, these companies do not generally place a high priority on the promotion of democracy. A potential solution to circumvent these issues would be to adopt open source principles. Open source can be broadly defined as "a development model that promotes universal access via a free license to a product's design or blueprint, and

universal redistribution of that design or blueprint, including subsequent improvements to it by anyone" (Lakhani & von Hippel, 2003). The best-known examples of open-source projects promoting broad collaboration are the operating system Linux, and the closely associated repository hosting service GitHub (github.com), which has contributed to collaborative functions such as code sharing, task management tools, and publishing services. The design and use of STSs for democratic purposes is no longer limited to proprietary enterprises but can take place at various levels of society and technical competency. In the following, a theoretical overview will be offered of STSs in a democratic context.

2.3.2 Socio-technical systems in democratic contexts

This section aims to analyze, position, and examine the concept of co-creative media in relation to STSs and their associated design approaches. For this reason, it is structured in three parts. The first part provides an overview of STSs with the aim to analyze their characteristics in relation to the concept of co-creative media. The second describes design approaches for STSs to position the concept of co-creative media. The third part examines the concept of co-creative media in light of concerns related to design approaches for STSs.

2.3.2.1 Overview of socio-technical systems

The term 'socio-technical systems' was originally coined by Emery and Trist (1960) and these can be defined as "systems that involve a complex interaction between humans, machines and the environmental aspects of the work system" (Baxter & Sommerville, 2010). These interactions consist of the relationships between a social system and a technical system; a socio-technical system (van Tol, 2013). Several socio-technical systems design (STSD) approaches have been proposed in order guide the design of such systems, and these will be addressed in Section 2.3.2.2. Some researchers suggest that STSs involve a bottom-up process with a focus on "the match between social needs and technology," and specifically on "the choice of technologies suitable to the social and psychological needs of humans" (Taveira & Smith, 2012, pp. 277-279). The term STS is often used to describe various complex systems, but Baxter and Sommerville (2010) present five characteristics of open socio-technical systems to which the concept of co-creative media adheres:

- Systems should have interdependent parts.
- Systems should adapt to and pursue goals in external environments.

- Systems have an internal environment comprising separate but interdependent technical and social subsystems.
- Systems have equifinality; in other words, system goals can be achieved by more than one means. This implies that there are design choices to be made during system development.
- System performance relies on the joint optimization of the technical and social subsystems. Focusing on one of these systems to the exclusion of the other is likely to lead to degraded system performance and utility.

While the authors mentioned above do not explicitly define or elaborate on concepts associated with STSs (e.g., interdependent parts, external environment, internal environment, equifinality, technical and social subsystems, joint optimization), the current thesis interprets and describes the meaning of these based on the existing literature related to STSs.

Firstly, a STS consists of two *interdependent parts*, a technical and a social subsystem (Klein, 2014). The author argues that "each affects the other" and that "technology affects the behavior of people, and the behavior of people affects the working of the technology." This description implies that a STS may vary based not only on the associations between the parts that constitute the system but also based on the characteristics of each part.

The *external environment* refers to the "social, economic, legal and political *milieu*" in which a STS is situated in (Carayon et al., 2015, p. 559). According to Davis, Challenger, Jayewardene, and Clegg (2014, p. 7), a STS is embedded in a wider context that incorporates "a regulatory framework, sets of stakeholders, [...] and an economic/financial environment". In contrast, an *internal environment* involves a technological component that is composed of "materials, machines, and territory" (Emery, 1993, p. 158), which mediates between the goals of a STS and the external environment.

The concept of *equifinality* is related to the ideas of dynamism and adaptability (Walker, Stanton, Salmon, & Jenkins, 2008). von Bertalanffy (1950, p. 25) elaborates on the concept in the following way: "A profound difference between most inanimate and living systems can be expressed by the concept of equifinality. In most physical systems, the final state is determined by the initial conditions. [...] Vital phenomena show a different behaviour. Here, to a wide extent, the final state may be reached from different initial conditions and in different ways." Equifinality contributes a paradoxical behavior to STSs, such that a system knows "the final state that it has to attain in the future" (von Bertalanffy, 1950, p. 25), which of course it cannot. This means that a STS can evolve through processes of internal elaboration to reach a final state (Trist, 1978).

Finally, *joint optimization* refers to "interactions among system components, and between the system and its external environment" (Carayon et al., 2015, p. 550). Joint optimization takes into account both the social and technical aspects of a STS. Social aspects comprise the "attributes of people (attitudes, skills, values, etc.), the relationship among people, reward systems, and authority structures", while technical factors include "the processes, tasks, and technology" that are needed to perform operations (Munkvold, 2000, p. 14). Both the social and technical aspects are connected to the two interrelated subsystems in a STS, that is, the *social* and *technical subsystems*. The social subsystem is composed of "individuals and teams, and needs for coordination, control and boundary management", while the technical subsystem includes "not only equipment, machines, tools, and technology but also the work organisation" (Carayon et al., 2015, p. 550).

Based on the discussion above, traces of these concepts and definitions can be found in the concept of co-creative media, which will be examined below. The concept of co-creative media includes three interdependent parts: *invitation*, *community building*, and *consensus-seeking* (Faraon, 2018; Faraon et al., 2013). Invitation refers to a process by which citizens proactively take on an initiative or identify issues, whether these are societal, political, or economic in nature. This process includes the possibility of one or more citizens inviting others through social media networks in order to mobilize support for an initiative or issue. When a mobilized crowd has become organized and a sense of community has been established, this may lead to community building, where the community engages in meaningful, constructive, and co-creative processes with the purpose of pursuing shared goals. Such goals may be guided, through consensus-seeking processes towards outcomes expressed in the form of joint efforts, for example, plans, proposals, strategies, budgets, designs, and other kinds of ventures within a community. In cases of disagreement, a mechanism is provided that can split these joint efforts into an unlimited number of branches (n) and thus allow actors or communities to pursue a parallel evolution of this co-creation.

In terms of the analysis elaborated above, the concept of co-creative media includes subsystems that may involve citizens, mobilized crowds, and communities. Technical subsystems in the concept of co-creative media consist of technical and collaborative tools for achieving joint activities, shared goals, and outcomes. Examples of such tools include wikis (e.g., Wikispaces, EditMe, Wikidot), document creation (e.g., Google Docs, Sync.in, Mindmeister, Docracy), and graphical visualization (e.g., Dabbleboard, CoSketch, Chartle). Both subsystems require a continuous, joint optimization by a community to address the needs, wishes, interests, and goals of the actors concerned, which may be both humans and non-human. These parts are mutually

connected, and may contribute to the pursuit of goals in external environments, namely through participatory and co-creative democratic processes within society. These parts do by no means follow a linear process; instead, it should be recognized that they have a thread-like, veined, and stringy character. For instance, it is possible to pursue a process that starts with invitation and goes directly to consensus-seeking, or which starts and stops at an invitation without involving community building or consensus-seeking (e.g., petitions).

The design of STSs has been approached in various ways, see Mumford (2006) for a historical review. These approaches include, for example, soft systems methodology (SSM), cognitive work analysis (CWA), the socio-technical method for designing work systems, ethnographic workplace analysis, contextual design, cognitive systems engineering (CSE), and human-centered design (Baxter & Sommerville, 2010). Each of these has their own set of values that guide the design of STSs and focuses on different aspects of such systems, for example, the understanding of a problem, operational issues within a workplace, or system design (e.g., functions, tasks). In the following, each of these will be examined in relation to the values associated with the concept of co-creative media.

2.3.2.2 Design approaches for socio-technical systems

The first approach is SSM, which builds on the ideas of action research and has its roots in systems engineering (Checkland & Scholes, 1999). The principal strength of this approach is the acquisition of an understanding of a problematic situation, which takes into consideration the roles, responsibilities, and differing viewpoints of the stakeholders concerned. Although SSM has been mainly used for problem understanding, it has also been adopted in the evaluation of information systems (Checkland & Poulter, 2006). Although the concept of co-creative media acknowledges the importance of understanding a problem and supporting related viewpoints, it is also necessary to clarify that not all situations are problematic. Aside from problem-solving, the concept of co-creative media embraces proactive initiatives as a point of departure, whereby citizens can act in advance of a future situation rather than merely reacting to identified issues.

CWA has emerged as an approach that focuses on analyzing the work that *could* be observed in complex STSs. Most approaches in STSD are characterized as normative, involving how work *should* be done, or descriptive, involving how work *is* done, while CWA has been perceived as formative, that is, predicting what *could* be done (Rasmussen, Pejtersen, & Goodstein, 1994). CWA can be seen as a toolkit, rather than a prescribed methodology, and can

be used for various purposes, for example, system modeling, system design, or interface design and evaluation (Euerby & Burns, 2014). The envisioning of futuristic use scenarios, or what *could* be, is something to which the concept of co-creative media adheres. However, CWA approaches design from a perspective that could be characterized as systems engineering, and this is incompatible with the concept of co-creative media, since it departs from a theoretical and conceptual perspective where the focus is on the production of knowledge.

Waterson, Older Gray, and Clegg (2002) proposed the socio-technical method for designing work systems, with a particular focus on system design. This has been used primarily used to identify which tasks and functions need to be assigned to machines and to consider how these could be performed by humans. In a similar way to the previous approach, the socio-technical method departs from a systems engineering point of view, which is incompatible with the starting points used in the concept of co-creative media, as discussed in the previous section.

An ethnographic workplace analysis approach emphasizes the way in which the results from ethnographic studies can guide the design of STSs (Martin & Sommerville, 2004). Ethnographic workplace analysis aims to identify the practical concerns within a workplace and the ways in which these affect the use of a system, and suggests workarounds by modifying the existing processes and functionalities in a system. Historically, the focus of this approach has been closely aligned with the design and development of workplace systems (Crabtree, Rodden, Tolmie, & Button, 2009). This focus is comparatively narrow in relation to the concept of co-creative media, which views design in a broader sense that requires collective effort within a society. Studies of work or the workplace have ceased to be the exclusive focus of design, which has shifted to emerging fields such as ubiquitous computing, where computing is seen to be present anytime and everywhere.

The next approach is contextual design, which is based on the notion that every system inherently includes a set of processes of how it should work, which in turn prescribe the structure of the system (Beyer & Holtzblatt, 1999). The point of departure in this approach is to acquire an understanding of the customer by unifying the "design, marketing, delivery, and support in a coherent response to the customer" (Beyer & Holtzblatt, 1999, p. 33). As the authors contend, "data gathered from customers is the base criterion for deciding which needs to address, what the system should do, and how it should be structured" (Beyer & Holtzblatt, 1999, p. 33). The values associated with this approach are the design and delivery of a product for customers, which implies a perspective that is related to marketing and industrial design. The values associated with the concept of co-creative media diverge from this

perspective, in the sense that citizens are not perceived as recipients of products but as active co-creators of design processes for democratic purposes. Contextual design assumes a top-down approach, where product designers gather customer data, generate ideas, and manifest these in products for customer use; the concept of co-creative media departs from a bottom-up point of view, in which citizens are provided with the necessary means to mobilize, participate, and collaborate in networks of communities with democratic aims.

