# Visualising Collective Actions

The Process of Creating
the ArtovaModel

Visualising Collective Actions

The Process of Creating the ArtovaModel

Georgia Panagiotidou

Author Georgia Panagiotidou

Title of thesis Visualising Collective Actions – The Process of Creating the ArtovaModel
Department Media Lab, Department of Media
Degree programme New Media
Year 2015   **Number of pages** 118   **Language** English

Abstract

This thesis illustrates the process of designing a visualisation of collective action practices through the case of the ArtovaModel visualisation. The vision was, through this visualisation, to help the Artova neighbourhood association enable further pleasurable collective actions, engage people in a discussion on collective actions or provide common grounds of communication. I aimed to achieve this by firstly helping to compile a vocabulary, a structure and a database of real-life examples from Artova–facilitated collective actions and later making them accessible by visualising the gathered information in a way that it is transparent and modifiable.

This thesis project has derived from a combination of data visualisation practices, human-centered design methods and collective action theory. It describes the collaboration with Artova, six collective actions and the independent company Avanto, to compile practices that Artova-facilitated collective actions share. Human-centered design methods were utilised to identify how these practices might aid other collective actions and the Artova association members. Lastly, an online interactive visualisation to communicate the gathered information was created, based on data visualisation practises. The activities employed and their risks and impact at each step of the visualising process are discussed. The thesis concludes with a personal reflection on this journey and lessons learned about visualising collective actions.

The ArtovaModel visualisation can be accessed online through:
http://www.artovamodel.fi/visual-eng/

Keywords information visualisation, collective action, data visualisation as a design process

acknowledgments

Contents

Figures & Tables

1 Introduction

Figure 1 Top: Capture of the 'You make the cuts' interactive visualisation, published online in the Guardian in October 2010. (Dant, Scruton, Rogers, & Sedghi, 2010)

Figure 2 Left: Community-based collective actions framework , screen capture from Mike Arauz's presentation on Design for Networks (Arauz, 2010, p.30)

Figure 3 Right: Visualisation of the action plan from the Collective Action Toolkit.
Frog Design (2013, p. 3)

1.1 Context

Visualising to enhance cognition is nothing new to sciences or to design. In statistics, data visualisations are used for understanding quantities and patterns in large datasets. Similarly, through graphic design, information is presented visually so as to encourage its understanding by others. Likewise, interactive information visualisations are also being employed to raise awareness about social issues as well as set the grounds for better communication.

As an example, the 'You make the cuts' visualisation (Dant, Scruton, Rogers, & Sedghi, 2010), published online by the Guardian in 2010, allowed the readers to visually restructure public spending in the UK (Figure 1). In their analysis of this visualisation, Dörk, Collins, Feng and Carpendale (2013) show that it empowered the users by giving them the opportunity to become the 'hand in control' of this open data. Another noteworthy part of the Guardian's article and visualisation is the 385 user comments[1] it gathered in three days. If the data had not been collected and made available (by the UK official bodies) or was not visualised to be made accessible, there is little chance this discussion would have taken place. And if it did, it would most likely not be based on common facts. Also, by letting the user shape and filter the data to his or her wishes allowed for multiple views on the same subject, accepting the fact that some *issues* need to be explored rather than just presented.

During the past years, a series of grassroots initiatives have sprung up in Finland to tackle or to comment upon current social problems. Such initiatives include Ravintolapäivä (Restaurant day), Siivouspäivä (Cleaning day), Dodo, Kallio-liike, and the Artova Film Festival[2] among others. Most of these voluntary actions are initiated by like-minded groups of individuals in no clearly defined manner. They are *collective actions* that are shaping their local environment through active participation[3].

These types of actions are for the most part self-organized, adapting to situations so as to fulfill their vision. And since each action has its own vision, tested methods and practices that helped them achieve it are dispersed in different people, spaces and artifacts (such as books). So far, even though these actions might have some means to document these practices, a unifying approach to collect their experiences and later present them, in order for them to reflect on or others to learn from, is still missing.

The presentation of a Community-centered Collective Action Framework (Arauz, 2010)[4] as well as the creation of a Collective Action Toolkit (Frog Design, 2013)

---

1   Counted until they closed the comments section three days after the publication.

2   See restaurantday.org, siivouspaiva.com, dodo.org, kallioliike.org (under maintenance at the time of writing) and Artova's website about the Artova Film Festival.

3   For a longer discussion on Finnish grassroots culture see Hernberg (2012) and Botero, Paterson and Saad-Sulonen (2012)

4   Arauz mentions in his blog that this visualisation is adapted from the 'The Collective Intelligence Genome' about web-enabled collective intelligence.

represent two recent attempts by designers and strategists to approach the subject of collective action practices (Figures 2 and 3). Both these examples use visual means to explain common principles and methods that collective actions often include or could include; with the hope to empower teams in their process. Also, both the visualisations in the paper toolkit by Frog Design and the visualisation that Mike Arauz has created, are *presentations* meant to augment cognition.

The value of visualisations, such as the aforementioned ones, lies beyond their method of interaction – exploratory or presentation. Above all, they are setting common grounds for communication related to (social) practices. In Star and Griesemer's words: *they are objects which are both plastic enough to adapt to local needs [...], yet robust enough to maintain a common identity across sites* (Star & Griesemer, 1989, p. 393); they act as boundary objects.

1.2 Research Focus

In this thesis, I focus on how to create a visualisation of collective action practices, from data collection to representation, so it acts as a boundary object. In particular:

> Starting from the hypothesis that visualising collective action practices could help to set common grounds for a wider discussion between people carrying out such collective actions, I will describe one possible approach to design such a visualisation. The concrete result of this degree project is called the "ArtovaModel visualisation".

1.3 Collaborations

For this degree work, I have collaborated with members of the Artova neighborhood association, six Artova-facilitated collective actions and an independent company named Avanto.

The Artova neighborhood association is a neighborhood association based in Helsinki, Finland who over the years have facilitated collective actions to achieve their vision in a pleasurable manner. Artova is the initiator for this degree work, whose outcome is the ArtovaModel visualisation.

The collective actions that are documented and analyzed as part of this degree work are six of the Artova teams. They are small groups of 1–10 people, mostly volunteers, who collaborate in order to fulfill their common vision. These teams are self-initiated and self-organized and their projects (namely, their visions) vary depending on their interests.

Avanto is an independent company appointed by Artova to help in the compilation of the Artova practices as well as their analysis. For further discussion on the stakeholders of the ArtovaModel visualisation refer to Chapter 2.

1.4 Approach

The ArtovaModel Visualisation was a collaborative effort between three parties (Artova, Avanto and myself), with my role being to help shape the ArtovaModel and design the ArtovaModel visualisation. This means that throughout the eight-month duration of this degree project, I have taken up various roles (analyst, designer as well as developer) and used appropriate methods to each of these roles. However, the overall approach is, in hindsight, harder to pinpoint as the boundaries of my roles became more vague.

Nevertheless, inspired by Artova's participatory nature and by open data ideals to allow for exploration, I found it important to keep the data, processes and conclusions transparent. It was clear (to me) from the beginning that this would not become a visualisation only to present conclusions, but to challenge both my process as well as Artova's – and eventually sparking a discussion and inspiring further work.

Concerning the methods applied, the process was human-centered and to the extent that time allowed, participatory. The interdisciplinary nature of the work meant that the process was a combination of approaches for design, social sciences and visualisation studies. For clarity, I have conceptually divided the process-path into three overlapping phases: Research, Content and Form.

The Research phase includes my conceptualization of collective actions and the Artova teams in particular. The goal was to understand what the expectations of the ArtovaModel visualisation were as well as begin to gather the different practices from the Artova teams. Therefore, this phase also includes human-centered design activities such as interviews, concept mapping and scenario building. For these activities I have worked closely with Janne Kareinen the Artova coordinator, as well as people active in the Artova project teams.

The Content phase groups the activities conducted to explore more deeply into the gathered data in the Research phase. These activities include thematic grouping, exploratory visualising and content analysis. The outcome of the Content phase was a proposal for the ArtovaModel and a few other data abstraction levels that I will be discussing later. The content analysis as such was done for the most part by members of Avanto, employing analysis methods from the field of sociology.

The Form phase uses a combination of best practices from the various sub-fields of information visualisation such as dynamic data visualisation, data journalism and infographics. This phase includes activities such as sketching and prototyping, as well as the design of the structure and context of presentation of the ArtovaModel. This is the final phase (not including the development process) before the launching of the online ArtovaModel visualisation in September 2013.

1.5 Motivation

During my studies, my interests have fluctuated from technology to art to design. As a natural continuum I became very fascinated with interdisciplinary fields such as information visualisation. Through this interest, I got introduced to some active members of the Artova association, who at the time wanted to create a visualisation of their practices. What these practices were and the overall purpose of such a visualisation were still unclear, however that just made me even more eager to explore this novel (for me) combination of visualisations – social actions under the umbrella of design.

1.6 Thesis Structure

In the first chapter I have introduced the general context of this degree work and its objectives. In the second chapter, I introduce my final design proposal, the ArtovaModel visualisation and its components. I choose to present the results upfront to be able to define in context the terms I will be using along this thesis work. In Chapter 3, I give a short introduction to what collective actions are, their self-organizing principles and how, in this case, these principles have been influenced by the particularities of an organization such as Artova. In the same chapter, I introduce visualising as a design process, explaining both its value and risks in representing information, and I close with a more in depth discussion about the design and research methods used during this thesis project. In the fourth chapter I discuss my process in detail, separating it in the three sections I mentioned above: Research, Content and Form. Lastly, in the fifth chapter I reflect on my process and its outcomes to draw some conclusions that are of relevance for visualising collective actions.

2 Case Study Introduction

the ArtovaModel Visualisation

2.1 Artova

Artova is the neighborhood association of the regions Arabia, Toukola and Vanhakaupunki in Helsinki, Finland. It is a pioneering neighborhood association, which often brings to life ideas that seem hard to implement even for professionals – let alone volunteers. They have developed a strong identity in the area and local partners are often keen to help out Artova projects. Nevertheless, the association's focus is more on the groups and individuals that make them happen i.e. the process, instead of the results of their projects.

Artova during its active years has been fostering the creation of small to large-scale collective actions[5]. The actions vary from interest groups who organize events (e.g. Artova Film Festival, Arabia Street Festival) to projects with a stronger social identity (e.g. Edible Arabia, Design Dog Park). These collective projects stem from ideas coming both from inside the association and from the local community. Artova's role is to 'house' these ideas by helping to form an action team, facilitating meetings, giving advice on interactions with the city and in general support the team members who are by default volunteers.

Janne Kareinen, the chair of Artova's board at that time, had the key role of a '*caddie*' or a change agent as it is so nicely described by Pirjo Tulikukka in his overview of peer-to-peer practices in suburban Helsinki (Tulikukka, 2012, p. 84). Artova's approach is to empower locals to actively engage in the development and well being of their neighborhood, and a *caddie's* role is to commit in gathering, testing and promoting methods in order to achieve this empowerment (Tulikukka, 2012).

Artova's innovative spirit can also be seen in the fact that they initiated this thesis work, and were keen on documenting, analyzing and visualising their practices to promote openness in their actions[6].

2.2 The ArtovaModel

Artova was interested to make visible their gathered experiences on fostering collective actions and to form the ArtovaModel. This model is a combination of Artova's best practices, advice and learnt-lessons put together during this degree work. The discussion of what constitutes a model is a long one with many contributors and changes depending on the field of study. In this context the term model here repre-

---

5 Throughout this thesis text, I will be using the terms collective action and collective project interchangeably. The difference between an action and a project resides (in my understanding) in the amount of time invested in each. However, in this scope, I will be using 'action' if to highlight their improvisational and fast changing nature and 'project' if to emphasize their organizational aspects.

6 For more information on Artova and their activities see artova.fi

sents an Aristotelian idealization or abstraction, namely a *deliberate simplification of something complicated with the objective of making it more tractable* (Frigg, 2012).

Compilation

Initially, the process of compiling the ArtovaModel was a bottom-up approach, from 'raw' data to higher level abstractions. The analysis and extraction of the 'raw' data was done by both Avanto and myself. I call 'raw' data the unprocessed (mostly qualitative) documentation of some Artova projects that includes blog posts written by the Artova projects and interviews conducted by both Avanto and myself. However, every hypothesis of what the model includes, was validated in a top-down approach by Artova coordinators and active members. Janne Kareinen, the Artova coordinator and chair of the board, played a key role in the analysis and validation since he was more knowledgeable about Artova's practices. His participation will be discussed further throughout Chapter 4.

Contents

After analyzing and grouping the 'raw' data mentioned above, five main thematic groups seemed to appear. We named these groups the **ArtovaModel factors** and each of them is composed of several **sub-factors** that represent one aspect of practices in Artova collective actions. For example, practices and recommendations referring to the group formation, group communication, meetings etc. are all grouped under 'Group' whereas practices concerning sponsors and city permits are grouped under 'Partnerships'.

The compilation and formulation of the ArtovaModel was a collaborative process with the most significant part being structured by Avanto. However, I had conducted some interviews with the Artova teams and made some preliminary groupings and project timelines myself which served as a basis for Avanto to continue the analysis. Nevertheless, the text describing the ArtovaModel factors was written by Avanto; therefore, the full report (which has been edited and re-worded) is added to this thesis work in Appendix A for further reading. I will, however, present the final ArtovaModel factors and their sub-factors as well as the description text of the 'Defining the vision & goals' sub-factor in order to show the nature of the findings. ArtovaModel factors and their sub-factors are seen in Table 1 and Figure 5 on the following page.
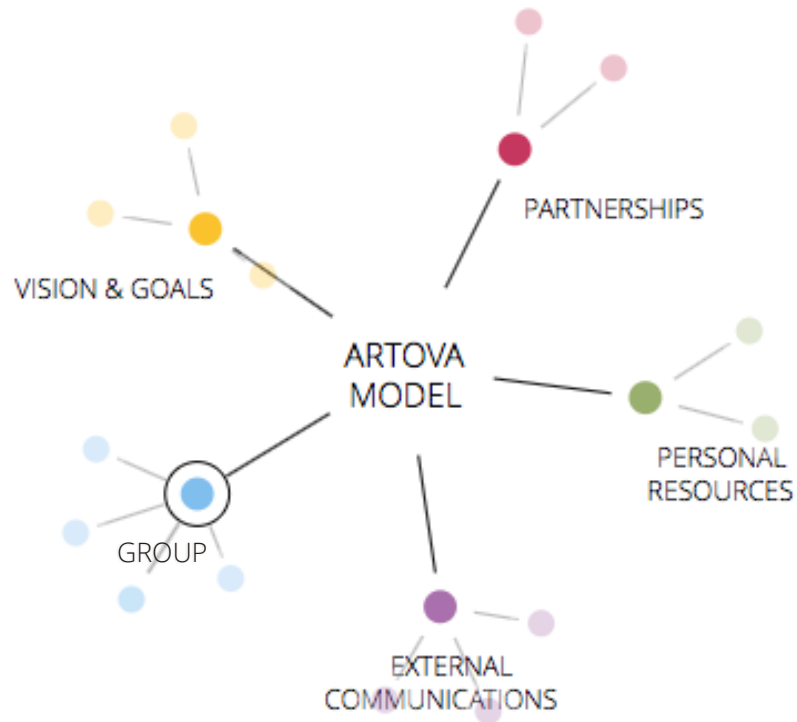
Figure 4 Artova's model visualised.

Group	Personal Resources
Forming a Group	Personal Skills
Time management	Flexibility
Internal Communication	
Decision-making & sharing responsibilities	**Partnerships**
	The city as a partner
Vision & Goals	Partnership strategies
Defining the vision & goals	**External Communications**
Vision management	Media Relations
Fulfillment of the vision	Web presence
	Visual Identity

Table 1 The ArtovaModel's factors and sub-factors.