CSE is an approach that involves the analysis of organizational issues and proposes practical solutions for systems design (Hollnagel & Woods, 2005). The idea underlying CSE is to move away from the notion that humans are *using* machines, towards a view that perceives humans and machines as constituting a joint cognitive system (JCS). Such a system "can modify its behavior on the basis of experience so as to achieve specific anti-entropic ends" (Hollnagel & Woods, 2005, p. 22). CSE uses observation as a tool for analyzing work processes within a particular context and to describe the results in terms of patterns that can be used across work settings. This approach focuses on systems engineering and organizations, and shares similarities with CWA, the socio-technical method for designing work systems, and ethnographic workplace analysis, as the points of departure and values of these stand in contrast to those used in the concept of co-creative media, as discussed above.

Finally, the human-centered design approach considers the users, the processes in which the users are intertwined in, and the environment in which these processes occur (Giacomin, 2014). Krippendorff (2004, p. 48) developed this view further, arguing that "human-centered design is concerned less with assuring that artifacts work as intended (by their producers, designers, or other cultural authorities) than with enabling many individual or cultural conceptions to unfold into uninterrupted interfaces with technology." This view, which the current thesis supports, asserts that any design activity should focus on questions related to motivation, discourse, and learning before moving on to identify means for implementation and evaluation.

Another approach that asserts the mentioned view and explicitly extends the previous approach is the concept-driven design research approach of (Stolterman & Wiberg, 2010). This approach focuses on theoretical development and knowledge production that are design and concept oriented at the same time. It can be seen as a "possible and valuable approach for theorizing in interaction design research" with the aim to manifest "visionary theoretical ideas in concrete designs" (Stolterman & Wiberg, 2010, p. 97). The concept-driven design research approach provides a useful methodology to guide research questions that depart from a theoretical/conceptual point of view, which is the case in this thesis. The following section examines concerns re-

lated to STSD approaches and discusses them in relation to the concept of co-creative media.

2.3.2.3 Concerns related to socio-technical systems design approaches

Baxter and Sommerville (2010, pp. 8-10) identify eight concerns associated with STSD approaches: *inconsistent terminology, levels of abstraction, conflicting value systems, lack of agreed success criteria, analysis without synthesis, multidisciplinary, perceived anachronism, and fieldwork issues*. While these have been mainly discussed in democratic contexts associated with organizational work, they are used below as an analytical tool to shed light on the concept of co-creative media. In the following, these will be examined in relation to the concept and, where relevant, to the theoretical framework of ANT.

Inconsistent terminology refers to variations in the use of the term *socio-technical system*. Different fields use the term based on their particular points of view, often focusing either on the social or technical aspects, but seldom together. This variation could offer an explanation for the contrasts within the literature on STSs (e.g., Griffiths & Dougherty, 2001). The focus on the social (Faraon et al., 2015, 2014) and technical aspects (Faraon, 2018; Faraon et al., 2011, 2013) of the concept of co-creative media has been relatively equal in this thesis. The term is treated as integral to the definition of co-creative media with an emphasis on democratic engagement, namely: *socio-technical systems that integrate and adapt existing information- and communication technologies (ICTs) with the aim of facilitating democratic engagement in terms of proactive, collective contributions, and consensus-seeking towards common interests*. This definition has a central role in the concept of co-creative media, which is theoretically prescribed by the terminology and the concepts associated with ANT.

An issue similar to that of inconsistent terminology is the *levels of abstraction* used when describing STSs. According to Eason (2001), the literature on STSs can be divided based on whether the focus is placed on the social or the technical system, and often emphasizes the technical aspects of a system. The concept of co-creative media recognizes that finding an appropriate level of abstraction is both essential and difficult to achieve. This thesis addresses the issue of levels of abstraction by finding a balance between a high abstraction level, in which the focus is on the composition of co-creative media (Faraon, 2018; Faraon et al., 2013), and a low abstraction level, which examines specific aspects of co-creative media (Faraon et al., 2011, 2015, 2014).

Closely related to the previous issue is the aspect of *conflicting value systems*, which refers to the division of values underpinning STSs; these can

be organized into two categories, namely humanistic and managerial (Land, 2000). Both categories are often referred to in the context of designing STSs for organizational or corporate work. Humanistic values focus on a designer who aims to improve the quality of working life for employees, whereas managerial values consider the means of achieving a company's objectives, which are often economic ones. Problems arise when these two sets of values come into conflict between employees (often represented by trade unions) and managers. The former are motivated to pursue humanistic values, while the latter focus more on managerial ones. The concept of co-creative media is informed by ANT's second principle, namely *generalized symmetry*, which aims to explain conflicting viewpoints (Callon, 1986). By engaging in processes such as collaboration and consensus-seeking, the stakeholders have the opportunity to put forward their views, interests, and needs in negotiation with each other with the aim of reaching joint agreements that represent the values of all concerned.

A lack of agreed success criteria concerns the implementation of STSs. Assessment of the success of an implementation is problematic because it is often defined by a number of different stakeholders (Baxter & Sommerville, 2010). An analysis was conducted of STSs in the context of democratic engagement to determine which criteria should ideally be fulfilled by the concept of co-creative media (Faraon, 2018). These criteria are *mobilization, collaboration, multilingualism, third-party adaptability, voting, scalability, integration of online content, and open source* (independence of government and proprietorship), and can be interpreted as an essential point of departure when designing STSs that aim to facilitate and support democratic engagement. However, it is necessary to adopt an open approach to the implementation of STSs based on the needs, interests, and wishes of the stakeholders involved (Naughton, 2012).

Analysis without synthesis refers to the issue of analyzing existing systems without suggesting how problems could be addressed (e.g., Kawka & Kirchsteiger, 1999). While not directly related to the concept of co-creative media, this offers a way of supporting various stakeholders in contributing to the collective intelligence in society, by sharing insights that may be relevant for others. Such insights could consist of, for example, plans, proposals, strategies, budgets, designs, programming code, and other ventures that could be adapted and reused (Faraon, 2018).

Multidisciplinarity relates to the perceived failings of STSD, which can be attributed to a lack of interdisciplinary fields being involved in a design process (Baxter & Sommerville, 2010). The perceived failings are linked to the failure of one discipline to understand what another can do, primarily due to discrepancies in both language and culture (Bader & Nyce, 1998). Rather

than depending on specialists in a design process, it is required that individual(s) or a team need to recognize and have an understanding of what other disciplines can offer (Baxter & Sommerville, 2010). The concept of co-creative media was elaborated using an interdisciplinary approach and was informed by various disciplines such as design (Faraon, 2018; Faraon et al., 2013), political science in conjunction with psychology (Faraon et al., 2015, 2014), and computer science (Faraon et al., 2011).

Perceived anachronism is associated with the idea that STSD approaches were mainly developed during the 1960s and 1970s, and were not updated to keep pace with the technical developments brought about by the advent of the personal computer (Baxter & Sommerville, 2010). Instead, the research community for STSs focused on ideological debates (Mathews, 1997). In contrast to STSD, HCI became recognized as a separate discipline since it emphasizes the interaction between people and technology at the lowest level. The failure to reflect technological developments may have contributed to the perception of STSD approaches as being outdated and anachronistic. The concept of co-creative media is built on *existing ICTs* and an open source approach, which allows STSs for democratic engagement not only to be continuously updated as new technologies emerge, but also to contribute to the development of co-creative media.

Fieldwork issues concern which users to select, and the level of design experience they need (Scacchi, 2004). While STSD methods such as participatory design prescribes the involvement of users, they are relatively silent on these issues (Baxter & Sommerville, 2010). More generally, for STSD and within HCI, there are ongoing discussions about the pragmatics of available methods, which have often been considered as expensive and time-consuming in their practical application (Crabtree, 2003). The ANT principle of *agnosticism*, to which the concept of co-creative media adheres, suggests that any *a priori* assumptions should be abandoned, whether relating to the nature of networks or causal conditions, should be abandoned. During the design process of a STS, new users may emerge as relevant, while tasks with initial users might be concluded. This view, which is aligned with the concept of co-creative media, is supported by the third principle of ANT, that is *free association*. The principle of free association calls for the elimination of all *a priori* distinctions between social and technical phenomena (Callon, 1986) since these are the effects of networked activity (Ritzer, 2005).

In summary, the previous sections have elaborated the concept of co-creative media in relation to socio-technical systems and their associated design approaches. This elaboration has been conducted by analyzing the characteristics of socio-technical systems in relation to the concept of co-creative media, describing design approaches for socio-technical systems to

position the concept of co-creative media, and examining concerns related to socio-technical systems design approaches with the aim to shed new light on the concept of co-creative media. As mentioned, because this thesis departs from a theoretical and conceptual research question, the concept-driven design research approach was chosen as the methodological approach. This approach will, in the following chapter, be described in terms of its application to the concept of co-creative media.

3. Methodological approach

This chapter presents the research questions and the methodological approach used in this thesis work, that is, the concept-driven design research approach of Stolterman and Wiberg (2010). The chapter also describes the data collection conducted in this work and the ethical considerations that were taken into account during the research process.

3.1 Research questions

Although the first article provided this thesis with valuable theoretical insights, it was necessary to carry out both theoretical and empirical investigations to *further* the concept of co-creative media beyond the *initial concept* presented in the first article. Based on the results reported in the first article and the initial concept, three research questions emerged to further the concept of co-creative media, and these were formulated as follows:

- RQ1. What role do existing means of consensus-seeking play in supporting democratic engagement?
- RQ2. How are political attitudes and voting behavior influenced in established socio-technical systems?
- RQ3. How can existing information- and communication technologies be redesigned to support the free flow of information in conditions of censorship?

Together, these questions relate to different aspects of the concept of co-creative media. Each research question was investigated and the results were reported in Articles 2-4. The results of these four articles were then fed forward into the concept-driven process, which further elaborated the concept of co-creative media and resulted in a fifth article. See Figure 3.1 for an overview of the relationship between the research questions and the appended articles.

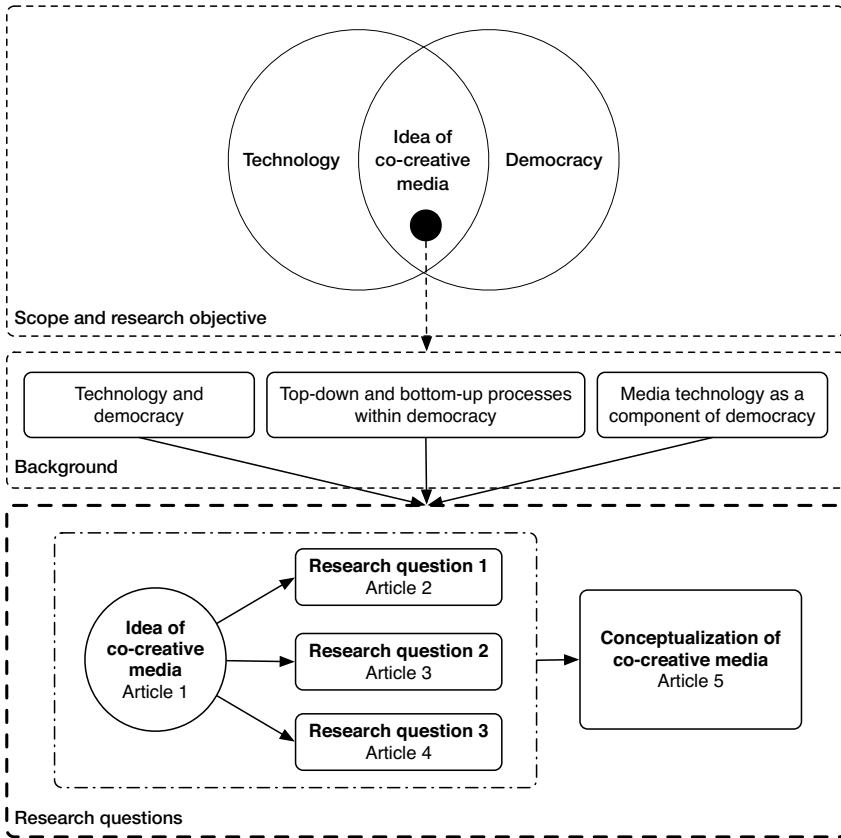


Figure 3.1: The section marked with bold-dashed lines illustrates the *idea* of co-creative media as conceptualized in the first article, resulting in the *initial* concept of co-creative media. Three questions emerged from the first article, and each was investigated in a separate article. The results from the first four articles were elaborated in the fifth article to further the concept, which resulted in a *refined* concept of co-creative media.

Each of the appended articles involved one or more specific research questions; these necessitated the selection of research methods, which will be described further in Section 3.2.2. In the following, the methodological approach of this thesis is described, with a focus on concept-driven design research, see Figure 3.2 for an overview.

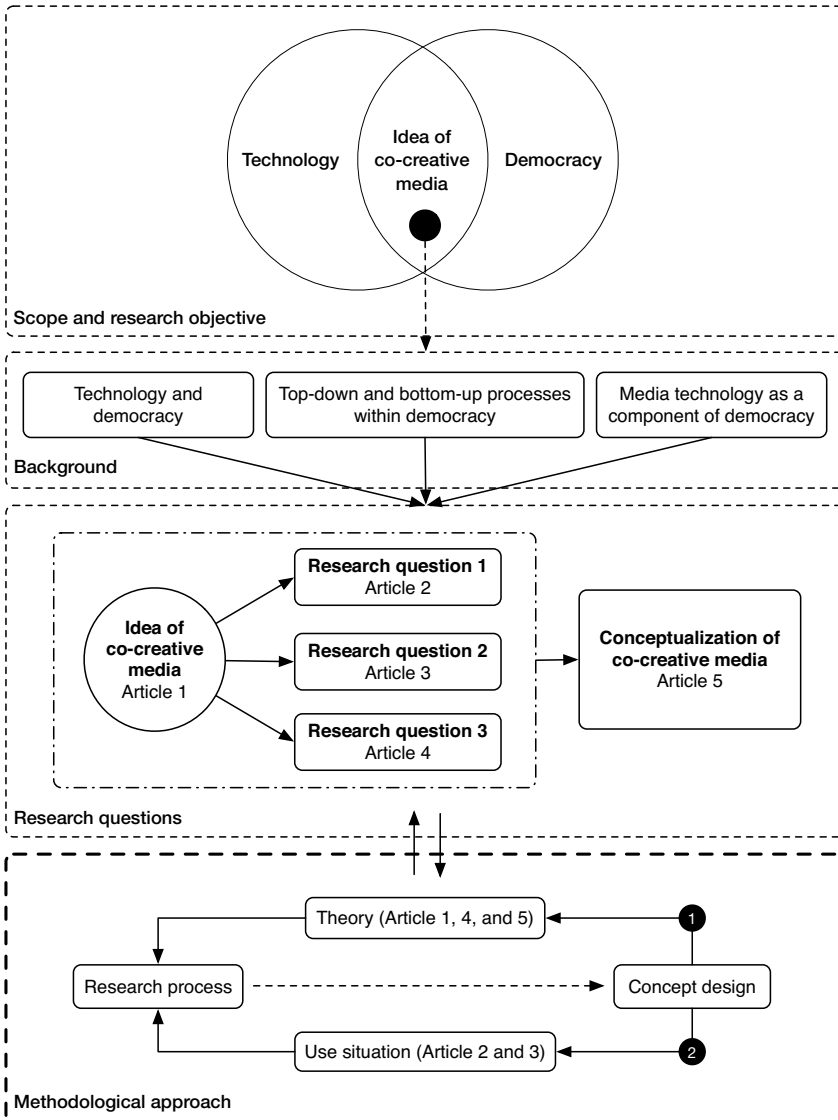


Figure 3.2: The section marked with bold-dashed lines illustrates the concept-driven design research approach of Stolterman and Wiberg (2010) as the methodological approach used in this thesis. The results from each article were fed into the research process to inform and further the concept of co-creative media.

3.2 Design research

Design research within the field of human-computer interaction (HCI) can be defined as "a discipline concerned with the design, evaluation, and imple-

mentation of interactive computing systems for human use, and with the study of major phenomena surrounding them" (Hewett et al., 2004, p. 5). Similarly, Löwgren (2013) provides a broad definition of design research in HCI as "shaping digital things for people's use". Other researchers, such as Hallnäs and Redström (2002), offer a different perspective on HCI in which digital technology "is presented not simply as something to use in the workplace, but also as a part of our lifestyle and a presence in our homes—something *we live with*, not simply something *we use*". While these definitions point in the direction of *developing* and *using* digital technology, the research objective of this thesis focuses on *theoretical* and *conceptual* advancements. For this reason, the following section introduces and elaborates on the concept-driven design research approach as the methodological approach used in this work.

3.2.1 Concept-driven design research

The concept-driven design research approach was proposed by Stolterman and Wiberg (2010) as "a complementary methodology in interaction research with a specific focus on theoretical advancements" (Stolterman & Wiberg, 2010, p. 96) and "a possible and valuable approach for theorizing in interaction design research" (Stolterman & Wiberg, 2010, p. 97). This research approach is "explorative in nature, aiming at manifesting visionary theoretical ideas in concrete designs" (Stolterman & Wiberg, 2010, p. 97) with a focus on theoretical development and an "overall aim of improving and widening the range of theory and knowledge" (Stolterman & Wiberg, 2010, p. 102).

The authors argue that the majority of contemporary interaction design approaches, such as "user-centered design, participatory design, contextual design, activity theory, and ethnographically informed systems design" (Stolterman & Wiberg, 2010, p. 97) are empirically oriented, indicating that "most of these approaches are built on the assumption that a suitable design proposal is to be grounded or even 'found' through careful analysis of an existing situation" (Stolterman & Wiberg, 2010, p. 97). With this in mind, the authors contested that "these common approaches are not always suitable when the purpose is to develop more conceptual and theoretical contributions" (Stolterman & Wiberg, 2010, p. 98). In the current thesis, empirical investigations are based not on analyses of existing situations but on novel research applicable to the concept of co-creative media in the context of democratic engagement. The collected empirical results are fed as theoretical insights into the research process for the purpose of elaborating the concept further.

Despite the number of approaches that are closely related to concept-driven research, such as *proof-of-concept tests* (Toney, Mulley, Thomas, & Piekarski,

2003), *concept design* (Gaver & Martin, 2000; Kerne, 2002; Pedersen, Sokoler, & Nelson, 2000), and *concept development through normative writing* (Jensen & Skov, 2005), Stolterman and Wiberg (2010, p. 103) note that these neither explicitly attempt to formulate *how* to conduct such research nor attempt to describe *how* such research is currently being conducted in the research field of HCI.

Furthermore, one of the many approaches to interaction design is the notion of *proof-of-concept*, which aims to actualize a method or concept to determine its *feasibility* (Ryokai, Marti, & Ishii, 2005; Soh, Jiang, & Ansoorge, 2004). Unlike this approach, the aim of the concept-driven design research approach is not to determine the feasibility of a method, a concept, or an artifact, but to focus on theoretical advancements that are simultaneously design- and concept-oriented. The process of the concept-driven research approach is illustrated in Figure 3.3.

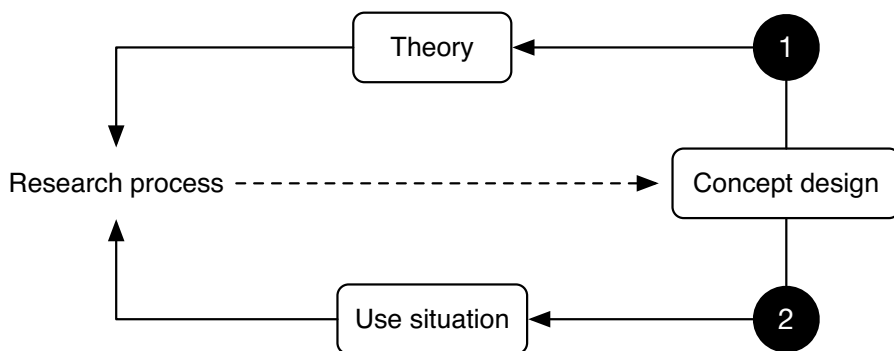


Figure 3.3: The process of the concept-driven design research approach in relation to theory and use situation, adopted from Stolterman and Wiberg (2010, p. 101).