Each item is accompanied by a text description (see Appendix A) that helps to open up the role of the item in the model. For example the text description for '*Defining the visions & goals*' is as follows[7]:

> *There is no one clear way how the Artova projects create their vision. The procedure is different in each project. Some of the example groups formed their visions in a self-directed manner (see DDP) or the vision came from inside the Artova activities (see MHA, AFF, ASF) or from individuals outside the Artova environment (see EA) or even from the city officials (see AK).*
>
> *But a common, shared vision should be established in the very beginning of the project because individuals may naturally have distinct understandings of the issue and the ways in which it should be dealt with.*
>
> *To do that, Artova organizes facilitated sessions where people interested in the ideas come together. In those sessions the goals of the project are left open for interested participants to incorporate their own ideas. This has proven to be the great strength of the facilitation sessions: incorporating people and ideas in a project. When everybody feels that their opinions are heard and they have the chance to influence the outcome, they commit more deeply to the project as they feel that it entails a bit of them. (see also GROUP "forming a group" for more on these sessions!)*

The descriptions of the factors were phrased in a personal tone as illustrated in the example text above. This was preferred over a rather detached research-report to highlight that the ArtovaModel is the result of empirical practices and to not be confused with an absolute method to be followed.

Figure 5 Band playing in front of Kääntöpaikka during the Arabia Street Festival 2012.

---

7 The initials seen in the text, describe Artova's collective actions as described in Section 2.3.

2.3 Empirical Material: Artova's Pilot Projects

Artova has facilitated several collective actions throughout the years. Before this degree project commenced, Artova had started 'monitoring' six of these teams and their processes. Throughout more than a year's time Artova encouraged the team members to record their processes, emotions and activities in a designated blog. This blog was named "Artovan Henki"[8] (Spirit of Artova). I will refer to these 'monitored' projects as the pilot projects of the ArtovaModel since the material gathered in the blogs and the reflections of the team members are the basis of the compilation of the ArtovaModel. The pilot projects were:

> » *Arabia Street Festival (ASF)*: A local event with music, art and recycling points happening in the Arabia neighborhood. It is a yearly event, with each year having a new production team.

> » *Edible Arabia (EA):* A semi-permanent city gardening intervention. An empty plot in the neighborhood was rented from the city and a group of urban farmers cultivate it every spring-summer.

> » *Artova Kino (AK):* A bi-annual series of film screenings both for children and adults.

> » *Artova Film Festival (AFF):* A local film festival that accepts entries, competing for the festival prize. The concept behind the festival is to create the "Sunset Boulevard" of Helsinki since most of the film schools of Finland are located in the Arabia neighborhood area.

> » *My House Arabia (MHA):* A local event aiming to connect the architects, designers and artists of the area's buildings with their residents. The event included open house invitations, workshops, performances and discussions.

> » *Design Dog Park (DDP):* A permanent dog park concept where visitors and local partners would be responsible for the design and management and the city for its construction. This original concept was never realized but the team did organize a pop-up dog park as well as various other smaller events in the same track.

---

8 The original blog is no longer maintained – however its (English) contents have been transferred: to artovamodel.fi/archives/ , similarly the Finnish ones artovamalli.fi/arkisto/.

Figure 6 Top: Design Dog Park Drive – a dog park in the snow, image by Markus Sokolnicki.

Figure 7 My House Arabia Event 11-16 September 2012, photo from Artova's Flickr stream (Artova kuvat)

Figure 8 Preparing for an Artova Film Festival screening. (Artova kuvat)

Figure 9 Children's worshop in the Arabia Street Festival 2012. (Artova kuvat)

Figure 10 Edible Arabia's gardening plot. From Artova's Flickr album (Artova kuvat)

2.4 The ArtovaModel Visualisation

The ArtovaModel visualisation[9] is meant to communicate the ArtovaModel; that is to show visually the practices of Artova-facilitated collective actions. It is designed to be used as a tool, structured in way that allows for different uses. The visualisation includes all the information gathered about Artova's practices and the pilot projects; organized in such a way so that collective projects both under the umbrella of Artova and independent can benefit. In particular it is created so that collective (volunteer) projects can get ideas of how to bring their visions to life, overcome their setbacks, identify their strengths and weaknesses and organize their projects so that they enjoy the process.

Essentially, it is an interactive online visualisation[10], consisting of computer-generated graphics to make the compiled text of the ArtovaModel (Appendix A) as well as information about the pilot projects more accessible. It is designed for desktop computer use and it is accessible online in both English and Finnish.

The contents and structure of this visualisation are closely linked to the process of formulating the ArtovaModel. Therefore I find it relevant to discuss its structure and foundations, in the following section, together with the conceptualization of the ArtovaModel.

---

9 The ArtovaModel visualisation can be accessed in English here: artovamodel.fi/visual-eng/.

10 Developed with Javascript and more specifically the d3.js visualisation library.

2.5 The ArtovaModel Visualisation Structure and Foundations

The ArtovaModel visualisation is divided in three levels that contain four separate types of visual representations (component visualisations). These levels as seen in the user interface (Figure 12) are:

(1) ArtovaModel

(2) Self-reflection Questions

(3) Example Projects

The four component visualisations are found throughout the levels. They are not named in the user interface, so I will be naming them here to aid the discussion. These component visual representations are:

» The *overview visualisation*

» The (pilot) *project timeline visualisation*

» The (pilot) *project visualisation* and

» The *self-reflection visualisation*

The ArtovaModel visualisation levels

Conceptually, this level separation represents the level of abstraction of the data, as seen in the graph in Figure 13. Since the approach was to keep all the visualisation transparent, most of these data abstraction levels are included in some way in the final result. However, not all the abstractions mentioned consist of a separate (user interface) level. For example, the blog-posts and the interviews are linked (out) from the ArtovaModel visualisation but are not part of it.

The blog-posts and interviews (abstraction 1 or 'raw' data) were discussed previously in Section 2.2 *The ArtovaModel – Compilation*. The timeline data (abstraction 2) are a compiled series of events as appearing in the blog-posts and interviews. The pilot project abstraction (abstraction 3) is the result of analyzing each of the pilot project based on its timeline. The ArtovaModel (abstraction 4) is the overview at the level of Artova based on all the pilot projects. The final abstraction – the self-reflection questions – is a series of questions meant for other collective actions and are derived from the ArtovaModel. I considered this a 'higher' level of data abstraction since these questions could not have been created beforehand and they generalize the accumulated knowledge for other actions outside of Artova. These questions together with Artova's recommendations concerning them can be found in Appendix B.
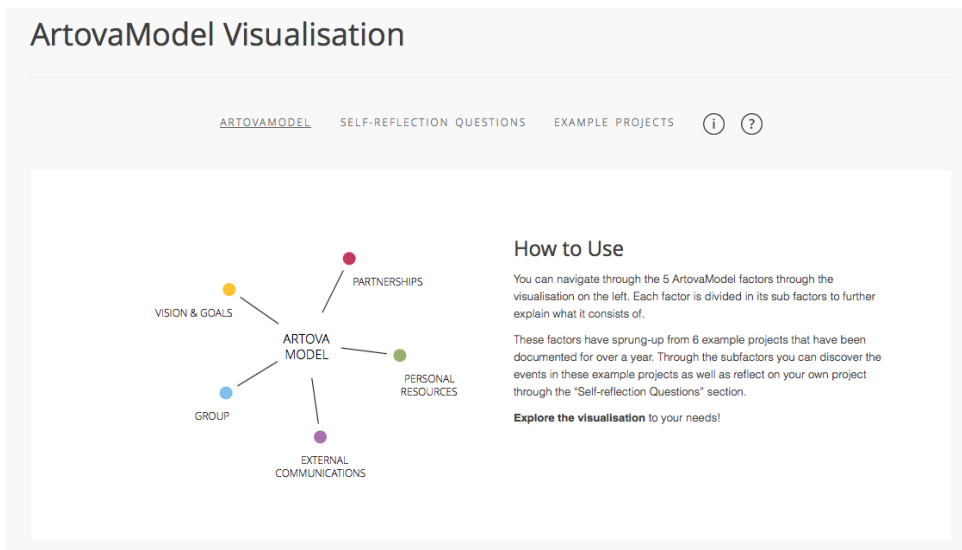
Figure 11 The ArtovaModel visualisation first view. URL: artovamodel.fi/visual-eng/
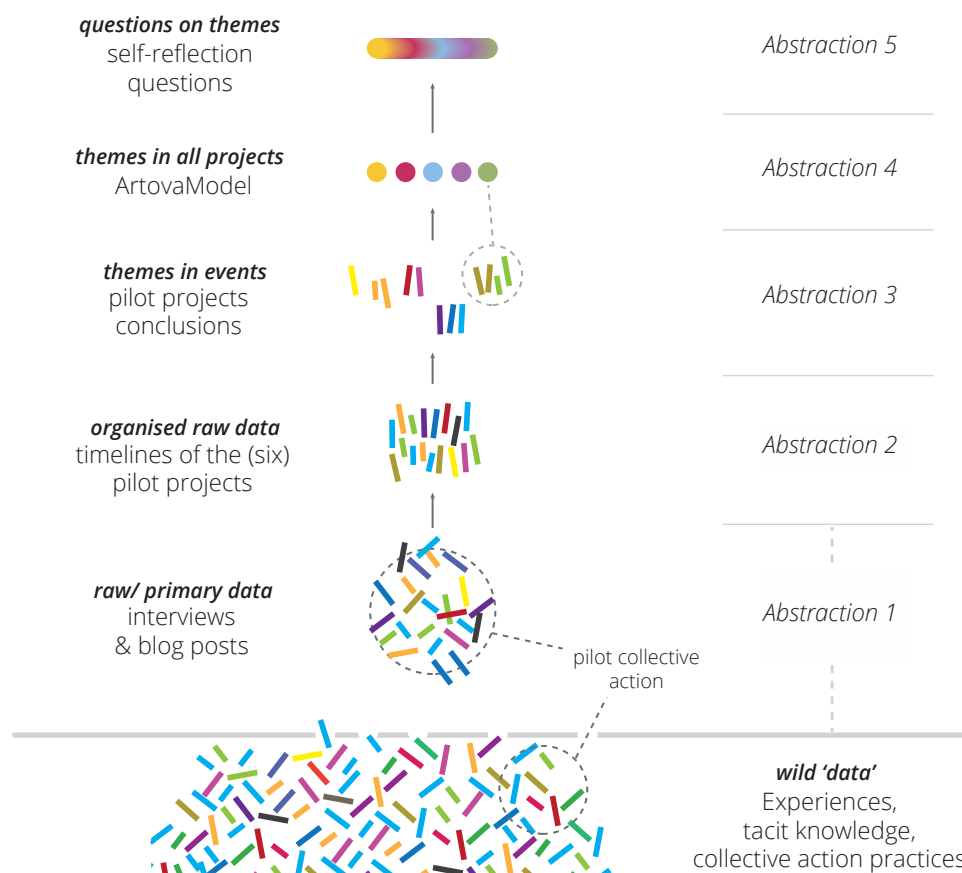
Figure 12 Data abstraction levels of the ArtovaModel visualisation.

As an example of the data abstraction process, I am including a specific case of a blog post that ended up in the self-reflection questions:

> *"In many internship positions unpaid employees are mainly allowed to use the shredder or wash the toilet, but in AFF (Artova Film Festival), power and responsibility was distributed to everyone who was motivated! I got the feeling that in an organisation such as Artova, they valued the thoughts and skills of people from very different backgrounds."*
>
> (Excerpt from blog-post titled 'Ryhmädynaamiikasta ja dynaamisesta ryhmästä', December 2012, Noora Lindroos, Translated from Finnish by Johannes Nuutinen)

This blog-post is part of the timeline event named 'Group and Recruitment' which describes the following:

> *Responsibilities were further clarified. The group size ended up being 6-7 core members with some volunteers. The group had connections to people who did not want to take on larger responsibilities but were willing to help in spreading posters in the area and other concrete tasks. Volunteers were recruited in the beginning of the year on and more volunteers were continuously recruited throughout the process as needed. The volunteers were given concrete responsibilities. The knowledge, networks and experiences of all involved were highly appreciated and utilized.Motivation self-rating: +3, Topics: Group, Personal Resources*
>
> (Timeline event 'Group and Recruitment', ArtovaModel visualisation, Artova Film Festival project)

In the Artova Film Festival, every similar event in the timeline that has dealt with personal skills has a group motivation quite high (abstraction 3). This fact highlighted the importance of valuing the skills at a personal level in order to keep the volunteers motivated. When found in other pilot projects as well, it is compiled under the 'Personal Resources' factor (ArtovaModel level -abstraction 4). I omit the factor's description here but it can be found in Appendix A –*Personal Resources*. Finally, the 'Personal Resources' factor inspired self-reflection questions (abstraction 5) such as:

> *Everyone has something to offer to the group. Have you asked to see how people can and want to get involved?*
>
> (Self-reflection questions on 'Personal Skills', ArtovaModel visualisation)

The naming in the user interface and the order in which the ArtovaModel visualisation levels are presented was decided based on the expected uses of the ArtovaModel visualisation as will be discussed further in Section 4.2 *Research*. These user-interface levels are interdependent, meaning that there are more than one possible ways to access the 'lower' or 'higher' abstractions of the data.
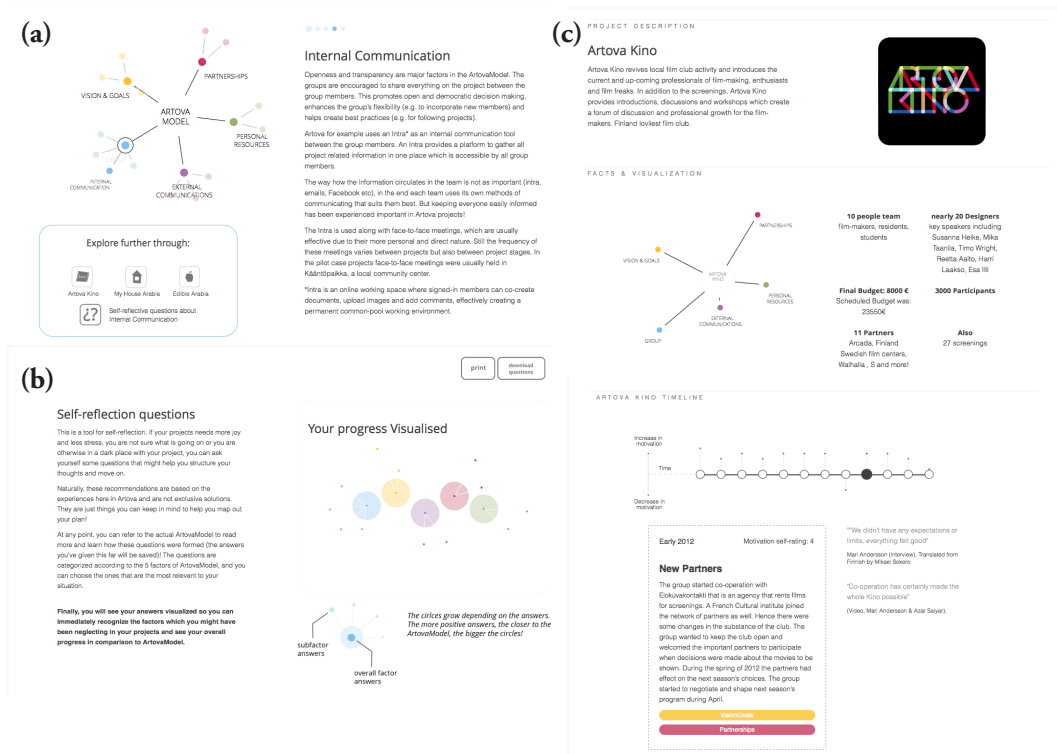
Figure 13 The ArtovaModel visualisation levels as seen in the user interface
(a) ArtovaModel. (b) Self-reflection Questions. (c) Example Projects.

The *ArtovaModel* level introduces the compiled findings of the Artova practices and therefore it is presented first. It includes the *overview visualisation* (Figure 14a). It is mostly expected to be explored by people interested in collective action practices and the ArtovaModel.