This approach can be understood as being "rooted in *futuristic* use scenarios" (Stolterman & Wiberg, 2010, p. 97), and "the actual design outcome, as a design that addresses real issues, is not necessarily important" (Stolterman & Wiberg, 2010, p. 101). While the other research approaches mentioned above mostly aim primarily to produce a concept that supports the *use situation* (Arrow 2), the primary goal of the concept-driven research approach is to support *theoretical development* (Arrow 1) (Stolterman & Wiberg, 2010, p. 100). Stolterman and Wiberg (2010) *explicitly* define the research approach as including the following steps (p. 98). Each of these has been elaborated in this thesis and is described in the next section.

1. The point of departure is conceptual/theoretical rather than empirical.
2. The research furthers conceptual and theoretical explorations through the hands-on design and development of artifacts.
3. The end result—that is, the final design—is optimized in relation to a specific idea, concept, or theory rather than a specific problem, user, or a particular use context.

Several prior studies have adopted the concept-driven design research approach (Eliasson, 2013; Johansson, Lassinantti, & Wiberg, 2015; Nazzi, Bagalkot, Nagargoje, & Sokoler, 2012). For instance, Eliasson (2013) investigated how mobile technology can be used for interaction purposes with the physical environment in outdoor lessons. This research resulted in the development of three design tools: (1) design guidelines that are specific enough to guide the design of mobile technology for outdoor lessons; (2) a design model for designing and evaluating mobile technology for outdoor lessons; and (3) concept designs for reflecting on the placement of mobile technology in outdoor lessons (pp. 56-61). Other researchers, such as Johansson et al. (2015), have examined how mobile e-services and open data can extend and allow citizen-driven continuation of the service lifecycle. This study resulted in a concept design that was manifested in a digital prototype, which allowed citizens to access and develop their e-services.

While some previous studies resulted in a prototype, others have concluded in concept designs. One such example was created by Nazzi et al. (2012), who explored the possibility of the use of a rollator by senior citizens to open up opportunities for social interaction within their local community. The design exploration was entitled Walky, and resulted in three concept designs based on the theoretical perspectives of embodied interaction, social interaction in aging, and the role of microblogging.

The concept-driven design research approach was adopted in the current work in order to make *theoretical contributions* in the form of theoretical explorations (Articles 1, 4, and 5), empirical studies (Articles 2 and 3), and concept designs (*initial concept*, see Article 1 or Section 4.1.1, and *refined concept*, see Article 5 or Section 4.1.5). Together, they show how the integration of various technologies (e.g., open source applications, social media, Internet voting, circumventing media) can contribute to democratic engagement by citizens.

3.2.2 Application of the concept-driven design research

The design research in the current work can be described as an iterative process between *theory* and *use situation*, which informs and furthers the *concept*

design. The concept-driven design research process involves the *theoretical anchoring* of the concept of co-creative media and the integration of the theoretical and empirical results of the five appended articles into the concept of co-creative media, as described Chapter 4.

To make theoretical advancements, as recommended by Stolterman and Wiberg (2010, p. 101), three research methods were selected, and were guided by the research questions and the concept-driven design research process. These methods were the integrative literature review method, empirical methods (survey and experiment), and the concept-driven design research method. Each of these is described below with reference to the five appended articles, starting with the integrative literature review method.

3.2.2.1 Literature studies

As suggested by Whittemore and Knafelz (2005), the purpose of using the integrative literature review method is to provide an understanding of a phenomenon, that is, to facilitate participatory democracy through co-creative media and circumvent censorship by means of ICTs. The first article synthesized the available literature in order to understand and inform participatory democracy, while the fourth article investigated the circumvention of censorship. The methodology of writing an integrative review method is based on a systematic process that includes identifying, analyzing, synthesizing, and reporting representative literature with the aim of generating new knowledge about the reviewed topic (for an overview of the method, see Torraco, 2005, 2016). According to Torraco (2016, p. 360), it can be said that "the literature is the data in the integrative literature review". A number of databases and keywords were used to obtain the literature for the mentioned articles; Table 3.1 gives a list of these databases.

The following keyword combinations were used to identify studies for the first article, and were limited to the period 1990 to 2012: "mobilization social media", "mobilization crowds", "democratic participation", "collaborative applications democracy", "citizen participation democracy", "top-down bottom-up processes", "consensus-seeking democracy", "design e-participation", and "collective decision-making". In the same manner, the following keywords or keyword combinations were used to identify studies for the fourth article, and were limited to the period 1990 to 2011: "MENA", "circumventing censorship", "social media authoritarian governments", "internet censorship Egypt Tunisia", "citizen uprisings technology", "mobilize people revolutions", "TOR censorship", and "social movements Twitter Facebook". The literature identified for the first article was analyzed and synthesized into three themes: top-down and bottom-up e-participation; design of ICTs for

Type	Databases	Used for
General	<ul style="list-style-type: none"> • Google Scholar • JSTOR • Web of Science • Scopus • Semantic Scholar • Directory of Open Access Journals 	<ul style="list-style-type: none"> • Browsing for general articles and books concerning participatory democracy and censorship • Initiating the research process and discovering the primary set of articles
Publisher	<ul style="list-style-type: none"> • SAGE Journals • Elsevier ScienceDirect • SpringerLINK • Taylor & Francis • Wiley Online Library • Emerald Insight • IOS Press • Inderscience • AISeL • IGI Global 	<ul style="list-style-type: none"> • Finding relevant articles through journals that periodically publish on the topic of participatory democracy • Browsing journals for the specific subjects, i.e., participatory democracy and censorship
Subject-specific	<ul style="list-style-type: none"> • ACM Digital Library • DBLP Computer Science Bibliography • Lecture Notes in Computer Science (LNCS) • IEEE Xplore 	<ul style="list-style-type: none"> • Browsing journal and conference articles that specifically examine the relationship between democracy or censorship and ICTs • Conducting in-depth research on these topics

Table 3.1: List of databases used as a part of the integrative literature review method.

democracy; and mobilization, collaboration, and consensus-seeking. In the same way, two themes emerged from the literature identified for the fourth article and were reported as social media and democracy, and the design of ICTs to further develop circumvention media. Unlike other methods, for example, systematic reviews or meta-analyses, the integrative review method allows for the incorporation of multiple methodologies "to capture the context, processes and subjective elements of the topic" (Whittemore & Knaff, 2005, p. 552).

3.2.2.2 Empirical studies

The use of the survey method, in contrast to in-depth interviews, provided a means of obtaining a substantial quantitative dataset reflecting the disposition of a population on a particular topic (Groves et al., 2009). The survey method was used in the second article to investigate the potential use of Internet voting as a means of continuous democratic participation. Moreover, the use of an experimental approach in the third article assisted the process hypothesis testing and the examination of causal relationships (Hinkelmann & Kempthorne, 2007), specifically in terms of how different media, i.e., online news and social media, influence explicit and implicit attitudes and voting behavior.

The empirical studies in the second and third articles were conducted as *exploratory investigations* of established theories "with the overall aim of improving and widening the range of theory and knowledge" (Stolterman & Wiberg, 2010, p. 102). In the current implementation of the concept-driven design research approach, a *use situation*, as referred to by Stolterman and Wiberg (2010, p. 101), is implemented by means of empirical studies to *inform* and *elaborate* the concept of co-creative media in the context of democratic engagement. While these authors refer to 'use situation' as "how well the result [of the research] resolves an unwanted situation and creates a desired one" (Stolterman & Wiberg, 2010, p. 101), the present work uses the term 'use situation' as a pointer to an event of participatory action, such as the use of Internet voting as a decision-making mechanism for continuous participation (Faraon et al., 2015) and the use of online content for participatory purposes (Faraon et al., 2014). These empirical studies aim to advance theoretical concepts associated with the abovementioned participatory actions. This approach can be compared to that of Johansson and Wiberg (2012, p. 25), who use empirical data to improve a concept.

The application of the concept-driven design research approach, which includes literature and empirical studies, is illustrated in Figure 3.4. The figure shows the relationship between the concept-driven process and the five articles.

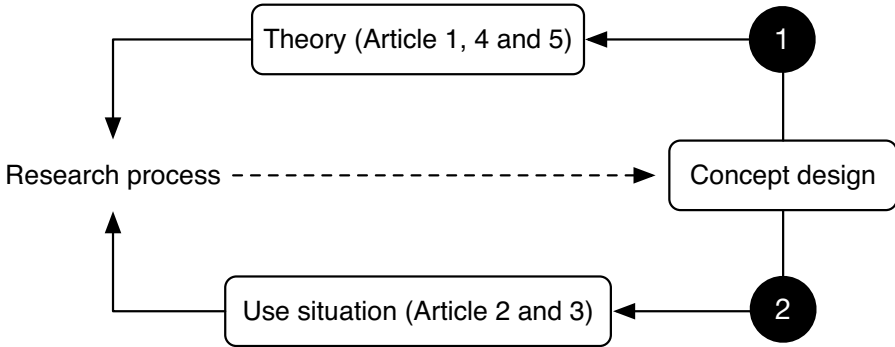


Figure 3.4: An adapted version of the concept-driven design research approach, as presented by Stolterman and Wiberg (2010, p. 101), which maps each article to its respective path (theory or use situation). A use situation in the current thesis is implemented by means of empirical studies and points to an event involving participatory action.

The previous figure can be understood as an iterative and knowledge-gaining process that aims to inform and advance a concept design (i.e., the concept of co-creative media) using the results generated from theoretical and empirical studies. The point of departure in this thesis was the idea of co-creative media, which was proposed in the first article (Faraon et al., 2013). Three research questions emerged from the first article and the initial concept, which related to the use of Internet voting (Faraon et al., 2015), the influence of online information on attitudes and voting behavior (Faraon et al., 2014), and how censorship could be circumvented (Faraon et al., 2011). The results of the previous four articles were fed forward into the concept-driven design process to advance the concept of co-creative media. The fifth article adopted the concept-driven design research approach to further elaborate the concept, partially based on the results from previous articles, and this resulted in a theoretically and empirically grounded concept of co-creative media (Faraon, 2018). The following sections discuss the data collection and ethical considerations in this thesis.

3.3 Data collection

As described in the previous section, data collection was used in the second and third articles in the form of empirical studies. In the second article, data were collected through a web-based survey consisting of twenty Likert-type items related to the security of Internet voting, participants' attitudes towards Internet voting, and opinions on participation by means of Internet voting.

Items were based on existing research, and in order to secure a reproducible factor structure, a factor analysis was conducted that gave rise to two strongly reproducible factors. A reproducible factor structure supports the overall credibility of the study by comparing factor loadings of items in two datasets from the same measurement. The two factors, participation and security, were formed based on the meaning of the included items. In order to obtain a comprehensive dataset, data were collected through Facebook, and using this channel provided us with a large number of users. The demographics of the questionnaire sample in relation to the Swedish electorate were comparable in terms of representation. The third article collected data using a web-based experiment that measured the influence of different types of online information on participants' attitudes and voting behavior. The web-based experiment consisted of a survey and the Implicit Association Test (for an overview, see Greenwald, McGhee, & Schwartz, 1998; Greenwald, Nosek, & Banaji, 2003). While explicit attitudes were measured using self-reporting items in a survey, a decision was made to obtain participants' implicit attitudes using the Implicit Association Test for comparative purposes and to counter potential social desirability effects that might arise from the explicit measures in the survey (e.g., Derzon & Lipsey, 2002; Slater & Kelly, 2002).

3.4 Ethical considerations

A number of ethical considerations were relevant to this work, based on the ethical recommendations made by the Swedish Research Council (2002), which requires the presentation of *information* about the study, *consent* from anyone participating, the *confidentiality* of participants' data, and the use of *collected data* for research purposes only. These recommendations were applied in the second and third articles, which involved data collection. In addition to these recommendations, research for the current thesis was conducted with the intention to publish the research as *open access* in order to make the published results available to the public.

Furthermore, the data collection for the second and third articles was completed using generalized options for items; for instance, the question of participants' gender assigned at birth gave the options 'male', 'female', and 'decline to state'. However, in order to create a representative dataset, it is necessary to consider including additional options for ethical reasons where applicable (Sausa, Sevelius, Keatley, Iñiguez, & Reyes, 2009). In the case of participants' gender, additional options could be given, including: 'male', 'female', 'transgender male', 'transgender woman', 'genderqueer', 'open-ended', and 'decline to state'.

The fourth article, which concerned circumvention media, involved ethical topics such as data protection of sensitive information gathered from politically active participants. Such sensitive information could potentially endanger participants in volatile political situations if it was exposed. No such data was collected within the context of this thesis.

4. Results of research articles

The previous three chapters outlined the scope and research objective of the thesis, the background with regards to the area of investigations, the research questions, and the methodological approach used in this work.

4.1 Summary of articles

The current chapter provides an overview of the five articles and their associated results. The chapter concludes by proposing four design guidelines based on these research results and an elaboration of these results into the *refined* concept of co-creative media, see Figure 4.1 for an overview.

4.1.1 Article 1: From mobilization to consensus: Innovating cross-media services to organize crowds into collaborative communities

Faraon, M., Villavicencio, V., Ramberg, R., & Kaipainen, M. (2013). From mobilization to consensus: Innovating cross-media services to organize crowds into collaborative communities. In P. Parycek & N. Edelmann (Eds.), *CeDEM13: Conference for E-Democracy and Open Government* (pp. 215-227). Krems: Edition Donau-Universität Krems.

The purpose of this article was to present a concept design that incorporates current information technology for the purposes of democratic engagement in society. More specifically, this article addresses how mobilized crowds can be empowered by means of technology to engage themselves in proactive collaboration, consensus-seeking, and co-creation. Previous governmental and non-governmental projects promoting civic participation have failed, primarily due to two reasons: (1) the exclusion of citizens from decision-making processes; and (2) a lack of both transparency and a communication channel that would allow citizens to express their opinions in an effective way. These obstacles have prevented citizens from communicating their political, economic, and social dissatisfaction, potentially leading to reactive mobilization in the form of protests (e.g., the London riots in the UK, the Indignados in Spain, and Occupy Wall Street in New York).

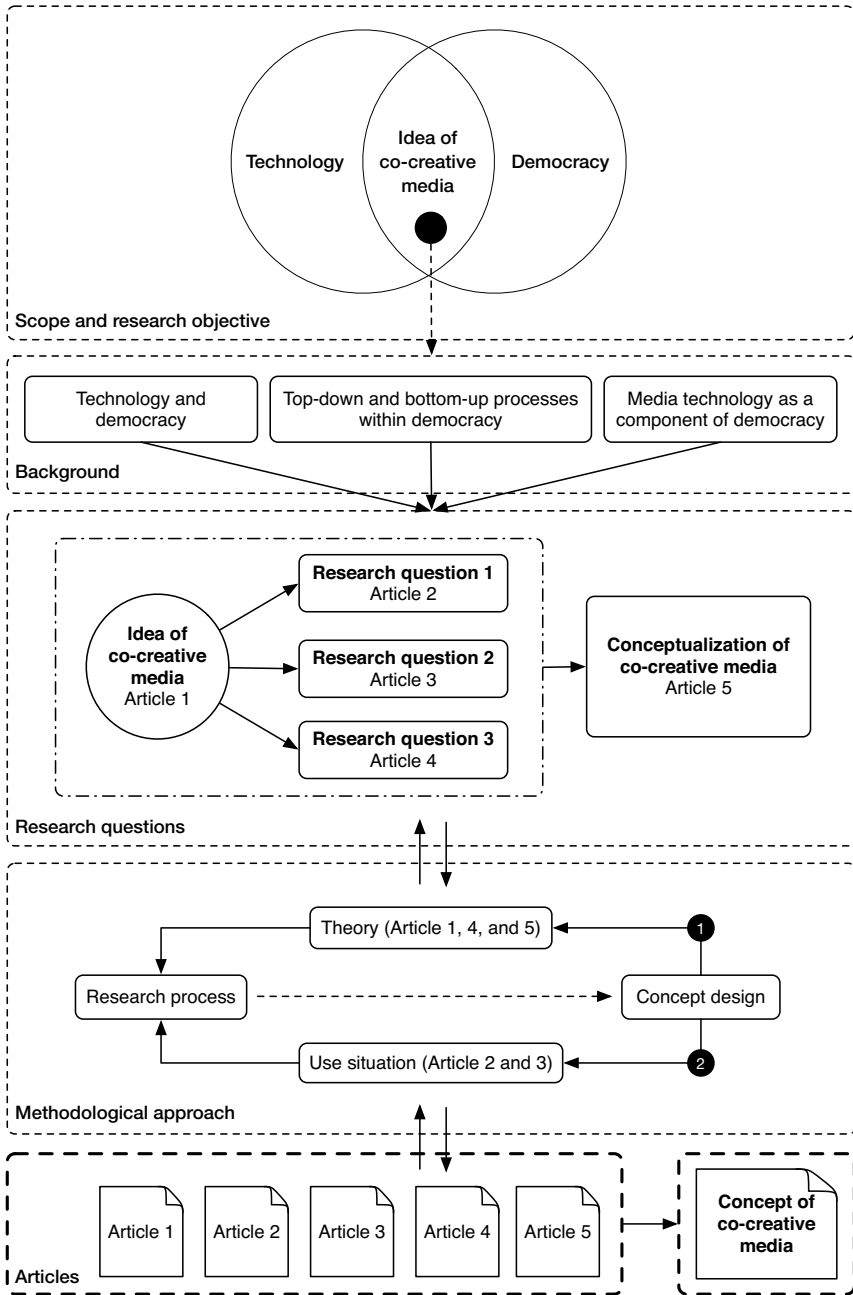


Figure 4.1: The sections marked with bold-dashed lines illustrate the overall contribution of this thesis, namely the concept of co-creative media, which is described at the end of this chapter. The five articles were written as an integral part of the concept-driven design research approach of Stolterman and Wiberg (2010).

A common denominator in the mobilization for these protests was the use of social media such as Facebook and Twitter. Hence, the point of departure used in this article was to ask what follows after the reactive mobilization of crowds, and how to design, integrate, and adapt current technological elements to facilitate both mass mobilization and collaboration for micro and macro democratic processes.

Based on a literature review and concept-driven design research, we proposed a concept that integrates social media and collaborative applications within a democratic context. The aim of this was to direct mobilized crowds towards collaborative, consensus-seeking, and co-creative activities. The framework is composed of three paths: (1) invitation; (2) community building; and (3) consensus-seeking. An overview of each path is given in Figure 4.2.

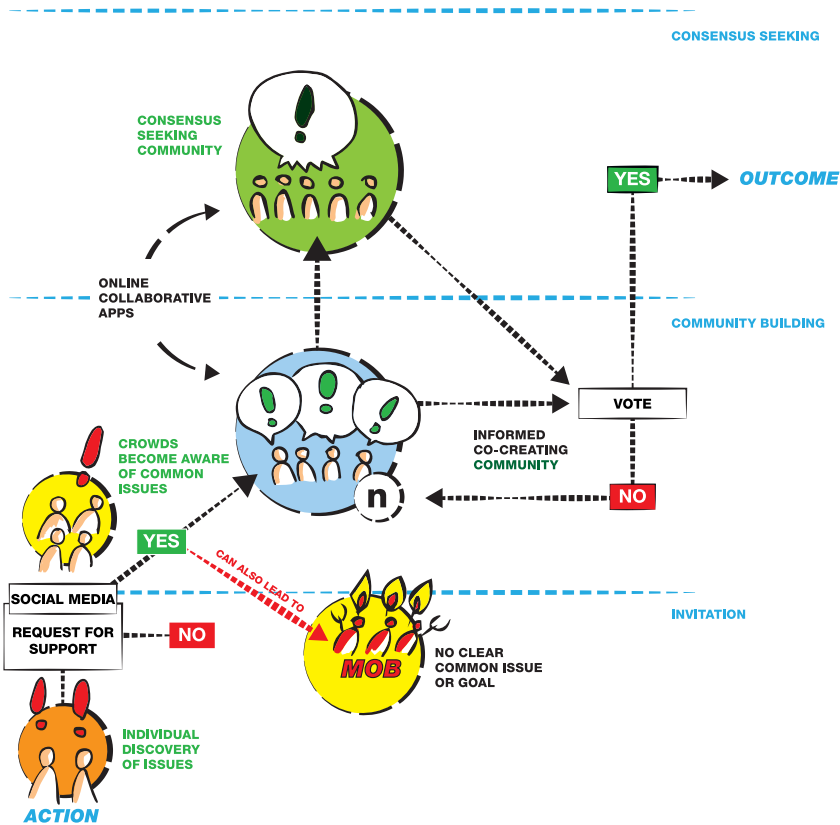


Figure 4.2: Abstract overview depicting the path of an individual who discovers an issue, towards becoming engaged and contributing to the process of creating a "solution" to the issue, involving three paths: (1) invitation; (2) community building; and finally (3) consensus-seeking, adopted from Faraon et al. (2013).

The point of departure is the identification of issues by citizens, whether these are societal, political, or economic in nature. Each citizen has the ability to invite others by means of social media networks or e-mail for the purpose of mobilization. As mobilized crowds become aware of the common issue, and a sense of community is established, they start to act toward meaningful and constructive outcomes, i.e., co-creation. Following this, shared goals emerge and become expressed as joint artifacts (e.g., text, images) within a community. In the case of disagreement over joint artifacts, a mechanism is provided that would allow the community to split into branches and create a parallel evolution of the co-creation. This evolution would continue until the manifestation has been validated through explicit unanimous support.