The *Self-reflection Questions* level contains a questionnaire divided into five sections, one for each factor of the ArtovaModel. This questionnaire generates the input data for the *self-reflection visualisation* that is also presented at this level (Figure 14b). This level was designed to aid future collective actions both inside and outside of Artova.

The *Example Projects* level includes all the information gathered on the pilot projects. There is a *project visualisation* and a *project timeline visualisation,* for each of the six pilot projects, as well as a short description and some general facts (Figure 14c). The *Example Projects* level also includes a general view of all the six *project visualisations* placed together so as to make it easier to compare the pilot projects. This level is describing the past (pilot) projects. It serves as a presentation tool for the members of the pilot project teams as well as a rich examples pool for future collective actions.

The component visualisations

The component visualisations are different views of the data gathered from all the abstractions. Each of these represents a different angle to the formation of the ArtovaModel and its manifestation in the pilot projects. However these component visualisations are not (necessarily) independent, since most of them can trigger other ones.

Overview visualisation

The *overview visualisation* as seen in Figure 15 is the central representation of the ArtovaModel. It represents the five factors and sub-factors of the model. It includes the structure and description of the factors. Each sub-factor, besides its description, is also augmented with access (links) to events in the *project timeline visualisation* and questions in the *self-reflection visualisation.* The *overview visualisation* also 'sets the tone' of the coloring throughout the ArtovaModel visualisation, meaning that each factor is given a color (color-coded) that remains consistent throughout.
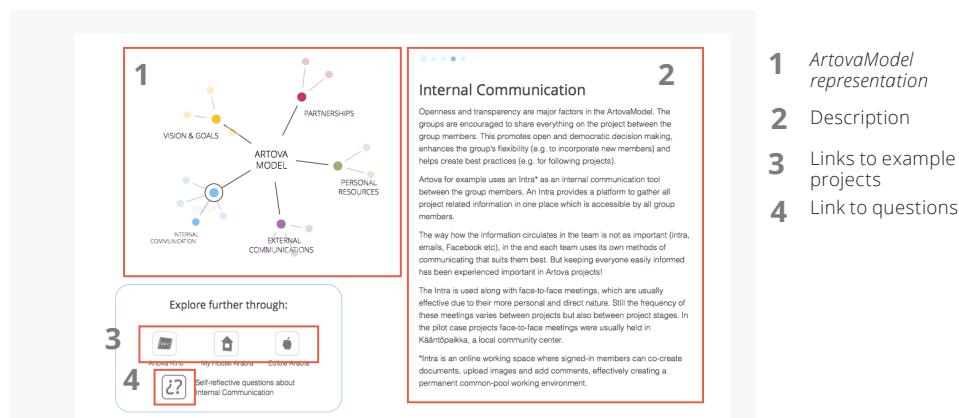
Figure 14 Overview visualisation.

Project timeline visualisation

The *project timeline visualisation* (Figure 16) is a visual presentation (timeline) of the events that have taken place during a pilot project. They are placed in sequence either by date or if not possible, by month or season. These events have a short description describing what has happened, as well as a rating of the (pilot) team's motivation at that time. Since each of these events/situations has been analyzed to create the ArtovaModel factors, they are all 'tagged' by the factor(s) that they include. This provides the two-way communication between the events (abstraction 2) and the ArtovaModel (the abstraction 4). For example the tagging allows the events to be linked to (as examples) from the *overview visualisation* sub-factors. In addition, it allows them to be highlighted from the *project visualisation* when referring to a specific ArtovaModel factor[11].

---

11 Communication between abstraction 3 to abstraction 2 as seen in Figure 13
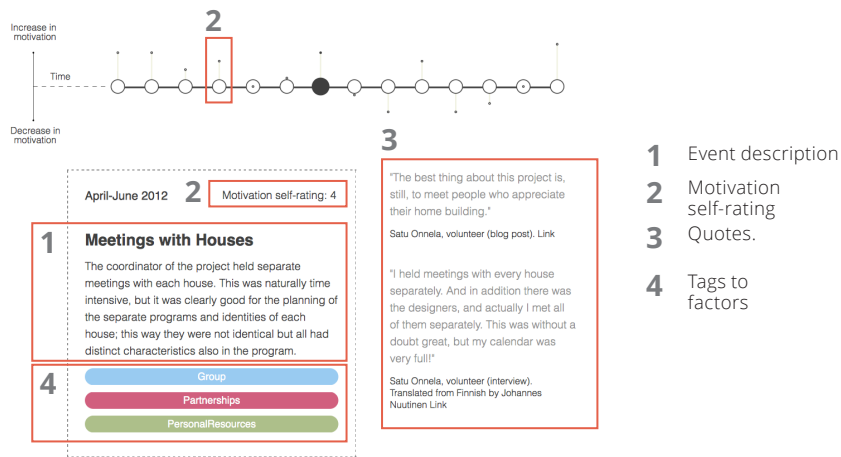
Figure 15 Project timeline visualisation of My House Arabia.

To make the *project timeline visualisation* more personal and hopefully relatable, I added a series of quotes about the event from the pilot project's members (in first person description). These personal quotes were taken from the blog posts as well as from the interviews conducted by Avanto and myself (with the permission of the interviewees) and they link back to them[12].

Project visualisation

The *project visualisation* is a visual representation of the relation of a pilot project to the ArtovaModel (Figure 17). This visualisation, shows at a glance, which of the ArtovaModel factors were more evident in that pilot project. By choosing a (color-coded) factor from the *project visualisation,* the user gets to see all the events in the corresponding *project timeline visualisation,* distributed through time. This component visualisation also allows for comparison between pilot projects.
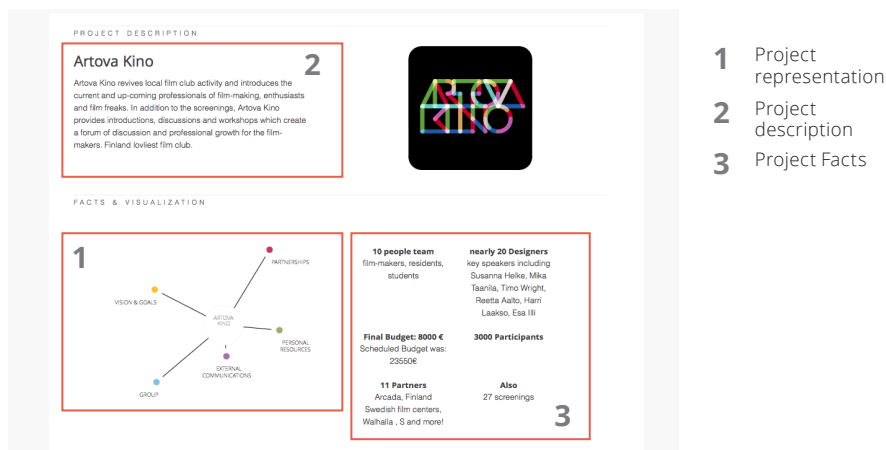
Figure 16 Project visualisation of Artova Kino.

---

12 Communication between abstraction 2 to abstraction 1 as seen in Figure 13

Self-reflection visualisation

The *self-reflective visualisation* is generated based on questions that were divided according to the ArtovaModel into five parts (the five factors). Each of these parts was meant to be independent so that the collective action teams answering the questions could 'mix & match' according to their needs or current interests.

This is a visual representation of the project progress of the person(s) answering the question as related to the ArtovaModel. For example, answering the questions about the Group factor, a circle is growing to represent how 'well' your project is going. If the circle remains small, then according to the ArtovaModel, you should give more emphasis to that factor of your project.
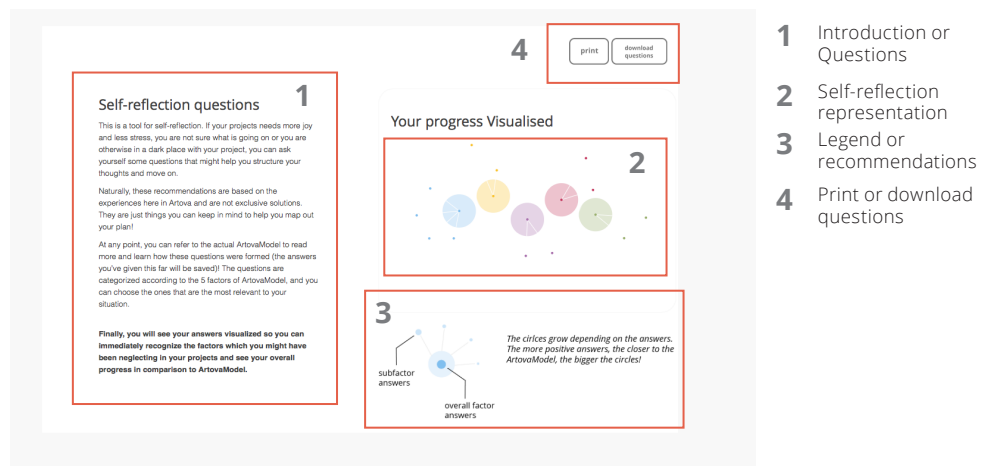
Figure 17 Self-reflection visualisation.

Abstraction 5
self-reflection
questions

Abstraction 4
ArtovaModel

Abstraction 3
pilot projects

Abstraction 2
timelines of the
pilot projects

Abstraction 1
interviews
& blog posts

pilot collective
action

wild 'data'
Experiences,
tacit knowledge,
collective action practices

With the self-reflection
questions, collective
actions can possibly
generate more
wild 'data'..
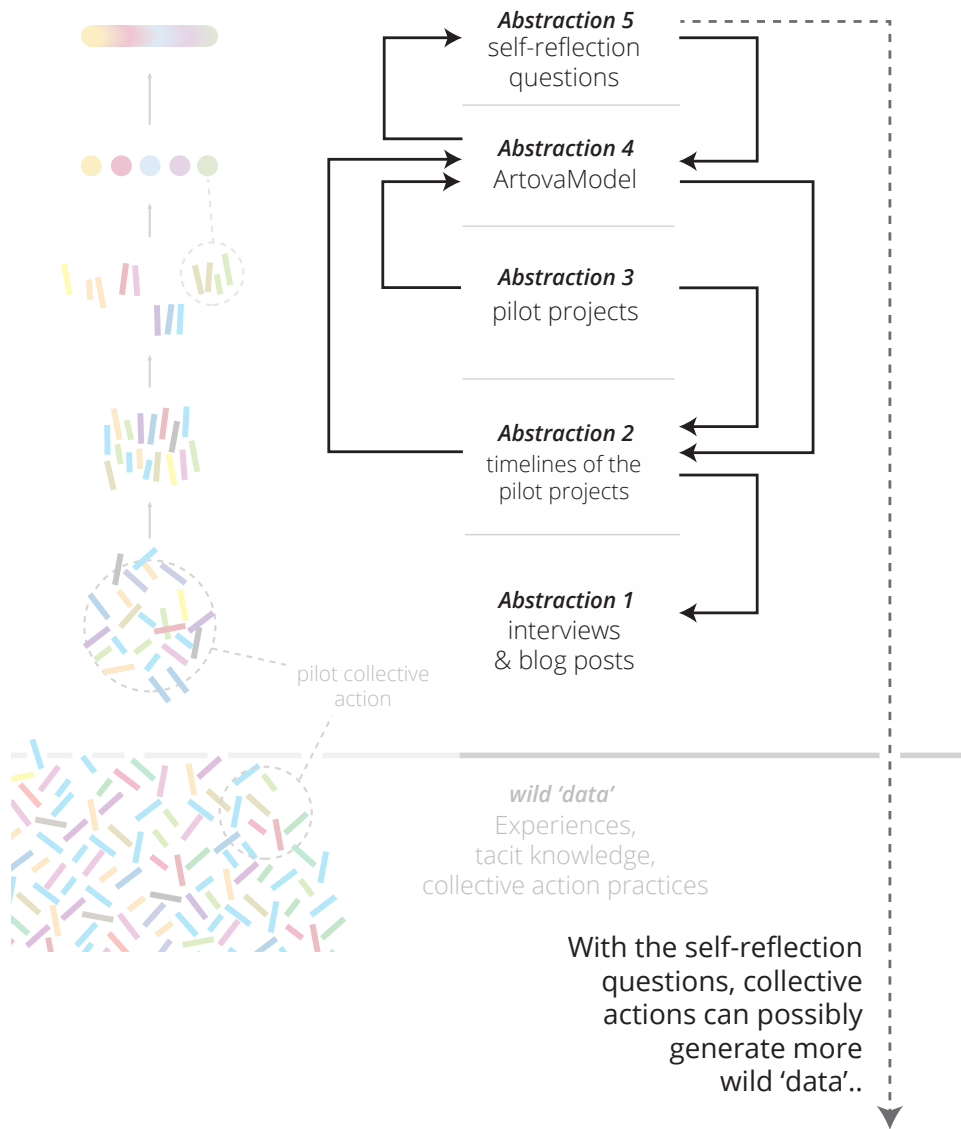
Figure 18 Access between abstraction levels in the ArtovaModel visualisation.

3 Theoretical Framework

3.1 Collective Actions and Artova

In order to comprehend the design domain, it was necessary for me to understand collective actions and Artova's role in facilitating them. Only then would I be able to take a relevant approach. This section discusses the theory behind collective actions that proved to be useful in defining both Artova's role and later my own approach.

Self-organized collective actions

There are several definitions of what is meant by collective action. I will be using the term similarly to how Ostrom and Hess (2007) have, combining two earlier definitions of it. Namely, collective action arises when the efforts of two or more individuals are needed to accomplish an outcome (Sandler, 1992, p. 1) and the efforts on the part of each individual are voluntary (Meinzen-Dick, Di Gregorio, & McCarthy, 2004, p. 5).

The Artova pilot projects are collective actions, since they include a group of people working (for the most part) voluntarily to accomplish their shared vision and goals. They are *projects* since most of them dismantled after the completion of their vision. In addition, they are self-organized and some even self-initiated.

Self-organized actions, as explained by Boonstra and Boelens (2011, p. 113), are collectives (or networks) who *organize themselves along an infinite variety of lines: they continuously undergo processes of group formation and deformation*. Their main characteristic is that they organize as they choose in order to adapt to the infinite number of possible dynamics both within their action and with other systems. These interactions cannot be foreseen or planned for, making the civil action a type of complex adaptive system. (Boonstra & Boelens, 2011)

When researching each pilot project and comparing them to the others it became apparent that even though they all followed different approaches to achieve their collective vision, they all shared the same principles on working practices. For example, not all teams spent time on communicating their vision to the public, however the decision of communicating it or not was reached through a similar process.

Ostrom's (1990) division of the working rules for common-pool resource groups (CPRs), provide a good starting point to identify the common practices between all the pilot projects (so as to compile the overall Artova practices) and to separate them from the team-level approaches for a specific end. Common-pool resource groups are self-organized initiatives that have a shared interest (often monetary) to sustain a (natural) common resource. Even if Artova pilot projects are obviously not CPRs,

the division of the rules serves well to describe this case. According to Ostrom (1990) three levels of rules can be identified in self-organized CPRs:

> *(1) Operational rules*, which regulate the day-to-day work and decision-making,
>
> *(2) Collective Choice rules* that are used by the groups to make their policies, and
>
> *(3) Constitutional rules*, which determine who is eligible to be part in the core group and rules on how to create the collective choice rules.

For example, in the Artova pilot projects, the Edible Arabia team (EA) decided that their vision is to grow vegetables in their area hence they don't need to spend much time on advertising their vision (*Operational level*). They also decided after Artova's recommendation to listen to all opinions and value them equally before making a decision (*Collective Choice level*). And lastly they collectively decided that they want to have a project leader and that new members are welcome but are limited to the amount of spaces on the plot (*Constitutional level*).

According to Ostrom (1990) in order for a team to be successfully self-organized, all these levels of ruling should fall under the team's own power. In the case of the Artova pilot projects, they do. In the previous example of Edible Arabia, the team members had decided collectively on their rules. Nevertheless, they did receive recommendations from Artova on the level of *collective choice rules* and *constitutional rules* based on Artova's past experiences[13] with collective actions.