Acquiring knowledge and becoming well-informed can alter citizens' preferences in decision-making processes such as Internet voting. Understanding and identifying the preferences of voters regarding the use of Internet voting and the extent to which this mechanism can be used as a form of democratic participation were the main motivations for the next article.

4.1.2 Article 2: Positive but skeptical: A study of attitudes towards Internet voting in Sweden

Faraon, M., Stenberg, G., Budurushi, J., & Kaipainen, M. (2015). Positive but skeptical: A study of attitudes towards Internet voting in Sweden. In P. Parycek, M. Sachs & M. M. Skoric (Eds.), *CeDEM-Asia 2014: Conference for E-Democracy and Open Government* (pp. 191–205). Münster: Edition Donau-Universität Krems.

This article investigates the disposition of Swedish voters to adopt Internet voting as a mechanism for democratic participation and the challenges associated with its implementation and use. Several reasons motivated the pursuit of Internet voting, including: (a) the growing demand for online services, since the general elections in Sweden remain a manual and costly process; (b) to maintain and possibly increase voter turnout; (c) to reduce proxy voting applications; (d) to provide voters with disabilities and expatriates equal grounds with regards to participation; and (e) to increase the accuracy of vote checking, tabulation of votes, and the reporting of the results.

Until now, most data available on the challenges of Internet voting refers to contexts outside of Sweden. Thus, the main purpose of this paper was to generate data that would both support the introduction of Internet voting in Sweden during the general elections of 2018 and identify the challenges associated with its introduction and use for democratic participation. Three research questions emerged from the main purpose and the literature review: (1) how far Swedish voters are disposed towards Internet voting; (2) how

factors such as age, gender, education, employment, and political background influence participation through Internet voting; and (3) what role security plays when engaging with Internet voting.

To answer these research questions, a large-scale survey was employed that consisted of 20 Likert-type items concerning opinions on participation through Internet voting, the security of Internet voting, and individual attitudes towards Internet voting. The survey was sent to participants who had responded to an experimental polling on Facebook prior to the general elections of 2010 in order to predict the outcome of the election before election day. Prior to the polling on Facebook, participants had given informed consent to being contacted in the future. The total number of participants for this survey was 5683, and 5237 participants remained after outliers were excluded.

The findings indicated that the majority of participants felt positively towards using Internet voting for participation in democratic processes but were skeptical about the possibility of solving related security issues. The acceptance of Internet voting was spearheaded by women, groups with a relatively low level of education, and the unemployed or self-employed. Compared to women, men were more optimistic about overcoming the security challenges associated with Internet voting. Participants with a lower level of education showed a stronger desire to adopt Internet voting more than their counterparts. Interestingly, there were no differences between the age brackets, indicating a possible fading of the digital divide. The adoption of Internet voting may ultimately pave the way towards new forms of democratic participation. With the increasing amount of misinformation online, it was necessary to understand how the different types of information can influence attitudes and voting behavior; this could have implications for the design of co-creative media, and was further elaborated in the next article.

4.1.3 Article 3: Political campaigning 2.0: The influence of online news and social networking sites on attitudes and behavior

Faraon, M., Stenberg, G., & Kaipainen, M. (2014). Political campaigning 2.0: The influence of online news and social networking sites on attitudes and behavior. *eJournal of eDemocracy and Open Government*, 6(3), pp. 231-247.

The work presented in this article is related to the first research question regarding the influence of online news (e.g., the New York Times) and social networking sites (e.g., Facebook and Twitter) on attitudes and behavior. The background to this research was that social networking sites have changed the way we acquire information, form opinions, and make decisions based on freely accessible information that is often not available from corporate-controlled media. For comparison reasons, it was important to examine whether

the dissemination of information in social networking sites could be perceived and evaluated with equal weight as that of online news with regards to implicit and explicit attitudes as well as voting behavior.

The main purpose of this paper was to test two hypotheses related to the formation of attitudes and voting behavior. The first hypothesis (H1) suggested that online news would have greater leverage and more extensive influence on both explicit and implicit attitudes and voting behavior, as compared to social networking sites. The second hypothesis (H2) advanced the argument that the negativity effect on explicit and implicit attitudes (i.e. assigning more weight to negative information) would be weaker for social networking sites compared to that of online news. In order to test these hypotheses, a web-based experiment was conducted that simulated a campaign, polls, and an election between two fictitious male candidates.

A total of 139 participants provided complete records, and after identifying outliers, 17 participants were excluded, leaving a final total of 122 participants. All data were recorded in an online database and later exported to MatLab and Predictive Analytics SoftWare (PASW) for computation and statistical processing. In terms of attitude formation, the results showed that online news had a significant influence on both explicit and implicit attitudes while social networking sites did not. With regard to the effects of valence (positive versus negative items), the findings indicated that negative information had a stronger influence than positive, especially if information emanated from online news. Finally, concerning the influence of positive or negative information from online news or social networking sites, the data suggest that unfavorable information, independent of the media used and when mediated through explicit attitudes, increases the chance of switching sides.

The findings of this study provided new insights into the influence of information from online news and social networking sites. The results could support the design of co-creative media, which provides the means to effectively communicate information to citizens on a wide range of issues. In order for co-creative media to work independently and without government intervention, solutions for securing information and network communication under conditions of censorship are essential. These are discussed in the next article.

4.1.4 Article 4: Using circumventing media to counteract authoritarian regimes

Faraon, M., Atashi, S., Kaipainen, M., & Gustafsson, N. (2011). Using circumventing media to counteract authoritarian regimes. In G. Bradley, D. Whitehouse, & G. Singh (Eds.), *IADIS International Conference on ICT, Society and Human Beings 2011* (pp. 251-254). Rome: IADIS Press.

The purpose of this article was to reflect on the development of circumvention solutions and communication technologies under conditions of censorship by governmental powers. The point of departure in this paper was the turmoil and political disturbance in the Middle East and North Africa (MENA) from 2010 onward. A number of governments (e.g., Tunisia and Egypt) did not realize that the path to civility lay through speech rather than censorship. Both of these governments decided to censor the flow of information, and in some countries (e.g., Egypt, Libya, Syria, Bahrain) services such as the Internet and mobile communication were entirely closed down for a short period of time. These events provided us with a warning that governments are still capable of shutting down crucial communication channels. However, the temporary closure of mobile networks and the Internet had the opposite effect to that hoped for by the government, which was to mute the protests.

As a reaction to the shutdown of services in numerous countries, engineers from Google and Twitter joined forces to develop cross-media services and circumvent governmental censorship. One of the first solutions developed was the Speak-2-Tweet service. As the name indicates, citizens in Egypt, for instance, could call one of several international numbers from a landline in order to leave a message that would later be posted on Twitter with the hashtag #egypt. Although mobile networks had been temporarily closed down, the same could not be done for landlines since this would have undermined the government itself. This allowed Egyptians to provide continuous updates on the prevailing conditions and events to the rest of the world. Another solution developed during this period of time was micro ad-hoc networks, i.e., low-power plug servers that decentralize information flow through the use of external peripherals such as satellite phones.

The aforementioned solutions were primarily developed with the aim of supporting activists and protesters in the MENA countries. However, censorship has also been imposed in Western countries (e.g., United Kingdom, Belarus, Italy) and this fact should not be overlooked (d'Itri, 2015; Opennet, 2015; Vincent, 2013). As long as there is a risk of censorship, there is a need to develop solutions and technological communication alternatives for circumvention purposes.

4.1.5 Article 5: Concept-driven design for democracy: Advancing co-creative media to support citizen participation and democratic engagement

Faraon, M. (2018). Concept-driven design for democracy: Advancing co-creative media to support citizen participation and democratic engagement. *eJournal of eDemocracy and Open Government* (accepted).

The purpose of this article was to further elaborate the concept of co-creative media, partially based on the results of the previous articles. The article applied the concept-driven design approach to theoretically underpin and empirically inform the concept. This was accomplished by adopting theoretical resources from the framework of ANT, identifying criteria using an analysis of existing STSs for democratic engagement, and building on the results of the previous four research articles.

ANT provided structure and explanatory value for the concept of co-creative media, and contributed principles, concepts, views, and characteristics that theoretically underpin and prescribe the aims of the concept of co-creative media. This analysis of existing STSs for democratic engagement resulted in a set of criteria that the concept aims to fulfill. These criteria are mobilization, collaboration, multilingualism, third-party adoptability, voting, scalability, integration of online content, and open source (independence from government and proprietorship).

The results from the previous four articles contributed to informing and elaborating this concept. The *first* article provided a point of departure for co-creative media and contributed by theoretically framing the concept (Faraon et al., 2013).

The *second* article explored the use of Internet voting and how this may be useful in supporting democratic engagement and aiding the mobilization of crowds behind political issues and campaigns (Faraon et al., 2015). The findings indicated that the majority of participants were positive towards using Internet voting for participation in democratic processes but skeptical about solving related security issues.

The *third* article investigated the influence of online content conveyed by online news versus social networking sites on explicit and implicit attitudes, and voting behavior (Faraon et al., 2014). The results showed that online news had a significant influence on both explicit and implicit attitudes, while social networking sites did not. Regarding the influence of positive or negative information from online news or social networking sites, the data suggest that unfavorable information, independent of the media and when mediated through explicit attitudes, increases the chance of switching sides.

The *fourth* article theoretically reviewed research on circumvention media, and contributed knowledge on the ways in which different technologies could be repurposed to develop novel cross-media services to support the free flow of information under conditions of censorship (Faraon et al., 2011).

Overall, ANT, an analysis of existing STSs, and the results from the four articles were used to elaborate the concept of co-creative media, see Figure 4.3.

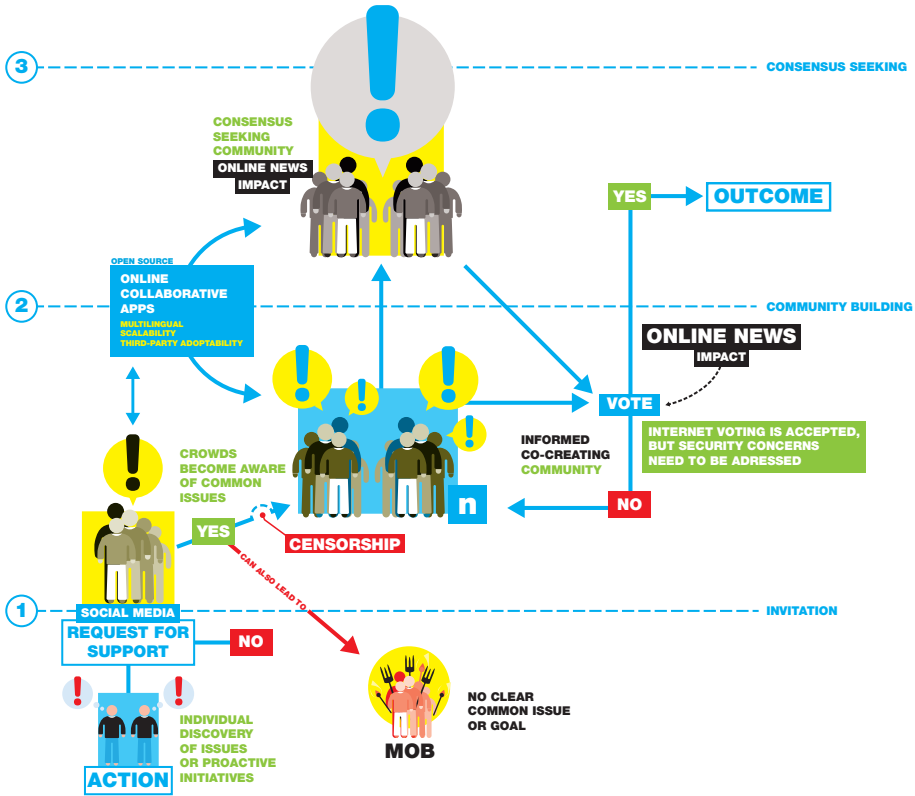


Figure 4.3: An illustration of the concept of co-creative media, depicting a process that may begin with citizens discovering issues or supporting proactive initiatives, and then moving towards constructive and co-creative outcomes.

Due to the dynamic nature of the concept of co-creative media, it is necessary to understand the process of engagement in terms of instantiations or iterations pursued by actors in a collective of networked relationships. Drawing on the framework of ANT, it is important to note that the figure is not assumed to be linear or hierarchical, but instead fibrous or stringy. This means that different processes, for example, collaboration and consensus-seeking, could occur along different paths. In this sense, it would be possible to pursue a process that starts with invitation and goes directly to consensus-seeking, or which starts and stops with invitation, without community building or consensus-seeking (e.g., petitions).

4.2 Design guidelines for co-creative media

A frequently used method of reporting results in HCI is by means of design guidelines (Dix, 2010; Dourish, 2004). Although design guidelines can be found for the reporting of results of research into technology and democracy, these are often not reported in a consistent way. For instance, while some studies report for whom and for what reasons they should be used (Mkude & Wimmer, 2013), others exclude such information (Council of Europe Publishing, 2009). Within the area of technology-enhanced learning (TEL), van den Akker (1999, p. 9) suggests the following definition of design guidelines:

"If you want to design intervention X [for the purpose/function Y in context Z], then you are best advised to give that intervention the characteristics A, B, and C [substantive emphasis], and to do that via procedures K, L, and M [procedural emphasis], because of arguments P, Q, and R."

While this definition has been proposed and often used for educational design research (Eliasson, 2013; McKenney, Nieveen, & van den Akker, 2006; Nouri, 2014), it is also relevant to research into technology and democracy, for several reasons. Firstly, the definition provides a context in which the design guideline is to be used; secondly, it includes a dimension that concerns what to do and how to do it; and thirdly, it provides arguments for why it should be done. For these reasons, the definition by van den Akker (1999) will be adopted for the proposed design guidelines in this thesis. It is important to note that design guidelines are not "intended as recipes for success but to help others select and apply the most appropriate substantive and procedural knowledge for specific design and development tasks in their own settings" (McKenney et al., 2006, p. 119).

In the definition above, the term 'intervention' refers to "products, programs, materials, procedures, scenarios, processes" (McKenney et al., 2006, p. 5). In the following, the term is rephrased in the proposed guidelines as "co-creative media for democratic engagement". Content marked with *italics* is what changes between each guideline. The design guidelines are motivated by the results of the five appended articles.

4.2.1 Design guideline 1: Support the mobilization of crowds

"If you want to design co-creative media for democratic engagement, then you are best advised to give these *co-creative media the functiona-*

lity of mobilization and collaboration because this helps citizens to gather support and work with each other on identified issues or proactive initiatives."

This design guideline was motivated by the results of the first and fifth articles. Research results from other studies similar to those presented in these articles further confirm this design guideline (Castells et al., 2012; Mason, 2012).

4.2.2 Design guideline 2: Facilitate Internet voting for continuous participation

"If you want to design co-creative media for democratic engagement, then you are best advised to give these co-creative media the access to Internet voting because this provides citizens the opportunity to continuously participate in democratic processes."

This design guideline was motivated by the results of the second article. A positive attitude was identified towards the use of Internet voting for participation in democratic processes, although potential security concerns need to be rigorously addressed before the adoption of this technology.

4.2.3 Design guideline 3: Integrate online content

"If you want to design co-creative media for democratic engagement, then you are best advised to give these co-creative media the ability to integrate online news because this helps citizens to stay up to date with current events and make informed decisions."

This design guideline was motivated by the results of the third article, in which it was identified that content emanating from online news had a stronger influence on our attitudes compared to that of social networking sites such as Facebook or Twitter.

4.2.4 Design guideline 4: Support open source for democratic engagement

"If you want to design co-creative media for democratic engagement, then you are best advised to give these co-creative media the characteristics of open source, because this helps citizens to adapt and scale technology based on their needs, interests, and wishes, even under unfavorable communication conditions."

This design guideline was motivated by the first, fourth, and fifth articles. It was identified that an open source approach could create the possibilities of adapting and scaling technology. In addition, open source facilitates transparency, increases security, and provides accountability. Finally, open source provides citizens with the necessary means to secure network communications, which can allow for the free flow of information under conditions of censorship.

5. Discussion

The current thesis set out to contribute to participatory democracy by *theoretically anchoring* and *conceptualizing* co-creative media. Accordingly, the research question was: *How can co-creative media be theoretically anchored and conceptualized in order to facilitate and support citizen engagement within democratic processes?* The concept-driven design research approach of Stolterman and Wiberg (2010) was used to address this research question, which resulted in the theoretically and empirically grounded concept of co-creative media. The completed work of this thesis can be described as an evolution departing from the basic idea of co-creative media and progressing towards the concept of co-creative media.

Co-creative media are defined in this thesis as *socio-technical systems that integrate and adapt existing information- and communication technologies (ICTs), with the aim of facilitating democratic engagement in terms of proactive, collective contributions, and consensus-seeking towards common interests.* They aim to create opportunities for citizens to continuously participate in dynamic environments with the purpose of mobilizing, collaborating, and acting together in networks of communities based on their needs, interests, and wishes.

This discussion is structured in four sections, covering the potential of the proposed design guidelines, ANT and self-organizing societies, methodological considerations, and concluding remarks. The first section reflects on the four proposed design guidelines for co-creative media and discusses their use in a broader context. The second examines ANT as an alternative to the dualism of technological determinism versus social constructivism, and relates it to the idea of self-organizing societies. The third describes methodological considerations concerning the concept-driven design research approach, and the fourth provides concluding remarks with regard to the relationship between technology and democracy.

5.1 Potential of the proposed design guidelines

Based on the research conducted in this work, four design guidelines were formulated to guide the further design of co-creative media for democratic

engagement. These four design guidelines are: *support the mobilization of crowds*; *facilitate Internet voting for continuous participation*; *integrate online content*; and *support open source for democratic engagement*. The potential implications of each design guideline are discussed below.

The first design guideline, *supporting the mobilization of crowds*, aims to offer individuals the possibility of rallying a large number of people behind certain issues, for example, political, economic or human rights conditions (Howard, Agarwal, & Hussain, 2011; Lotan et al., 2011). The mobilization of crowds can be perceived as a form of grassroots-based social movement that seeks to facilitate change. In some instances, for example, the London riots in the United Kingdom, violent tactics emerged. The concept of co-creative media may avoid the use of such tactics by guiding the mobilization of crowds towards a co-creative process that is supported by ICTs and which leads to collaboration, negotiations, and consensus-seeking among involved stakeholders (Faraon et al., 2013). In addition, this concept may contribute to supporting the mobilization of crowds in different environments, for example, students and teachers garnering support for various causes in school environments, residents mobilizing within housing cooperatives, or staff members trying to improve working conditions in local institutions.

In the second, *facilitating Internet voting for continuous participation*, the concept of co-creative media has the potential to support and accelerate the use of Internet voting in democratic processes. Using Internet voting as a decision-making mechanism embedded in co-creative media could empower citizens to participate and make legally-binding decisions. Although Internet voting can be applied for continuous citizens democratic engagement by citizens, both informal and formal, as illustrated by the Swiss example (Germann, Conradin, Wellig, & Serdült, 2014), it is susceptible to external intrusions, as reported for example in the 2016 US presidential election (Greenberg, 2017; Shugerman, 2017). For this reason, additional research is therefore needed to further strengthen the security of Internet voting, possibly by looking towards the emerging potential of blockchain technology (Boucher, 2016). Within the context of the concept of co-creative media, Internet voting is envisioned as a mechanism that support citizens' consensus-seeking and decision-making activities. Such activities include, for example, nurses and doctors in local hospitals aiming to influence their working conditions, citizens expressing their preferences on initiatives in their municipality, or residents establishing legitimacy for decisions reached in housing cooperatives.

The third design guideline, *integrate online content*, contributes with a dimension of co-creative media that allows citizens to acquire and disseminate information that may aid them within democratic processes, for example,

when making informed formal and legally-binding decisions. The concept is informed by empirical insights that may help designers and citizens to better understand the integration and influence of different online content in democratic contexts. This concept could also be useful in other contexts with regard to the integration of online content, for example, by organizers of balloting at academic environments, campaign managers during elections, or designers working on online services such as Facebook, Twitter, and Google. In this respect, the results of this thesis support the initial assumption that contemporary social media facilitate mobilization. Integrating online content may well be an important contribution to this capability and is therefore worth including in future co-creative media implementations as well.

The fourth design guideline is *support open source for democratic engagement*. More than five billion people will gain access to the Internet over the next decade. The most significant increases will be in countries where information is severely censored: for example, in Russia, tens of thousands of dissent sites are blocked (Maréchal, 2017); in Vietnam, there is a law called Decree 72 that makes it illegal to disseminate content opposing the government; and in Pakistan, services such as Wikipedia and YouTube are replaced by warning messages upon access (Guzzetti & Lesley, 2016). Currently, activists from the Internet Freedom Movement create and distribute open source tools by means of repository hosting services like Github in order to support citizens' freedom of expression. Co-creative media can facilitate a community in which activists, coders, and engineers could collaborate, create, and distribute open source tools aimed at democratic engagement. In addition, co-creative media have the potential to facilitate open design environments, that is, digital ecologies that offer citizens the ability to access and co-create their own open source tools or services for democratic purposes (e.g., STSs). Such tools or services could, in turn, lead to a chain of subsequent activities that may result in unforeseen outcomes or change in a society.