The role of Artova

Artova's role is to aid locals to realize their own vision for the neighborhood, diminishing as much as possible the obstacles that initially seem overwhelming. Referring back to Ostrom's (1990) division of rules, they provide a tested set of *collective choice* and *constitutional rules* that the actions can choose to follow. I became very aware of their approach to this task when I was told the following situation by Saara Vanhala, an Artova coordinator:

> *A woman entered the Kääntöpaikka community center and complained that all Artova's activities so far have been for youngsters and young families, and not for her age group. Instead of apologizing, the coordinators of Artova, prompted her to start something for her own needs promising that they would help gather more people and organize events. And so it happened, Artova actives helped her make posters to gather*

---

13 The ArtovaModel can actually be seen as the compilation of these recommendations at the collective choice and constitutional levels.

RULES	EXAMPLES	WHO PARTICIPATES
Constitutional Rules	how to form a group, deciding on leadership	**core group with guidance from Artova**
Collective-Choice Rules	how to make decisions. communication rules	
Operational Rules	meetings, events, decisions etc.	**core group & volunteers**

Common-Pool Resource Groups   Artova Collective Actions
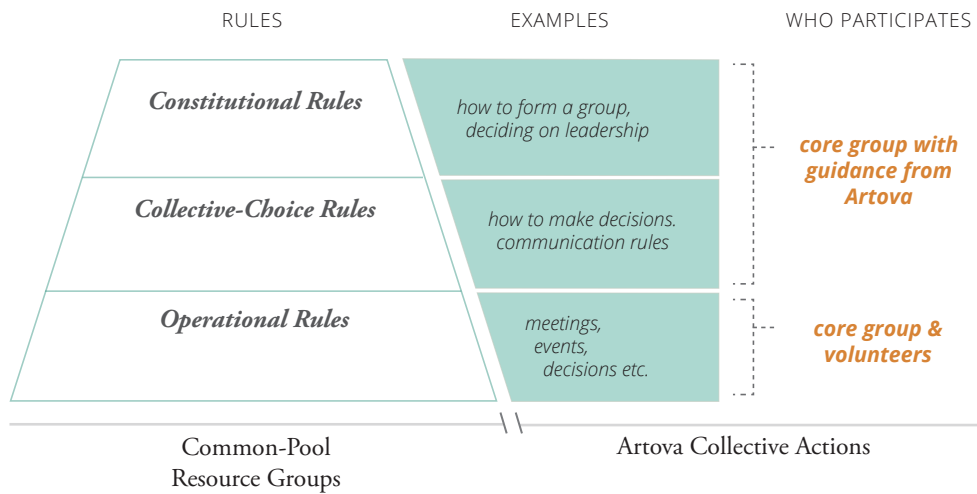
Figure 19 Separation of rules in CPRs (Ostrom,1990, p. 53) and examples from Artova.

more same-minded people, and later to organize the space and find tutors for their activities. Eventually this woman with Artova's help organized at least three activities: over-60-year-olds tango, senior gymnastics as well as tea sessions!

This story was very enlightening. Their role in the community was definitely not to provide *for* them but to *motivate* them to organize themselves. Artova is working at the meta-level of collective actions, helping them to make the process more pleasurable. They are providing a physical location (Kääntöpaikka) for the collective actions to utilize, workshop facilitation to help the teams articulate their vision and even tutoring of new technologies that enhance collaboration.

All in all, Artova, as a body, has gathered a fair amount of experience and insight on facilitating collective actions. Even if there is no objectively correct way to facilitate a collective action, there are ways that seem to be more effective and pleasurable than others. Until the start of this degree project, this knowledge was not yet explicit or in a form that would be easily accessible by others. Therefore, my role was to help them compile this knowledge (in collaboration with Artova and Avanto) and visualise it so as to enable further pleasurable collective actions, spark a discussion on the subject or even just provide common grounds on which communication can be based.

3.2 Visualising

Card, Mackinlay and Shneiderman (1999) define visualisation as the transformation of data into visual representations, presented as interactive computer graphics with the goal of amplifying cognition. Similarly, Ware (2004, p. xvii) defines information visualisation *as the use of interactive visual representations of abstract data to amplify cognition* and later more generally as a *graphical representation of data or concepts* (Ware, 2004, p. 2).

The field of information visualisation has attracted researchers and practitioners from various fields such as design (e.g. Density Design Research group, Politecnico di Milano), knowledge management (e.g. Eppler, University of Lugano), cognitive science (e.g. Colin Ware, Data visualisation Research Lab), journalism (e.g. Alberto Cairo, University of Miami), art (e.g. Stefanie Posavec, data illustrator) and of course computer science (e.g. Edward Tufte, Yale University). Therefore, I consider it a multidisciplinary field that can be approached through different angles and has vague boundaries.

However for the purpose of this thesis work, with the term '*visualisation*' I am referring to visual representations of data not necessarily with interactive computer graphics but definitely with the goal of amplifying cognition (similarly to Ware's more general definition attached above). This approach includes static visual representations such as infographics and annotated graphs used in journalism however it excludes visualisations without predefined purpose (i.e. for the sake of art). Similarly with the term '*visualising*', I am referring to the process of creating a (purposeful) visualisation. *Visualising* is a design process besides being a scientific field of its own. Throughout this degree project, I have been drawing interchangeably from design and visualisation fields to create the ArtovaModel visualisation.

The value of visualisation

Effective visualisations can aid in our understanding of quantities and large datasets. This has been proven effectively in Anscombe's quartet example (Anscombe, 1973) on quantitative data. In this example, the statistician Francis Anscombe presented 4 datasets containing of (x,y) values which all have the same statistical properties (such as mean, variance, correlation between the variables), however when mapped out graphically they appear to vary considerably thus proving the importance of graphing statistical data.

In general, the value of visualisation as discussed by van Wijk (2005) changes according to the criteria we access it with. He mentions as an example that for a visualisation to be judged as a technology[14], it should be assessed by its *effectiveness* and *efficiency.* Or in other words, it is accessed by whether it does what it set out to do *(effectiveness)*, and achieves this with the least amount of resources such as time and costs *(efficiency)*.

This leads to the obvious question: why is visualisation the technology used to spark discussion on collective action practices (based on the ArtovaModel)? There are primarily two reasons for this choice. Firstly, the process to create a representational model of data (Frigg, 2012), which is what Artova set out to do, is very closely linked to the process of creating a visualisation of data; namely, that of data transforma-

---

14 According to van Wijk in the same article, visualisation can either be judged as art (for its own sake), science (the research field of visualisation) or technology (i.e., as a collection of methods, techniques, and tools developed and applied to satisfy a need.

tion and abstraction to simplify complex systems, so as to enhance understanding, learning or cognition. Secondly, visualisations are proven effective in creating mental representations of information. Quoting Colin Ware:

> Visualizations have a small but crucial and expanding role in cognitive systems. [...] We acquire more information through vision than through all of the other senses combined. (Ware, 2004, p. 2)

In addition by placing the ArtovaModel visualisation online we can also utilize the interactive abilities of computers as well as make it available to anyone with connection to the Internet, in contrary to, for example, a location-based workshop.

In its core, visualisation is thought to highlight patterns and exceptions of the underlying data. The brain is trained to see patterns and exceptions in a single graphic much faster than seeing them in sequence (for example as numbers in a table). Edward Tufte gives a good example of the benefits of visualisation in the case of London's Soho cholera outbreak in 1854. During that outbreak, and while everybody believed that cholera was spread by air, Doctor John Snow took a map of the area and augmented it with the instances of the disease. This mapping revealed the locality of the cases, eventually proving that the cause of the outbreak was a polluted water pump in the area (Tufte, 1997).

As visualisations have become more frequently used outside of scientific circles, their role has expanded. As Dörk, Collins, Feng and Carpendale (2013) identify that an increasing number of visualisations are appearing which aim to engage citizens around social issues. The benefits of these visualisations go beyond merely recognizing patterns and generating insights, they have the ability to influence, manipulate and empower (Dörk, Collins, Feng, & Carpendale, 2013).

This does not mean that every visualisation will have this ability; Dörk *et al.* (2013) do however provide some common principles that visualisations, which successfully engage citizens, have. The initial factors they propose for a critical approach to visualisation are *disclosure*, *plurality*, *contingency*, and *empowerment*.

> » *Disclosure* refers to the practice of stating the decisions and assumptions made throughout the design of the visualisation concerning the data, the interaction as well as the representation.

> » *Plurality* refers to the different positions or stories presented from the data. Since not all points-of-view can be covered equally in a single presentation, the designer should make sure not to advocate one position over the other.

> » *Contingency* refers to the user's ability to explore the data further. In their words, "*By considering both viewer and phenomenon to be dynamic, contingent visualizations can provide room*

for more unique and profound experiences and insights" (Dörk, Collins, Feng, & Carpendale, 2013, p. 5).

» And lastly *empowerment* refers to giving the opportunity to the user to discuss and question the representation as well as to use it further to tell their own story.

Visualisation and risk

Visual representations such as visualisations are not without risk of misinterpretation, at the level of their cognitive, emotional, social reading (by the user) or at the level of their design (Bresciani & Eppler, 2009). In order to avoid these risks, or to better identify them, I will be referring to Tamara Munzner's nested model of visualisation design (Munzner, 2009).

This nested model, unlike other visualisation models such as Colin Ware's (Ware, 2004, pp. 4–5), does not include the data-collection phase that was, for example, part of the ArtovaModel visualisation. Nevertheless, I chose to use this nested model for two reasons. Firstly because it specifies the threats and validation points of each stage thus making it easier to identify the level of the problems. Secondly, because it refers to the visualising process as a design process, including factors such as user objectives and user testing. Munzner divides the process of designing a visualisation into four steps:

(1) domain problem characterization

(2) data/operation abstraction design

(3) encoding/ interaction technique design

(4) algorithm design

The first step is not exclusive to visualisation but to any design task, since it refers to discovering the requirements and goals that the designed system should accomplish. The second step is referring to the process of generating higher abstraction of the data and discovering the relevant operations (views of the data) for the users. The methods used in the second step will be discussed in Section 3.4 *Information (analysis of the data)*. The third step is referring to the data and information acquired needing to be well represented and communicated. The last step is referring to the method of implementation (development) of the visualisation that is beyond the scope of this thesis work.

Each of these steps might encompass different errors that eventually will be transmitted to the lower level (therefore the nested nature of the model). The Figure 21 shows Munzner's model, together with the *threats* and *validation proposals*. I see these as the potential threats to the effective design of the ArtovaModel visualisation, also including the threat of abstracting from subjective qualitative data that is missing here. I

will be discussing these threats at the corresponding level of the visualisation design process in the following section and their validation throughout the Chapter 4.
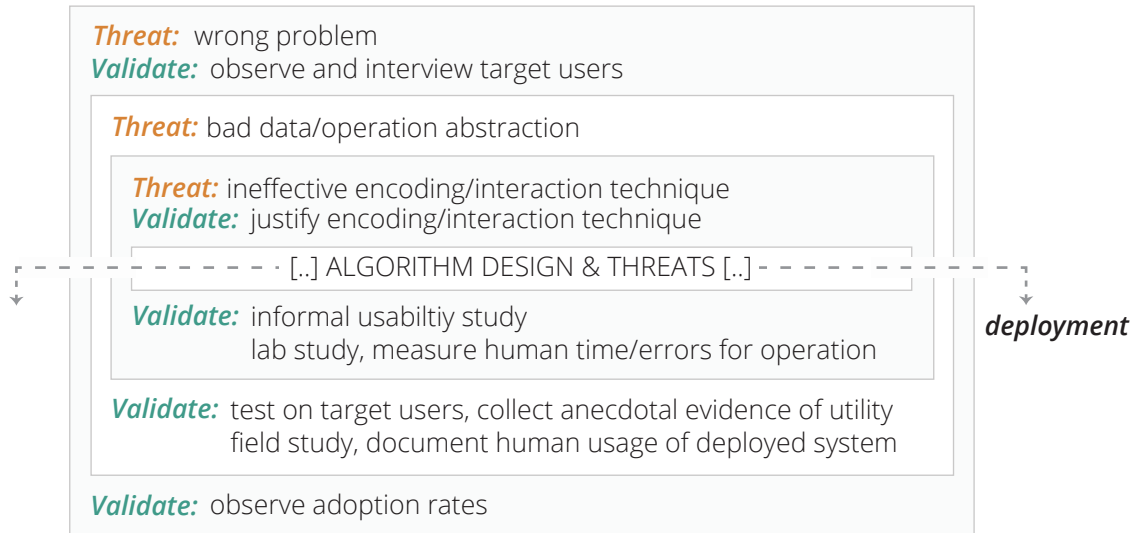
Figure 20 The nested model of visualisation design. Adapted from (Munzner, 2009, p. 923).

3.3 From (Qualitative) Data to Knowledge

I have been using the terms data and abstraction of the data extensively. It would be therefore beneficial for reasons of clarity to define what is meant by data, information, knowledge and wisdom or the so-called DIWK continuum. According to Ackoff's definition (Ackoff, 1989): *data* is raw, it is pure facts that cannot be questioned, *information* consists of processed data found in descriptions for example by adding relational connections to it of who, what, where, *knowledge* is the know-how, it is what makes the transformation of information to instructions possible, which can lead to *wisdom* when connected to other knowledge through the process of judgment.

Data and qualitative data

In Section 2.2 *The ArtovaModel* I have discussed the blog-posts from 'Artovan Henki' and the interviews conducted with the pilot teams as 'raw' data. They are by no means undisputable facts since they are written (or spoken) through a first-person perspective and include qualitative values (such as emotions). Moreover, the interviews with the pilot teams were conducted up to a year later than the events took place, so it is safe to assume that the facts are influenced in hindsight.

Subjectiveness is a known issue with qualitative research (Guba, 1981), and it was anticipated from the beginning of this degree project. Moreover, the aim of the

ArtovaModel (and its visualisation) was not to provide a 'truth statement'[15] but to spark discussion and give a first glance into collective actions (such as the pilot projects). This discussion would have more value if it had derived from qualitative methods rather than for example (quantitative) questionnaires since it left more room for exploration.

The gathered ('raw' or primary) data included stories, opinions and emotions; they had personality and helped me form a more complete picture of the collective actions. Moreover, qualitative methods, such as semi-structured interviews, are also a central part of the human-centered design process. Since in human-centered processes, interviewing is often used as a method to understand the stakeholders and formulate the requirements of designed systems (Krippendorff, 2006; ISO 9241-210, 2010). For these reasons, I considered the gathered qualitative facts about the pilot projects as enlightening and a valid point from where to start analyzing.

Information (analysis of the data)

Every higher abstraction after the 'raw' data has derived from some process e.g. grouping or relating to other data. It is therefore, returning to Ackoff's (1989) definition, information. Since this information is human processed (how it will be grouped or with what), it might be misleading[16]. To avoid this situation in the ArtovaModel visualisation, I chose to provide access between 'raw' data and the other abstraction levels (the information). When information can be traced back to its data it becomes more credible but it also gives the opportunity to generate new information (which can lead to new knowledge). I also believe that when designing, open data and transparent processes give another level of human-centeredness.

The primary responsibility for the content analysis was given to Avanto. However, I also did some exploratory analysis (before Avanto joined) in order to get the feeling of the abstraction process and not to jump from data to conclusions without the in between abstractions. The impact of my exploratory analysis to the design will be presented in Section 4.3 *Content*, however I will introduce here the combination of methods that I chose.

Qualitative data analysis

After putting all the events from each pilot project in sequence, and in order to generate relations between the 'raw' data, I applied a method resembling[17] the thematic network analysis (Attride-Stirling, 2001). Overall, the thematic network analysis is broken down into three stages.

---

15   Using the term as in Egon Guba's article, (Guba, 1981).

16   They might be misleading when for example highlighting unimportant relations or occluding others. Hullman and Diakopoulos (2011) have discussed this issue in narrative visualisations.