5.2 Actor-network theory and self-organizing societies

The development of projects using ICTs for democratic engagement has often departed from a view related to technological determinism or social constructivism. While the former is considered to be the driving force for social change and determines the direction in which a society develops (Elle, Dammann, Lentsch, & Hansen, 2010), the latter argues that technology is a product of the social, political, and cultural contexts in which it is situated (Humphreys, 2005). This dualism has created what is referred to as hard-soft gaps, i.e., gaps between the technology and the social context in which it is intended to be used. These gaps have often been a contributing factor to the failure of

projects involving democratic engagement (Anthopoulos, Reddick, Giannakidou, & Mavridis, 2016). As an alternative view, ANT was developed to sidestep not only the dualism created by the techno-determinism versus socio-constructivism, but also the many polarities that exist in social science, for example, micro versus macro, local versus global (Barter & Bebbington, 2012). ANT proposes a social topography that can be considered free from hierarchy, scales, or levels; this is a flat ontology that rejects any *a priori* attribution to power (i.e., power should be abandoned) or size (e.g., micro versus macro, local versus global) (Latour, 1986).

In the type of ontology that Latour discusses, power is conceptualized as "a shared capacity, involving myriad natural actants as much as social ones, which is thoroughly decentred in different networks" (Castree, 2002, p. 121). ANT asserts a view in which power can be perceived as a relational achievement and not as a "monopolisable capacity radiating from a single center or social system" (Castree, 2002, p. 122). While it is possible for a primary actor to hold power by mobilizing and speaking on behalf of other actors in a network, it is concurrently possible that mobilized actors may eventually reject the power of the primary actor, "at which network stability can be contested" (Castree, 2002, p. 122). In this sense, the relationship between actors in a network is never so stable that different networks cannot emerge. With the support of ICTs for democracy, networks of actors provide a means of facilitating and structuring self-organizing societies.

Concerning Latour's view on size, ANT suggests a shift from scale to networks, where networks are not comparable in size but rather based on the intensity and strength of their connections (Latour, 1996). This reminds us that ANT is not a theory, but a method that can be used to trace relationships between different objects. ANT would suggest that if an actor, for instance, a citizen, is complaining about a city area where there are plans to rebuild to make room for new apartments, it is neither the intrinsic nature of the city area nor the right of the actor to complain that is of concern, but the relationship between them. The question then follows: why is this area important for the actor, and how many others can be mobilized behind the cause? Understanding this relationship may simplify decision-making for actors, as it would avoid theoretical discussions of the perceived value of both the city area and the actor. The concept of co-creative media may aid in locating and tracing relationships that actors have to each other and to non-human objects with which they interact in relational networks. A consideration of both the relationships between humans and non-humans and the shape of networks, it could lead to a better understanding of how democratic engagement processes can be furthered, by and for actors, possibly towards self-organizing societies that are supported by ICTs.

Existing systems, such as living organisms, animal societies, and natural ecosystems, are self-organizing, which means that order emerges and is established by the system itself rather than via external agency. Members of natural ecosystems are connected in vast relational networks that demonstrate a high degree of order, even without a central point of control, for example a forest and its inanimate habitat. Comparable to natural systems, complex human systems can also be self-organizing and exhibit their own forms of order. Take for instance a complex organization, such as a university, a medical facility, or a business enterprise, all of which appear to resist any efforts towards control by an outside force. The ability to self-organize provides systems, whether natural or human, with the necessary means to adapt and evolve in response to changing environmental conditions. As human societies become ever more complex, it is likely that political leaders and decision-makers may encounter difficulties in processing the immense amount of information necessary to make informed decisions. Thus, power should be devolved in the form of a shared and decentered way to actors in networks of organized communities. Through non-deterministic and dynamic interactions, actors may make use of the concept of co-creative media to aid the viability, sustainability, and development of an adaptive and self-organizing society. This implies and opens the way for a potential shift from representative democracy to forms of participatory democracy.

5.3 Design methodological considerations

With regard to the methodological approach employed here, namely the concept-driven design research approach proposed by Stolterman and Wiberg (2010), this work suggests the possibility of applying an empirical perspective to a use situation with the purpose of advancing theoretical concepts while at the same time using empirical results to optimize a concept design in relation to a specific idea. This work could be compared to that of Johansson and Wiberg (2012), in which they apply empirical data to improve a concept. Empirical studies in design research can provide researchers with the ability to examine how things *do* happen while concurrently contemplating, based on theoretical considerations, how things *ought* to happen in futuristic use scenarios.

The concept-driven design research approach includes the seven methodological activities of concept generation, concept exploration, internal concept critique, design of artifacts, external design critique, concept revisited, and concept contextualization. The current work follows these activities with the exception of external design critique, which has been adapted. According to Stolterman and Wiberg (2010, p. 111), external design critique means that

"the conceptual design is exposed to a public and critiqued as a composition". While a public, for instance, a focus group, may convey constructive feedback about a concept, one alternative is to evaluate a concept by first examining aspects of it in the form of theoretical and empirical studies. Such studies advance theoretical development, lead to knowledge production, and contribute with results that further a concept.

This thesis also suggests how *external design critique* could be implemented in the form of theoretical and empirical studies in order to evaluate aspects of the concept of co-creative media, as discussed in the fifth article. Design critique takes many forms, for example, self-critique, peer-review, and expert tutoring, and is an integral part of the process of designing, which directly informs the practice of making (Scagnetti, 2017). Peer-review feedback by external reviewers could be perceived as a form of external design critique that aims to drive a design forward. Going beyond peer-review, it is possible to consider the opportunities such as the scalability, availability, and affordability of applying a crowdsourced approach to an external design critique (Yuan et al., 2016).

Finally, the completed work offers a contribution to the discussion of how empirical research and external design critique in the form of theoretical and empirical studies can *inform* as well as *further* a concept design, rather than of applying more traditional user-centric methods such as usability evaluation.

5.4 Concluding remarks

The completed work of this thesis theoretically underpins and elaborates the concept of co-creative media for democratic engagement. This concept represents a step forward in facilitating and creating opportunities for citizens to continuously participate and engage in bottom-up and co-creative processes by means of digital technology. The implications of such processes could be the building, advancement, and strengthening of partnerships between communities and local services, the extension of digital skills in society through community-engaged practitioners, and the propagation and coordination of large-scale creative practices.

The widespread use of digital technology and connectivity to the Internet does not necessarily lead to increased participation in democratic processes or the empowerment of citizens. It is feasible to consider that building on existing technologies and citizens' practices online could be a possible path towards increasing the inclusion and engagement of citizens in democratic processes. Co-creative media may drive change by acting as a catalyst for democratic impulse and an outlet for citizen expression in which collective beliefs and social movements could be shaped. This shaping has the potential to motivate

and organize citizens to reach and involve a broader mass of people who can take democratic action, protests against injustice, and press for change, for example, social, political, or economic.

Concurrently, it is important not to lose sight of the fact that in some regions of the world the liberating effects of the Internet and in particular social media are subdued by effective government censorship that stifles human agency. The ability to connect, communicate, and organize using circumvention tools and services, especially in places where authoritarian regimes have a monopoly on information, may help in enabling democratic actions to occur. In this sense, co-creative media could give those seeking change the ability to reach a critical mass of activity, which ultimately could pave the way to democratic transition.

Technology and democracy have historically been closely intertwined with each other. The evolution of technology and democracy does not follow a straight line but is rather characterized by zigzags. Given the exponential development of ICTs, it is possible to contemplate that the trend lines of their relationships will ultimately be in the direction of a more networked, participative, and collaborative world. The current thesis makes a contribution by steering their co-evolution in terms of elaborating and conceptualizing co-creative media with the aims of promoting citizen engagement and strengthening democracy. Looking forward, creating a self-organizing society built on expanded citizenship and continuous democratic participation is a long-term commitment that requires us not to go gently into the night.

6. Future work

Future study could further elaborate the concept of co-creative media by including different stakeholders from a range of fields, for example, political scientists and representatives, academics, law experts, computer scientists, hacktivists, designers, and citizens. Considering other points of view than solely a media technological perspective may produce results that are of significance for the evolution of co-creative media. For instance, political scientists and representatives may examine consensus-seeking processes within co-creative media and their implications in practice; academics and experts within the field of law may examine the legal aspects of Internet voting and the necessary requirements needed to adopt co-creative media in society. In addition, a legal perspective might investigate how decisions are implemented once they have been made in co-creative media, and how political representatives could be involved in decision-making processes.

Furthermore, computer scientists and hacktivists may investigate co-creative media in terms of the design of information architecture, the use of block-chain technology, the practicalities of coding, open source deployment, and the security of Internet voting. By engaging with economists, it may be possible to examine the ways in which co-creative media can support a sharing economy, Wikinomics, value-generating activities, and citizen-led practices.

Looking at co-creative media from a design perspective, a possible continuation for the current thesis would be to evaluate and develop the suggested design guidelines within a digital artifact for use by citizens use in democratic processes, for example, in the form of a mobile application.

Moreover, in order to work towards an inclusive society, it is necessary to examine how to integrate into co-creative media types of digital technologies that are accessible to the broadest possible spectrum of citizens with different disabilities (e.g., visual impairment), competencies, devices, and network connectivities. Diversity within a society may not only be a matter of competencies, devices, or network connectivities but can also be seen as an issue of conceptual and linguistic understanding.

In terms of the studies conducted in the appended articles, a next step for the *first* and *fifth* articles concerning the concept of co-creative media might be to invite various stakeholders to participatory design processes, in order to ignite the development of co-creative media. In addition, these processes may

conceivably form starting points for developing practices and procedures for managing, coordinating, and evaluating applications and services for co-creative media. A further research effort for the *second* article would be to investigate the technical implementation of blockchain technology for Internet voting and specifically address citizens' security concerns. A continuation for the *third* article might perhaps be to adopt a web-based experiment that examines how citizens are influenced by content from online news versus that of social networking sites with regard to facts, rather than issues related to political candidates. The *fourth* article, which deals with censorship, has the potential to be extended by examining how different low (e.g., analog radio) and high technologies (e.g., the Internet) and different types of online and offline communication could be applied to circumvent censorship.

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