17   I use the word resembling, since at the time I was not aware of this analysis method, nevertheless the process as well as the form of the results were the same.

(a) the reduction or breakdown of the text;

(b) the exploration of the text; and

(c) the integration of the exploration.

The result of the first stage is a networked diagram of themes that is used as an analyzing aid when re-reading /exploring the original text (stage b) and identifying patterns (stage c). Reducing the qualitative data (text) into meaningful and manageable segments is necessary for the analysis (Attride-Stirling, 2001). For the ArtovaModel data (that were transcribed and translated) these chunks were chosen at the level of project events. The segments (events), abstracted from the whole text, were described by a theme. The themes in turn were arranged into higher-level groups also given a theme. Attride-Stirling names the themes that derived from the segments directly as *Basic Themes* and the higher-level ones as *Organizing Themes.* In the ArtovaModel we named them sub-factors and factors accordingly.

Exploratory visualisation

Another method used for generating meaningful connections between the data, comes from the field of quantitative sciences. Exposing hidden patterns is an inherent trait of visualisations (Tufte, 1997; Card, Mackinlay, & Shneiderman, 1999) therefore I created small visualisations based on quantified versions of the gathered data to see if any patterns emerge.

Some of these visualisations were only representing entity relations (i.e. Figure 22). Their purpose was to help me comprehend the task in focus (the design space) through multiple views, just as sketching is known to aid the design process. The visualisations drafted at this stage were exploratory pre-visualisations and most of
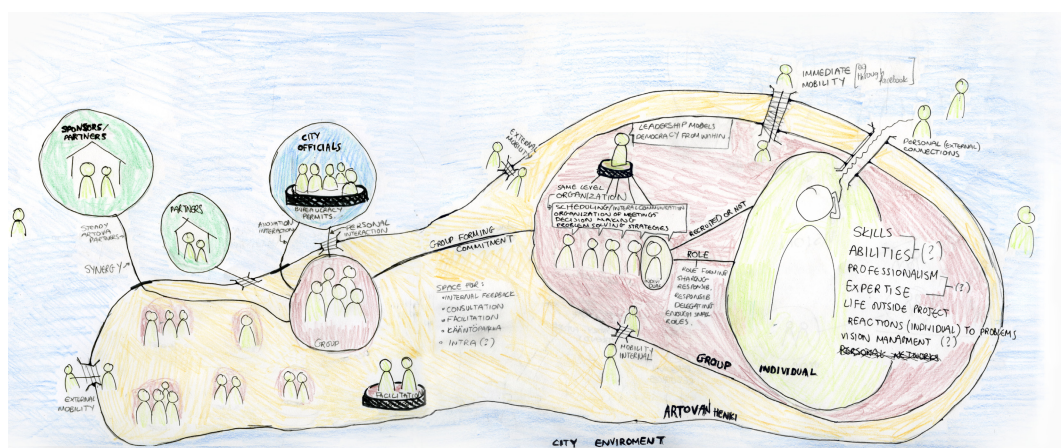
Figure 21 Mapping of relations in Artova. I made this sketch to understand the differing levels of participation.

them were eventually discarded, however they did help me understand the information, which leads us according to Ackoff (1989) to knowledge.

Knowledge (through visualisation)

Masud, Velsecchi, Ciuccarelli, Ricci and Caviglia accurately present that visualisations are a transformation artifact within the data-information-knowledge-wisdom (DIWK) continuum. Specifically, they explain how the designer and creator of the visualisation gathers data/information/knowledge, processes it and later represents it, in order to transfer knowledge to the viewer. Therefore, as they define, visualising is a process of transforming *materials* into knowledge. (Masud, Valsecchi, Ciuccarelli, Ricci, & Caviglia, 2010)

I have already discussed about the methodology concerning the two first stages of this transformation (gathering and processing). These methods had made me become (to an extent) knowledgeable about the collective actions inside Artova – the domain. However, in order to transfer this knowledge (or to help *generate insights* as it is often called in the visualisation field (Card, Mackinlay, & Shneiderman, 1999; North, 2006)) it needs to be well represented and communicated.

For a visual representation and ultimately its communication to be effective, it has to be data and task-specific; meaning not all visual encodings fit all data and therefore its effective communication is not assured. However, there are some cognitive principles that visual encodings should follow based on how the human brain groups and prioritizes information. The Gestalt school of psychology[18] has investigated the brain's ability to identify patterns in images and has identified certain principles, which are, nowadays, the cornerstones for most visual representations of information. These principles are noted in Figure 23.

The Gestalt laws of pattern perception are a valid starting point to compare one representation to another. For example in the ArtovaModel visualisation in the *overview visualisation* all the nodes were chosen to be circular, to show that they represent similar entities, based on the Gestalt laws of similarity.

The Gestalt laws are primarily focused on human vision and perception and even though they can guide the designer to decide on layout and color, they do not always help to make a decision for example between an annotated chart or an interactive slideshow. The latter are decisions that depend on a combination of the data, the user and their context of presentation[19].

In data journalism it is often said that data hold a story (Gray, Chambers, & Bounegru, 2012) and by visualizing them the designer is trying to communicate

---

18 As described by Kofka (1935).

19 This is not the case for visualisations for the sake of art, however as I mentioned earlier I am only referring to visualisations as a designed artifact with a predefined aim for users.

Similarity   Proximity   Closure

We see a square even if there are gaps

this one looks out of the group

we see them as two curves, not like this:

connection implies grouping

Symmetry   Continuity   Connectedness
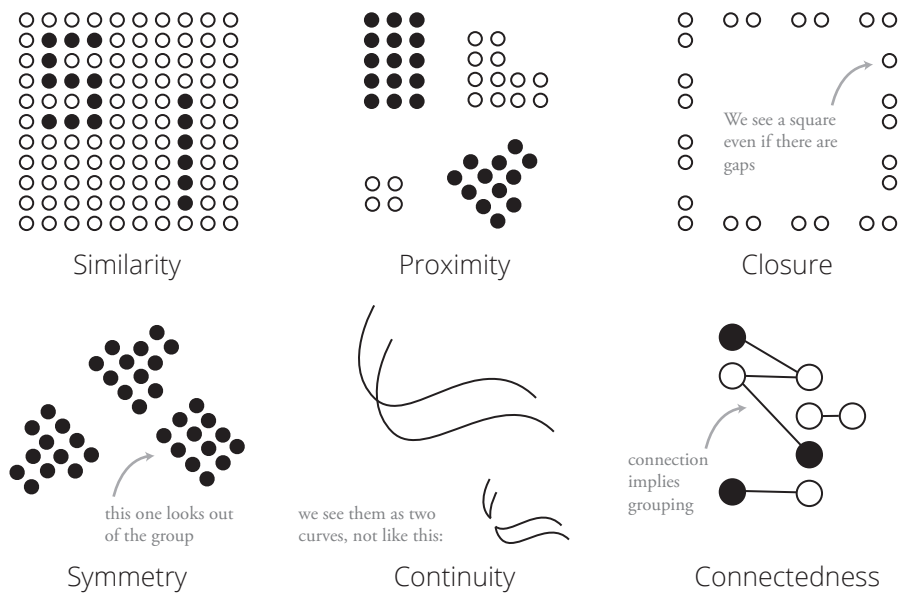
Figure 22 The Gestalt Laws. Kofka (1935) plus Connectedness (Palmer & Rock, 1994)

a message (data stories). Segel and Heer (2010) identify seven genres of narrative visualisations that employ different *visual narrative tactics* (such as *highlighting* and *visual structuring*) and different *narrative structures* (such as *ordering* and *interactivity*). Therefore, it is important for the designer to understand the data and discover their data-stories in order to choose the most fitting *visual narrative tactics* and *narrative structures*.

From a user perspective, visualisations, especially when interactive, are a digital tool[20]. The users perform tasks in order to explore, learn, understand, be entertained and be empowered among others. Therefore, user parameters such as expectations, experience, goals and time investment have to be taken into consideration when deciding on issues of representation, interaction and interface.

Naturally, visualisations do not "live" in a vacuum. They are objects, artifacts, even technologies that interact with their surroundings. A visualisation used in a newspaper article augments the report by presenting the graphed data that supports the research. The same report on the online version of the newspaper gives the readers the freedom to explore the same data further through interactivity. Therefore, the context of the visualisation is critical to its meaning as well as its form – making the designer's approach vary for each context.

In the ArtovaModel visualisation design process, when deciding on representation and interaction, I tried to look at the stakeholders, the narrative of the data as well as the environment of use. Namely, to understand more about the stakeholders I

----

20   Merriam-Webster defines tool as: 'a means to an end'.

employed human-centered design methods throughout this degree work. These activities, discussed in Section 4.2 *Research*, were initially focused to discover how a visualisation might be used and what it should include; however the interaction with the stakeholders also shaped my approach to keep the data transparent and try to make the ArtovaModel visualisation extendable.

At the same time, I had in mind the whole narrative of the ArtovaModel and its underlying data. This narrative is something that Artova members are very familiar with, however I was discovering it along the way in order to represent and communicate it more clearly to others.

The environment of presentation (the context mentioned above) was decided early on to be online. The reason for this was to allow for accessibility detached from the necessity of an Artova intermediary. Also, an online environment could enable more voices to be heard allowing for asynchronous discussion. This defined some choices related to development and the use of interaction quite early on, thus narrowing the representational choices of the visualisation in the activities of the Form phase (discussed in Section 4.4 *Form*). However at the same time, it widened the possibilities of designing the Artova visualisation environment to include comments and links to more resources.

4 Process & Activities

Pilot ation
blogging

Collaborative
(Design) Probes
*December
2012*

Concept
mapping

Artova
interviews

Pilot teams
interviews

Scenario
building

Data
exploration

Feedback

digital
prototypes

Sketching

Drawing
Motivational
qualities
1

Sketching

Content Analysis
Avanto

Encouraging
self-reflection

digital
prototypes

Self-reflection
Questions testing
Artova

Feedback
session

Drawing
Motivational
qualities
2

Designing the
context

Developing

Testing /
evaluating

LAUNCH!
*September
2013*

Research
Content

Form
Development

○ Testing / Evaluating / Feedback
Process of collaborators

Figure 23 Activities to create the ArtovaModel visualisation over time.

4.1 Process Phases

The process of creating the ArtovaModel visualisation can be conceptually divided into three overlapping stages. For example the *content* activities were continued throughout the process and brought new information on what to include (or exclude) in the final visualisation. The graph seen in Figure 24 illustrates how the activities are dispersed through time and also distinguishes in which of the three stages (*research, content, form*) they belong to.

4.2 Research

The research stage includes those activities whose aim was to help me understand Artova and the Artova collective actions as well as define ArtovaModel visualisation aims. In design terms these activities were focused on understanding the stakeholders and their potential usage of the ArtovaModel visualisation. From a visualisation point-of-view, and referring to the theoretical framework discussed, the research stage includes activities to:

>> *Understand* the domain – the first step in Munzner's (Munzner, 2009) model.

>> *Discover* the story to be told – as Segel and Heer (Segel & Heer, 2010) explain.

>> *Gather* the 'raw' data

In the following sections I will describe various approaches that form the research process as well as the impact each activity had on the end result and on the process. Often the individual impact cannot be clearly articulated since the activities are exploratory and each of them builds on the findings of the previous ones.

Gathering collective (design) probes

The pilot projects, before my collaboration with Artova, started documenting their progress in the form of blog posts. The first blog post of the Design Dog Park pilot action is dated already in September 2007[21], describing why a group of dog-owners founded a dog association in the Vanhankaupunginkoski area *"when the first buildings of a new block had just been completed and new residents with their dogs moved in."* (Gammel Dogs Association / Markus Talvio, translated by Pigasus Translations). All together the Design Dog Park collective action posted around 50 blog-posts with varying length describing their action, the last one dating in July 2013. They are written in a light, personal tone, often describing their frustrations with the city planning

---

21   It is probably the case the blog-post was written later in 2010 referring to events that happened in 2007 and therefore dating it as September 2007.

or their excitement in their progress. I quote two examples of these. Referring to the Design Dog Park drive, a pop-up dog park in the area the Design Dog Park collective action organized:

> *"First things first: it was so much fun! The "warm up" on Friday and then Saturday were a success in spite of the low temperature, and considering the schedule and available resources. The Design Dog Park initiative attracted the interest of the media. Radio Helsinki did an interview in their morning broadcast 2.2.2012. The hosts had some tricky questions but I suppose we passed with flying colours"*
>
> (Excerpt from post titled 'Design Dog Park Drive' , February 2012, member of the DDP team, translated by Pigasus Translations).

And later, in September 2012, after no progress within the collaboration with officials to realize their idea during the Helsinki World Design Capital year (WDC):

> *"My current goal is to at least take care of the task we have promised the WDC organization to do: to document how the project proceeded. It's useless to hope that we could have anything concrete on the meadow during this design year"*
>
> (Excerpt from post titled 'Tired', September 2012, Anna Saarnisto / Gammel Dogs Association).

Naturally, not all the pilot actions were as thorough with documenting their progress. When asked about their blogging during the interviews, it became apparent that, for some actions writing about their experiences was a way to open up their project to the world and even help them organize their facts and thoughts. For others, this process was considered secondary, which is also apparent in the number of posts they actually wrote and their contents.

These posts are rich in information about collective action experiences. From a design point of view, these blog posts could be compared to design probes (Mattelmäki, 2006) aiming to understand the pilot teams' experiences and context in more depth, through self-documenting. The usual approach to design probes is for the designer to frame the research by giving instructions (to individual users) of what to document and in what form. Often the probe kit (through which to perform the self-documentation) includes physical objects such as cameras and diaries, as well as tasks; but it can also be extended to Internet based diaries such as blogs (Mattelmäki, 2006).

In this case, the collective actions were documenting themselves in a level of a team and not an individual, and secondly the probing was framed and initiated by Artova (not the designer). I am therefore uncertain on whether to call them design probes (even though T. Mattelmäki specifically mentions their open and exploratory nature (Mattelmäki, 2006, p. 40, 66)), however they had the same results.

Impact on design

As is the case with individual design probes, the collective web-diaries were *miscellaneous and of questionable reliability* (Hirsjärvi et al. as cited by Mattelmäki, 2006, p. 65) before further exploration and interviews with the pilot teams. Nevertheless, I cannot imagine a better way to have been introduced to the pilot projects than through their 'diaries'.

I quickly got a grasp of the type of issues they were facing such as the fluctuation of motivation during their process and their dependence on collaboration both from other individuals (as volunteers) but also from the side of official bodies (such as local authorities). These served as a basis to later design the follow-up interviews. They also highlighted potential uses that the ArtovaModel visualisation could have. For example, could the visualisation inspire collective actions during low-motivation periods?

Besides the issues, most of all, these web-diaries introduced me to the pilot teams in general. Their choice of wording, the humor, the images they chose to accompany their text, their excitement, all together let me understand whom I am designing for and what has to be represented in the visualisation. Since I will be dealing with abstracted (and often out of context) data all throughout this visualisation, understanding the experiences and stories of the people who generated that data is important so as not to misinterpret the meaning or lose the wider perspective.

Interviewing the pilot-projects

After going through the blog-posts, I arranged a series of meetings with the people behind each pilot project. Overall, I interviewed members from five out of the six pilot teams, excluding Artova Film Festival whose members were later interviewed by Avanto.

The interviews were semi-structured with a series of open-ended questions divided into three parts. The first included questions regarding their personal involvement in the pilot project, Artova and similar type of collective actions. The second part had questions that focused on the events of the pilot project, including their setbacks, internal organization and group size. The last part was related to the visualisation, and what they imagined an ArtovaModel visualisation to do. Each interview lasted for approximately 1–2 hours and was recorded for further use.

During the interview, the team members were also asked to describe their projects in a rough timeline of events. They had already documented most of the facts in the 'Artovan Henki' blog but of course hearing it first hand offered the opportunity to go deeper into events that were problematic or rewarding.

Impact on design

When discussing about the help they could have used during their action or what they would have done differently in hindsight, several topics came up. For example a My House Arabia member mentioned she would like to have known beforehand

the amount of time they would need to invest in certain actions like marketing their event, and also receive more regular mentoring. Similarly in an interview with an Arabia Street Festival member, he would suggest to the next team to organize the street festival to start planning for it earlier.

Later, when discussing about the potential use of a visualisation of their actions, different topics came up, not necessarily aligned with what they were discussing before. For example, both Arabia Street Festival and Edible Arabia members mentioned they would like to able to compare their process to other similar actions of smaller and bigger scale and see solutions of similar setbacks. Design Dog Park members mentioned it would be interesting for them to see the amount of hours they spent on their initiative as well as use it as a condensed form of information when communicating with other external parties.

Obviously not all the topics addressed could be covered in this visualisation project. Nevertheless, they can be divided into how they could have used the ArtovaModel visualisation during their action and how it can serve them after their project was over. In the table X you can see all the potential uses that came up divided into the two separate groups of (past) pilot actions and current actions.

Completed Collective Projects	Current Collective Projects
See the original vision and the final conclusion of other actions.	Knowing the way to proceed - feeling that things are moving forward even when uncertain.
Compare their project to other of smaller or bigger scale.	See different approaches/ solutions to similar problems and obstacles.
See the amount of personal time used or the intensity of working hours throughout the project.	See possibilities of who to contact when in need of guidance.
Use as a communication tool with the city or elsewhere about their action.	Consult for scheduling
Transfer their knowledge that was gained through the project.	

Table 2 Potential uses of the ArtovaModel visualisation from the interviews.

Interviewing Artova key members

The blog posts and the pilot actions interviews introduced me to the pilot projects and their teams. However, the role of Artova was still unclear, and so was an overview of these collective actions. I therefore also conducted interviews with the Artova coordinators at the time, Janne Kareinen and Saara Vanhala.

Throughout this degree project, and especially in the beginning, I was meeting Janne Kareinen almost on a bi-weekly basis. Thanks to their frequency, these sessions were relatively unstructured, allowing the discussion to flow where needed. Naturally, as the design was progressing, the topics discussed in the meetings were changing as well, eventually focusing more on the representative value of visual representations rather than Artova, the ArtovaModel or the pilot projects.

Impact on design

In general, Janne Kareinen introduced me to Artova and gave me a high-level understanding of the pilot projects and eventually I became familiar with Artova's approach to *build on peer-to-peer thinking and empowerment* (Tulikukka, 2012, p. 84).

Moreover, I understood that the ArtovaModel was being compiled so that '*caddies*' (Tulikukka, 2012) like Janne Kareinen could eventually step down after having created a system to sustain Artova's practices – and help actions to effectively self-organize. Therefore their aim for the ArtovaModel visualisation was to provide easy access to the ArtovaModel to collective actions and other neighborhood intiatives. All in all, my interaction with Artova was so close that its impact on the final visualisation is inseparable and their help integral.

Concept mapping

To promote collaboration and mutual understanding, I would sometimes prepare visual and narrative[22] aids for the sessions. For the first session, I drafted a concept map including my assumptions and my till then understanding of the Artova collective actions. It was printed out and apprehended collaboratively with extra nodes and notes during the interview as seen in Figure 25.

The discussions through this concept map grew around the meaning of a *successful* self-organized collective action. Since for Artova the goal was to facilitate collective actions be successful, then a relative measurement of what is considered a success for them would have to be identified. Moreover, collective actions such as the Artova pilot projects do not follow industry methods or have monetary rewards; therefore, a project management approach of judging them on effectiveness or efficiency would be unsuited and not representative.

According to Artova, a collective project is successful if despite the difficulties, the team members have enjoyed the process and would be willing to get involved in

---

22 The narrative aids are discussed separately in the following Subsection *Scenario-building*.

yet another collective action. Of course, the team's pleasure is influenced by a good project outcome; nevertheless, the expected project outcomes in a self-organized project are defined by the members themselves. As an example, if a collective action organizes an event expecting ten people to join, when fifteen show up it is already a good outcome for them. This attitude for the teams only to set their goals as relative to their time and expectations is one that Artova actively advises.

Impact on Design

If the whole ArtovaModel visualisation was a story, then through these interviews, it became apparent that the title of the story would be on the lines of: *'how volunteers have been bringing their ideas to life while enjoying the procedure'*. In our conversations with Artova coordinators, as well as later in the process with Avanto, we have been using the term *motivation* to indicate this pleasure and satisfaction during an action[23]. It was therefore evident that the motivation of the collective action teams should be reflected in the final design of the ArtovaModel visualisation.

Scenario-building

I became familiar with the stakeholders of this degree project through the collective (design) probes, the pilot project interviews and the close collaboration with Artova. Having identified some of their expectations and wishes for the ArtovaModel visualisation, I compiled five fictional narratives describing five reasons why an individual uses the ArtovaModel visualisation. These fictional narratives of how (and why) users accomplish tasks, are referred to in design literature as *scenarios* (Carroll, 2003). The fictional users in scenarios are usually based on archetypes of users expected to use the system and are referred to as *personas* (Cooper, 2004).

The ArtovaModel visualisation scenarios and personas might have fictional names, yet they are inspired by real stories and individuals from the Artova environment. For example, in the following narrative titled 'Scenario 2: Information Noise', Bob's persona is inspired by a team member of Design Dog Park. The Design Dog Park project was never actually implemented as the team had envisioned, yet even after five years of trying, the members were still active and even organized a pop-up design dog park in the Arabia neighborhood. Similarly in the scenario titled 'Scenario 3: Scheduling', Heidi, was inspired by a member of the My House Arabia action, where the project leader was asked to learn a lot of new things outside her comfort zone due to the small organizing team.

In these narratives I compiled the possibilities of the ArtovaModel visualisation as they appeared in the interviews and blog-posts. Artova could feel the potential for a visualisation of their practices but could not express how it might be used, therefore these narratives also served as an effective communication tool in the meetings with Janne Kareinen; and created the common ground to build upon.

---

23   Therefore, I have been using the same term in the ArtovaModel visualisation and throughout this degree work.
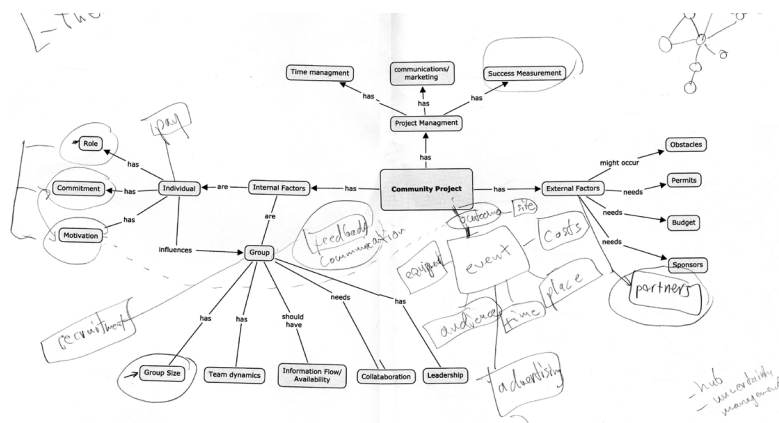
Figure 24 Concept mapping of (my understanding) of Artova and collective actions. Augmented after a common session with Janne Kareinen, Markku Reunanen & myself.

Scenario 1: Information Structure

A few neighbors came up with an idea of how to enhance the social interactivity in their area and they would like to share their ideas with other neighbors and see what kind of feedback they would get. They have not initiated something like this before and are not sure how possible their vision is. Namely, they would like to see a process of a community project, but since they are all working in the mornings, their afternoons is all they can spare.

They discover the visualization online, which includes a series of already completed projects. Each independently finds a project and starts moving through its timeline to read its process. They don't spend much time since for the time being they are only interested in how it was initiated.

Some parts of the visualisation are highlighted with different symbols that represent group size and motivation. They understand that most projects start with just that — a group of people and their motivation to make something. This makes them feel like they are on the right track!

*Continuing, they see a different symbol representing something like **keyframes** — special times that have been noted as important in the project. By interacting with this symbol, it shows the visualised project's first meetings, how many people went, how they advertised it and what was discussed. They then understand that when organizing the first group meetings it is good to involve as many people as possible in their idea.*

They close their browsers and know the first steps they have to take!

Scenario 2: Best Practices and Mistakes

A current project has reached a point where enough interest has been gathered but motivation in the team is running low. The initial participants seem to have spread out. The project managers consult the visualization tool to see how that has been dealt with in past projects.

They discover in the visualisation that motivation of the participants is closely related to the updates provided. Some past projects at this stage have organized meetings. However, this is not possible for them. They decide to update their blog/website more often even with minor changes so as to keep everyone in the team informed and possibly make them more active to find solutions.

They also see a pattern here that in every project motivation runs low at some points, and don't feel so threatened that their project is not progressing correctly.

Scenario 3: Information Noise

Bob has just completed a volunteer project with a group. The project wasn't as successful as they would have wanted because they had some problems with the city. Nevertheless, they did have a good connection with the team he was working in. He enjoyed it, even though it was his first volunteering project, and is considering getting involved with another project.

Consulting the visualisation which includes five previous projects that have been realized, he understands that some projects are more probable to need a lot of interaction with the city. He wouldn't want that again so he chooses another type that, in his view, is more probable to succeed.

Scenario 4: Scheduling

Heidi is currently organizing a neighborhood event; she has never done so before. She doesn't mind her inexperience since she feels that she is learning many new things. Of course, this learning procedure means that it takes her more time to complete the tasks. For example, she had never before had to market an event. So she doesn't know when she should distribute the event posters. She checks the visualization that had been previously mentioned to her, and compares to see when previous projects had started their poster distribution. She also discovers that other projects have informed magazines about their event and she decides to do the same.

Scenario 5: Fast Understanding

> *Meg has been working on the same project for five years. It has been quite tiring for her because the project seems to die off and resurrect over and over.*

> *Their project progress has been visualized so far. She decides to look through it and try to understand visually the work and time she has put in to it and what might have gone wrong. Later, she also shows it to people around her to explain the team's actions since it is too much information to explain only with words.*

The above scenarios represent the potential outcomes of the visualisation from the perspective of the users rather than how it looks or functions. They are purposely quite naïve since they are data-ignorant as well as implementation-blind. For example, there was no possibility to have detailed information of the pilot actions' first meetings as described in 'Scenario 1: Information Structure'. Also, in 'Scenario 5: Fast Understanding', the real-time and saved progress of Meg's project was never really considered as a possibility due to time and resource restraints. Nevertheless, they approach what I believed an 'ideal' ArtovaModel visualisation could do for its users, at that stage in the design process.

Impact on design

By creating scenarios where the visualisation is a black box, I could generate some more general conclusions. For example it became apparent that the visualisation should be able to respond to different users with the information that would be relevant to them in each case. More specifically, and as seen in the scenarios, the ArtovaModel visualisation should:

> » Provide to actions just starting to form, easily accessible information that is well structured.

> » Motivate the newly formed teams and let them understand some underlying principles of past collective actions such as practices in first meetings.

> » Act as a knowledge pool, so as mistakes and best practices are avoided, repeated or plainly acknowledged by other collective actions.

> » Allow filtering and excluding of irrelevant information — avoiding information noise.

> » Accommodate comparison between past projects to see common grounds and important differences.

> » Aid in decision-making for specific situations such as planning.

» Be used to present current collective actions to themselves or to share with the public.

Understanding this separation in users and uses, inspired me to follow the *'overview', 'zoom and filter'* and *'details-on-demand'* mantra (Shneiderman, 1996), and to separate the levels of interaction and engagement of the users to several views. These views, as seen in Table 3, were made to suit three different user types and eventually included the four component visualisations mentioned in Chapter 2.

Research phase outcomes

In visualisation terms, and more specifically based on the nested model of visualization design (Munzner, 2009), this stage includes the threat of wrongful identification of the problem. In order to identify the potential tasks and aims of the ArtovaModel visualisation, similarly to what Munzner proposes, I observed and interviewed the domain experts and some users. Not all these tasks were eventually designed for in the final visualisation. However, they inspired the overall aims of the ArtovaModel visualisation, when reflecting on them in combination with the interviews and the available data. In particular, through the ArtovaModel visualisation we aim to:

» Explain what the Artova association might do differently than other collective actions in order to promote pleasurable collective actions.

» Tell the story of the Artova pilot projects — indicate the team's satisfaction.

» Show how the ArtovaModel might affect or relate to other collective actions.

These aims, derived from identifying three central stakeholders in this degree project (excluding myself). They are:

(1) The Artova neighborhood association,

(2) The pilot collective actions, and

(3) Other collective actions and neighborhood associations.

Concluding the research activities, I had a more clear idea of what I should be looking for, what data would have to be gathered to fulfill these aims and a general direction for the design process.

The ArtovaModel visualisation *should*	Possible *users*	Component visualisations
Provide easily accessible information that is well structured.	New collective actions and neighborhood associations (3), Artova (1)	*Overview, Pilot project timelines*
Motivate the newly formed teams and let them understand some underlying principles of past collective actions	New collective actions and neighborhood associations (3), Artova (1)	*Overview, Pilot project timelines, Self-relfection questions*
Act as a knowledge pool, showing mistakes and best practices	New collective actions and neighborhood associations (3), Artova (1)	*Overview, Pilot project timelines,*
Accommodate comparison between past projects	Pilot projects (2), Artova (1)	*Pilot project visualisation,*
Aid in decision-making	New collective actions and neighborhood associations (3)	*Self-relfection questions*
Be used to present collective actions to others	New collective actions and neighborhood associations (3), Pilot projects (2)	*Overview, Pilot project vis., Self-relfection questions*

Table 3 Possible uses of the ArtovaModel visualisation mapped to the users and final component visualisations.

4.3 Content

The content stage includes those activities whose aim was to explore the 'raw' data, analyze them, find relevant relations as well as give structure. In short, they are the steps between the 'raw' data and the compilation of the ArtovaModel. Referring back to the theoretical framework, the content stage includes activities that aim to:

> » *Create abstractions* of data and operations – second step in the Munzner's model (2009).

> » *Clarify* and *structure* the story to be told – based on Segel and Heer (2010).

> » *Create information and knowledge* from data – based on the DIWK continuum from Section 3.4.

> » *Refine and gather* missing data.

For the most part, the steps that lead to the documentation of the ArtovaModel were done by Avanto. Avanto, more experienced on analyzing social systems, conducted interviews with other collective actions in Artova as well as external parties. I have therefore only included here some activities that were initiated by me in relation to the visualisation aims. In the following sections I will describe these activities in more detail and discuss their outcome and importance for the design of the ArtovaModel visualisation.

Figure 25 Motivation during the projects process – drawn by the members of the actions
(a) Design Dog Park (b) Artova Kino (c) Artova Film Festival (d) My House Arabia
(e) (next page) Edible Arabia

(e)

Drawing motivational qualities

The combination of the interviews and blog-posts were put in a draft sequence of events (a timeline) that was then crystalized and used as a primary data source for analysis by Avanto. However, as these interviews and blog-posts were abstracted to events, they became less personal. One of the aims of this visualisation, as shown from the research activities, was to reflect the motivation of the teams during their process.

Hence, I asked Avanto during their interviews with the pilot teams, to gather by drawing the fluctuation of team's motivation throughout their action. This participatory research technique gave results that varied depending on the participant. The differences can be seen in the Figures 26a and 26b comparing the Design Dog Park drawing of their motivation to the Artova Kino one. Another problem with the teams drawing their motivation was that they did not have the same scale or reference points with other actions as seen in the differences between the My House Arabia and Edible Arabia drawings (Figures 26d and 26e).

Therefore, I sent separately to the team members of each action their project timeline and asked them to rate their motivation for each event. They were asked[24] to fill a number between 5 ('I'm really enjoying what we are doing') to -5 ('this project feels like a burden'), with 0 meaning that the event had no effect on them. This approach seemed to work much better for them; especially since I had already introduced them to more visual clues as to where their rating was going to be used and its importance in the visualisation. Finally I combined these individual self-ratings to a group rating by averaging[25].

---

24 The introduction explaining to the team members how to rate their motivation can be found in Appendix C.

25 Altogether motivation was gathered from the core groups of: Artova Kino (3 members), Arabia Street Festival (4 members), My House Arabia (1 member), Design Dog Park (3 members), Edible Arabia (2 members) and Artova Film Festival (3 members).
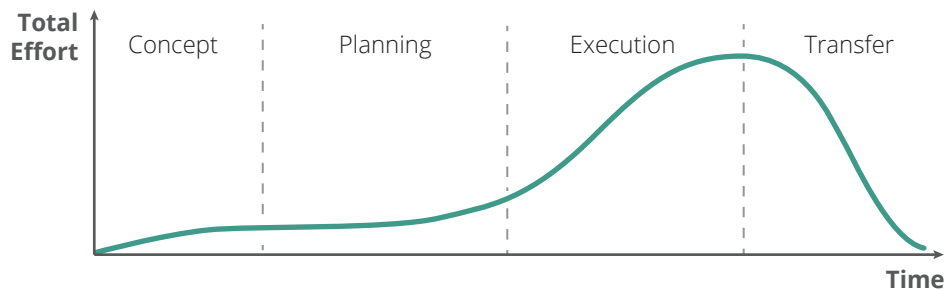
Figure 26 Project Management Lifecycle compared to organizational effort. Adapted from Max Wideman (2001)

Impact on design

Including the motivation of the teams in the final visualisation was one of the ways to highlight the individual stories in the ArtovaModel visualisation and therefore make it more relatable. The hypothesis when asking them to self-rate their motivation was that it would change depending on the type of event as well as the stage in the process. For example, I (wrongfully) assumed they might follow a similar pattern to organizational effort through stages in the project lifecycle (Figure 27). Also, I wanted to see for example if events that deal with partnerships with the city such as permits would be less pleasant than, say, meetings.

Obviously these ratings were subjective and inaccurate since the motivation was rated in view of the results of each action and was also averaged to the level of the team. Therefore, for the most part the hypothesis that had started this inquiry did not seem relevant anymore. Moreover these types of results (for example comparing to project management methods) would most likely not add extra value.

Nevertheless, these ratings were included in the ArtovaModel visualisation, so as to show the existence (if not the specifics) of the team's motivation fluctuation of throughout the course of a project. In short, it was considered a communication point between experienced and novice collective actions (as discovered from the scenarios of the research phase). In light of the results I believe it to be a key element in the ArtovaModel visualisation.

Exploring the data

As a way to understand the data that we have collected and that would form the ArtovaModel, as well as to explore different views that the final visualisation could have, I started rearranging the timelines events by theme, time or pilot action. These explorations have not been used in the compilation of ArtovaModel as such, however they did help, later on, to identify a few topics that were underrepresented in the ArtovaModel report (such as the consistency in all the pilot projects to have a high-quality visual identity and materials – Figure 28).

In order to abstract themes from the timelines, I used a process similar to the thematic network analysis (Attride-Stirling, 2001) as described in Section 3.4. I did this manually, by attaching each event description to a post-it and separating between the collective actions based on the post-it color as seen Figure 29.

After generating the themes, I started comparing how many events from all pilot actions are concerned with a specific theme for example 'interaction with the city'. I also looked for which themes are more common in each pilot project and if they are representative of the project based on the interviews I had conducted and the blog posts. I also (unsuccessfully) tried to see if some themes occur sooner or later in the process of all the pilot projects.

Impact on design

These explorations happened quite early on in the process, when the timelines were not yet finalized. In addition, the themes that appeared from my analysis were uneven – for example the 'Interaction with the city' and 'Decisions' themes are certainly not mutually exclusive. Therefore most of these groupings did not give a *real* story of the data. Nevertheless, thematic grouping seemed to be an interesting approach to compare the pilot actions between them as well as to identify with what each pilot action spent most of their time. This exploration led to the idea that each event should be tagged to the themes (later called factors) it deals with from ArtovaModel so as to allow the visualisation user for such explorations as well.

The same process was later repeated with the final factors/themes related to the complete timelines of each project. The results, which were initially in the form of

Figure 27 Visual material for My House Arabia event – locations that are part of the event. Map and visual design by Tero Juuti (2012).
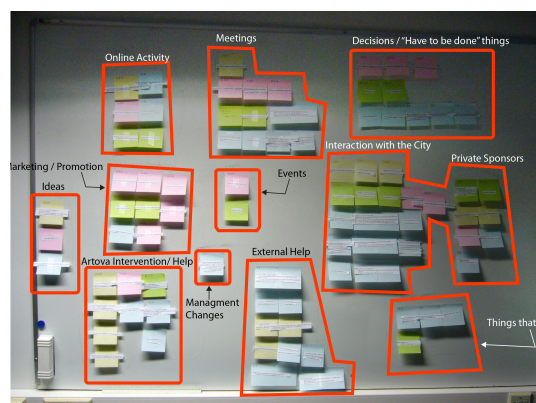
Figure 28 Exploring the data through post-its. Grouping by appearing themes.

63

frequencies and percentages, were later combined in a draft visualisation (Figure 30). The draft visualisation was presented to the pilot actions, in an informal feedback session including members from all teams, to see how much they found it interesting or representative of their action.

The representation seen in Figure 30 attracted the most conversation out of those I had included, and the teams started comparing their projects to those of their peers and talking about what had dominated (or not) their attention. The form of this draft visualisation was later changed, however this view of the data was included in the ArtovaModel visualisation in hope of yielding same results.

Encouraging self-reflection

Showing how the ArtovaModel relates to or affects other collective actions was part of the original goals of the visualisation. However, with the completion of Avanto's report on the ArtovaModel, it became evident that the ArtovaModel was overloading with information and was therefore becoming harder to relate to – especially from collective actions outside Artova. Inspired by the self-documenting practices discussed in the Section 4.2 under *Collective (Design) Probes*, I wanted to encourage self-reflection on the key issues addressed in the ArtovaModel.

As a result, I formulated, with the help of Janne Kareinen, a series of 27 questions that are based on the ArtovaModel and that could be presented to people interested in collective actions but that are unfamiliar with Artova practices. The value of these questions was not to distill right answers from the people, it was more to help the person answering to focus his or her attention to aspects of the action the group might not have considered. For example, based on the ArtovaModel sub-factor 'Decision-making and sharing responsibilities' the following question arose:

> *Does everyone in the group know their responsibility area?*
>
> *i.e. Try this example. Think of a task: "Informing the newspaper X for the event". In your current settings who would be assigned to do that? Is it clear and immediate? If not then maybe your roles are a bit intertwined which might cause confusion in the group dynamics.*
>
> > ⊙ *No, we improvise as things come up.*
> > ⊙ *They are defined but not completely.*
> > ⊙ *Yes, the roles are well defined*

Even if the purpose was self-reflection, they were still given three options to answer just like a questionnaire so as not to make the questions seem too open and time consuming. All together, the questions covered the main learnings of the Artova practices divided into five parts and varying sub-parts, one for each ArtovaModel factor and sub-factor accordingly. The full list of questions and recommendations, as they were formatted, is included in Appendix B.

Impact on design

Artova started using these self-reflection questions with groups[26], even before the visualisation was completed. The feedback was positive[27] and we therefore decided to include them in the ArtovaModel visualisation with some modifications on their wording. Eventually these questions become the second level in the ArtovaModel visualisation interface, conveniently named *Self-reflection Questions* and have their own component visualisation, the *self-reflection visualisation* that I discuss in the Section 4.4.
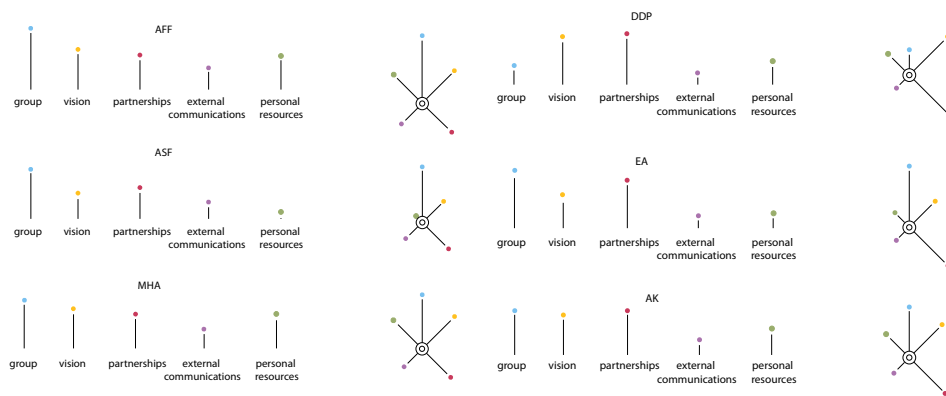
Figure 29 Fast visual representation of the pilot projects and their corresponding data. Used in feedback session with pilot actions on 27/5/2013.

Content phase outcomes

The content phase was concluded with an approximately 60-page report describing the ArtovaModel, six pilot action timelines with their motivation on each event and 27 self-reflection questions; all of which were both in Finnish and English. Everything else except the collection of Artova's practices (the ArtovaModel) was gathered (or compiled) for the sole purpose of the ArtovaModel visualisation. Gathering and crosschecking this data was a long collaborative process spreading over four months, and it still needed to be structured and re-worded to become more accessible to people unfamiliar with Artova. Nevertheless, the aims set by the research phase could not have been possible without this process. To be more specific, I present in the following page the original aims of the visualisation next to the gathered information concerning them.

---

26 They used them with similar neighborhood actions in Estonia as well as some newly formed Artova teams in Helsinki.

27 Unfortunately I have only received it through Artova and not first-hand.

(1) Explain what the Artova association might do differently than other collective actions in order to promote pleasurable collective actions.

> The five ArtovaModel factors and their descriptions, divided into sub-factors containing more specific information and linked to examples from the pilot project events. The differences with other project work are highlighted in the descriptions of the factors and sub-factors. (Appendix A)

(2) Tell the story of the Artova pilot projects — indicate the team's satisfaction.

> The story of each action is visible in a series of events which include a description of what took place, the team's motivation at that time and quotes from the blog posts or interviews about it. These events are tagged with the ArtovaModel factors.

(3) Show how the ArtovaModel might affect or relate to other collective actions.

> We compiled 27 questions based on the ArtovaModel factors so as to make other actions reflect or compare their practices with those of Artova. (Appendix B)

The data abstraction layer in Munzner's nested model has the risk that *'chosen operations and data types do not solve the characterized problems of the target audience'* (Munzner, 2009, p. 923). She proposes testing on target users at the time of design, or documenting usage after deployment, as a way to identify the designer's misinterpretations. The data abstraction in the ArtovaModel visualisation case was tested at the time of design not after deployment and for each operation (aim) separately.

The ArtovaModel compilation and its related artifacts (the sub-factors, the examples and descriptions and their in-between relations) were shown to (and later edited by) two Artova board members and well as the Artova coordinators. This seemed relevant since all four individuals were very familiar with Artova's practices and could easily recognize mistakes, omissions or wrongful relations in the abstraction.

In addition, the timelines and their tagging based on ArtovaModel factors were shown to the pilot project teams in a feedback session. Through this feedback session, as mentioned in the Section 4.3 under *Exploring the data*, I realized that the approach chosen to present the pilot projects was successful in engaging the teams in discussion. Lastly, the self-reflection questions were handed out and tested by Artova on other collective actions both in Finland and Estonia, and their responses were also positive.

4.4 Form

The form phase is the final part before developing and ultimately launching the ArtovaModel visualisation in September 2013. Overall it includes activities that relate to:

> » *Encoding* and *designing* interactions – from Munzner's nested model (Munzner, 2009).

> » *Telling* the story – based on Segel and Heer (2010).

> » *Communicate* the information.

> » *Designing* the online environment (the context).

The main method used in this phase was exploratory sketching combined with frequent unstructured sessions with Artova. I had already begun exploring visual representations soon after the aims of the visualisation were formulated and in parallel with the content related activities. Therefore, since the content was not complete, the sketches from the early stages of the form phase are using arbitrary entities and data. In time, and as the ArtovaModel was taking shape, the sketches and their data became more accurate. I have divided the form phase to three parts. The first part discusses the design of the component visualisations, followed by their integration to create the whole ArtovaModel visualisation. Lastly I will discuss briefly about designing their context (the artovamodel.fi website).

Designing the component visualisations

To reflect the values of collective actions I decided to use computer-generated graphics that can be adopted, modified and augmented more easily compared to closed formats such as images, which don't allow extension. Therefore, these explorations were focused on forms that could be run-time[28] generated and allow for user exploration through interactivity.

At this stage, I was comparing various visualisation forms and reflecting on their meaning based on the Gestalt laws mentioned in the theoretical framework, as well as their representative value of collective action activities in general. I narrowed the explorations to visualisation formats that are supportive of qualitative data excluding for example most charts and plots. Knowing the nature of the data, I mostly focused on visualisations that show relations between entities and emphasize structure. I felt that emphasizing the relations was important for understanding abstract entities such as the ArtovaModel factors and that structure would possibly lead to memorability.

---

28 *Run-time* refers to a computer program's lifecycle when the code is actually being executed. In this context, I am referring to the ability of forms to be generated by code – through an algorithm (a sequence of steps). This would mean that the 'data' that the algorithm uses, in this case the ArtovaModel factors, their descriptions and even their relations, could change but the pattern (the algorithm) of how to generate the form would remain the same.

Designing the overview visualisation

The *overview visualisation* would be the central part of the ArtovaModel visualisation, and would set the tone for the other component visualisations as well; therefore creating it took more time and effort than the others. It had to represent the ArtovaModel report, including all its factors and sub-factors. As well as '*explain what the Artova association might do differently than other collective actions to promote pleasurable collective actions*' as mentioned in the research phase.

It had to have clear structure without giving false impressions yet at the same time accommodate the quite long (in visualisation and user interface terms) textual descriptions. The sketches I made can be divided into the types of forms they are based on and they are discussed for their strong and weak points.

Tag clouds or word clouds are often used for qualitative data because they represent the frequency of appearance of certain words or themes in a text by changing the color, font-size or position accordingly. They are used for example to identify themes of political speeches (see Figure 33) but also as a navigation technique in websites.

Tag clouds are an efficient way for a user to get an immediate overview over large amounts of text. Some of their proposed variations such as SparkClouds (Lee, Riche, Karlson, & Carpendale, 2010), Parallel Tag Clouds (Collins, Viegas, & Wattenberg, 2009) and prefix tag clouds (Burch, Lohmann, Pompe, & Weiskopf, 2013) enhance the traditional tag cloud's shortcomings to give the user a more complete view of the textual data[29]. Nevertheless, tag clouds alone are not good for showing structure or relations between entities and thus, occlude the story of the text (the data); often leaving the users to fill the gaps of the narrative based on their own preconceptions on the subject. I therefore did not consider them as a good representational form for the ArtovaModel visualisation.

Chord diagrams (Figure 32) are a popular method in the data visualisation field to show inter-relations of data often grouped into categories. They are aesthetically pleasing and allow for large amounts of data to be shown in one diagram[30], often highlighting their relations when hovering or clicking with an input device. I considered using chord diagrams to represent the ArtovaModel overall visualisation (image XB). However I rejected the idea because of the complexity to read through all the content as in the example of the Flare code imports above. Also the value of chord

---

29 SparkClouds include the trend of the topic in the tag cloud through time (each tag's sparkline). Parallel tag clouds combine tag cloud frequency methods with the layout of parallel coordinate diagrams to favor comparison between different bodies of text. Prefix tag clouds group tags together that derive from the same term and therefore possibly having the same meaning. For example 'visualising' and 'visualisation' would be grouped under the same tag.

30 Also when combined with the hierarchical edge bundling method (Holten, 2006) as in Figure 32 to bundle adjacency edges together, the results are beautiful and the relations more understandable.
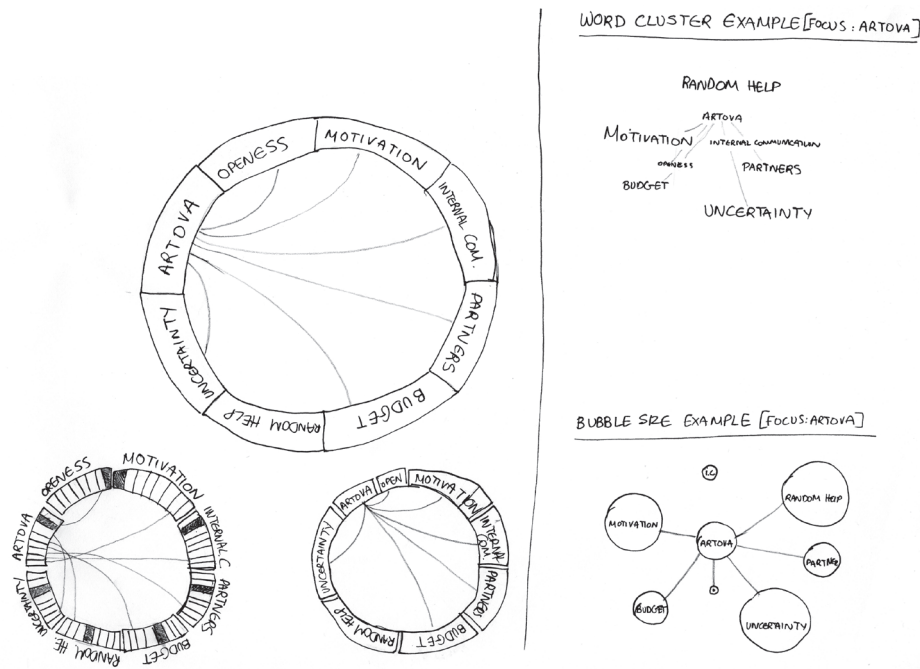
Figure 30 Tag cloud and chord diagram ideas / sketches for the Arto-vaModel visualisation.

Figure 31 Visualising code dependencies and imports of software Flare. Chord diagram using hierarchical edge bundling. (created with d3.js, Mike Bosctock)

Flare imports
hierarchical edge bundling

tension:
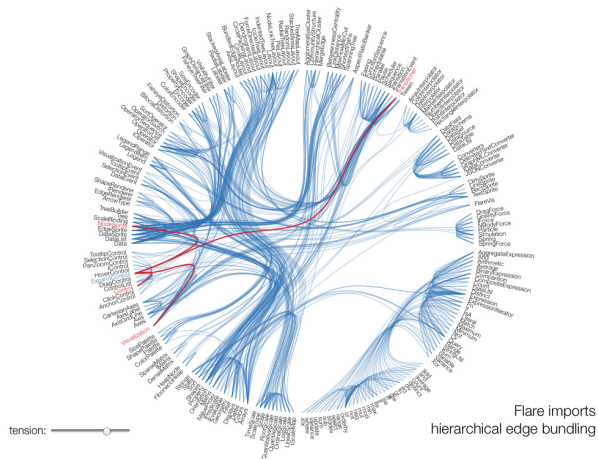
Figure 32 Word cloud comparison of two State of the Union speeches by two U.S. presidents, by Pyrsmis generated by TagCrowd.com

69

diagrams arises when dealing with large amounts of inter-related data; making it a superfluous method for the ArtovaModel case.

Graph diagrams are a very open approach to represent relations between entities. Generally, in a graph, the entities are represented as nodes (often by abstract shapes such as circles or squares) and their relations by lines. This is using the perception principle of connectedness (Palmer & Rock, 1994), where objects that are connected in a line appear to be more related (than others not sharing that line). Also, following the Gestalt principle of similarity, nodes in graphs can be grouped to similar entities based on for example their shape and color. Chord diagrams mentioned above are also a specialized form of graph.

I therefore created more simple representations of the ArtovaModel factors (the nodes) to explore other ways of utilizing graph's relational ability. I had foreseen that the ArtovaModel factors (which were not ready at that time) might contain more complex relations than just from factor to sub-factor. This was not the case, therefore some of the sketches (for example Figures 34a and 34b) did not make sense with the final data and were rejected. The final decisions for the remaining ones (for example to only show sub-factors when the factor is clicked) were based on reasons of text legibility, to avoid visual clutter and aesthetics.

I represented all the nodes with circles[31], to show that the ArtovaModel factors were of similar abstract entities and separated their subjects by color and title. The colors were chosen from different hues (variations of red, blue, green, yellow and purple) so as to be perceived as distinct.

In addition, the five ArtovaModel factors in the *overview visualisation* were placed in a symmetric circular way around the main node, so as to reflect that they had no organizational structure between them, for example they are not hierarchical or sequential.

In the *overview visualisation,* by clicking on an ArtovaModel factor of the graph, the user is presented with the analysis from the ArtovaModel report of Artova's practices. This way the 60-page text report is broken up into pieces that appear only under the user's instruction. Therefore, the graph acts somehow like a visually structured navigation menu (similarly to how tag clouds are occasionally used in websites).

Designing the (pilot) project visualisations

The decision to make a separate *(pilot) project visualisation* arose after the interest to compare the pilot projects to each other. I therefore started to look into visualisation forms that enable immediate comparison over multiple aspects.

---

31 These nodes are in effect glyphs used to represent multivariate data as Ware (2004, p. 176) discusses.

(a)

(b)

DRAGABLE AROUND THE CIRLE & NEW LINES APPEAR.

• "ON OVER" THE PROJECTS THE CORRESPONDING LINES & FACTOR! ARE HIGHLIGHTED.

• HOW TO SHOW "SPIRIT OF ARTOVA OVERVIEW TOTAL!?

(c)
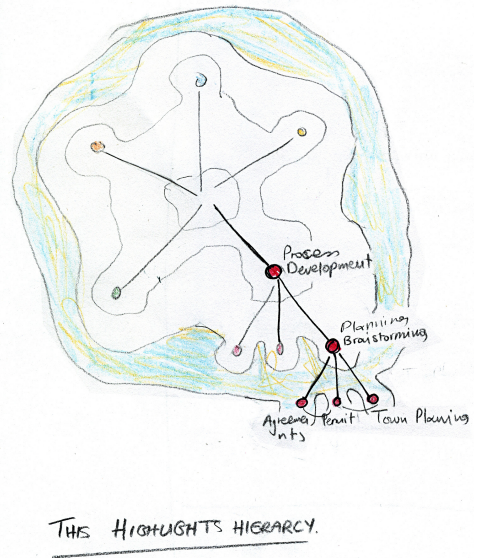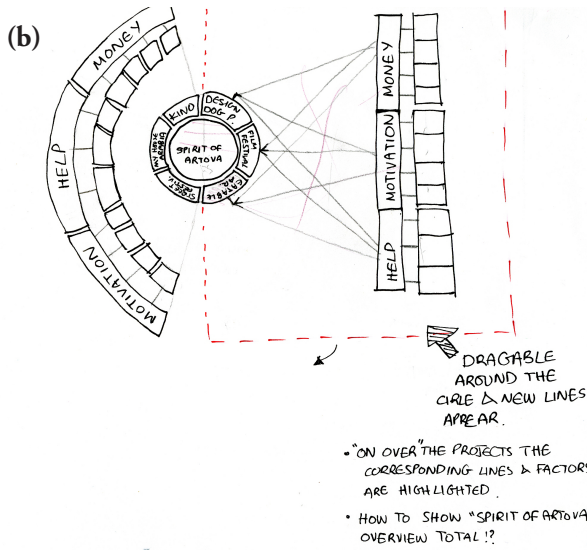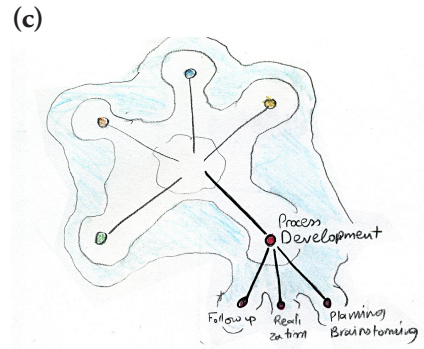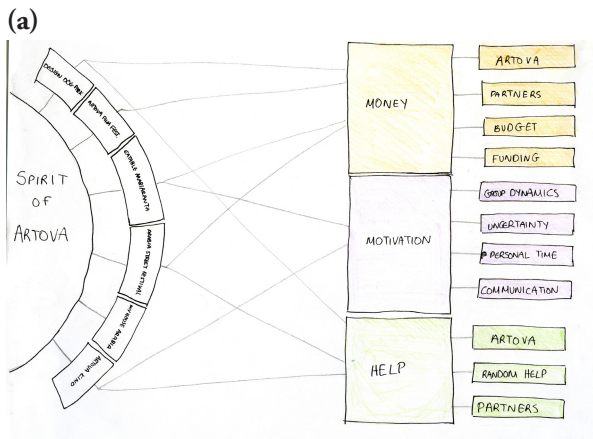
THIS HIGHLIGHTS HIERARCY.

Figure 33 Sketches of graphs for an overview of the ArtovaModel, (a) organisation-style graph (b) A dynamic circular graph (c) star-like graph
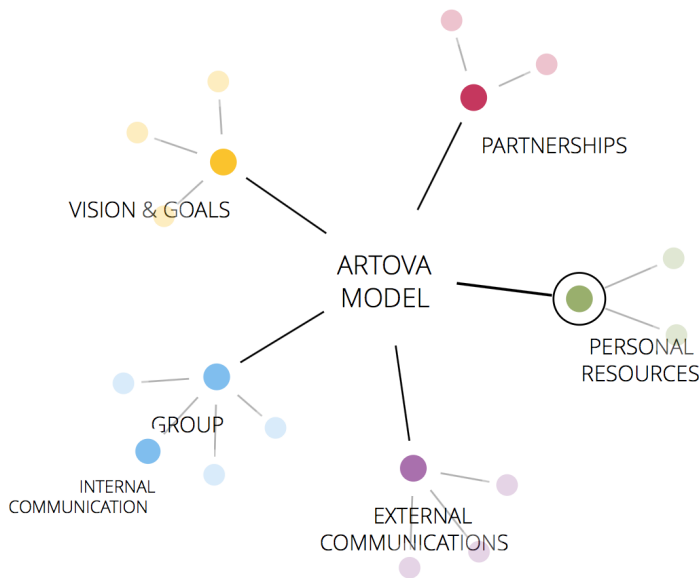
Figure 34 Left: The overview visualisation final representation.

PARTNERSHIPS

VISION & GOALS

ARTOVA MODEL

PERSONAL RESOURCES

GROUP

INTERNAL COMMUNICATION

EXTERNAL COMMUNICATIONS

Parallel coordinates (Inselberg, 1985), which can visualise effectively multivariate datasets[32], are hard to understand and extract meaning from for non-expert or unfamiliar users. Also, as Robert Kosara mentions in his online introduction to parallel coordinates (Kosara, 2010) they are most useful for at least moderately sized datasets therefore they did not offer much insight for comparing six projects.

Radar graphs, also called spider charts (Figure 37), are another way of visually representing multivariate datasets. Each dimension of the graph represents one quality on which you can access a given dataset or problem. They are used for comparing similar entities on the same properties. For example to compare between car models based on fuel consumption, acceleration, size and price.

Still, in order for these qualities to be comparable, their properties have to be quantifiable. For example to access how an Artova pilot action was more effective in external communications than another action would imply a quantification of (successful) communication; which is neither possible nor desirable in the ArtovaModel. This realization made me reject the ideas shown in Figure 36.

Since I still wanted to compare between the pilot projects, it soon became obvious that they could only be compared in their relation to the ArtovaModel factors. Therefore I was able to quantify how much a factor was evident in the timeline of a pilot project by counting the frequency of the factor in the events (their tags as mentioned above). In the final *(pilot) project visualisation*, seen in Figure 40, the colors of the diagram dimensions were consistent with the *overall visualisation* coloring to show that they are based on the same factors; based on nominal pseudocolor sequences (cf. Ware, 2004, p. 128).

The ArtovaModel factors are aspects that have been evident in the pilot projects both as positive and negative; for example both the following excerpts are of events tagged under Group:

> *'The group had some problems with communications. This was due to not having decided on a main communications channel. There were some personnel changes in partners. Also the group had some problems with finding a place for the newly joined members*
>
> ('The third season of Artova Kino' event, Artova Kino action, Fall 2012)
>
> *'An urban gardening board was created to support the project activities and share responsibilities. The board consisted of active volunteers and was headed by the volunteer project manager. The creation of the board was suggested by Artovan*

---

32 For example in the ArtovaModel pilot projects, we wanted to be able to compare the six actions based on the five ArtovaModel factors (group, partnerships, personal resources, external communications and vision) both individually and collectively.

EACH PROJECT SEPERATELY
MULTIPLE (65) FACTORS WITH A LOT SUBFACTORS
THE FATTER THE PEDAL~ THE MORE SUBFACTORS...

BAD EXPLORATION ~ GOOD LOOKS.

DESIGN DOG PARK

SELECTED LINE
FACTOR IN SUBTOPIC
HELP
MONEY MATTERS
MOTIVATION
MAXIMUM POSSIBILITY

Figure 35 Rejected sketches of presentation of projects based on undetermined factors at that time.
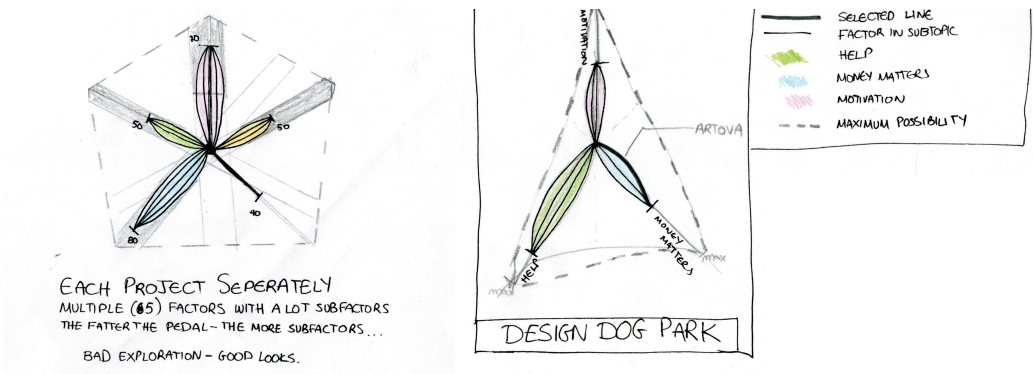
All units in per 90
Time Played: 24.4 90's
Fabregas, **Arteta** Overlay
Arsenal
Season: 2009-10
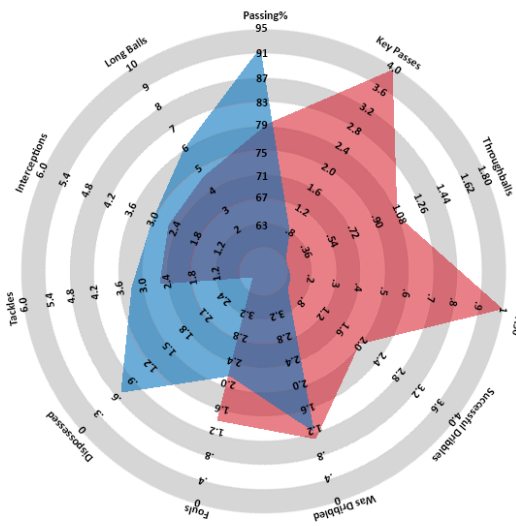
Created by:
Nat James &
Ted Knutson

Statsbomb.com

Figure 36 An example radar chart: Comparing Arsenal Midfielders, Ted Knutson (2014)

Figure 37 Rejected ideas of overlaying the project visualisations to allow for comparison

Design Dog Park
Arabia Street Festival
Artova Film Festival
Artova Kino
My House Arabia
Edible Ararianranta

GROUP

PARTNERSHIPS

VISION

PERSONAL
RESOURCES

73
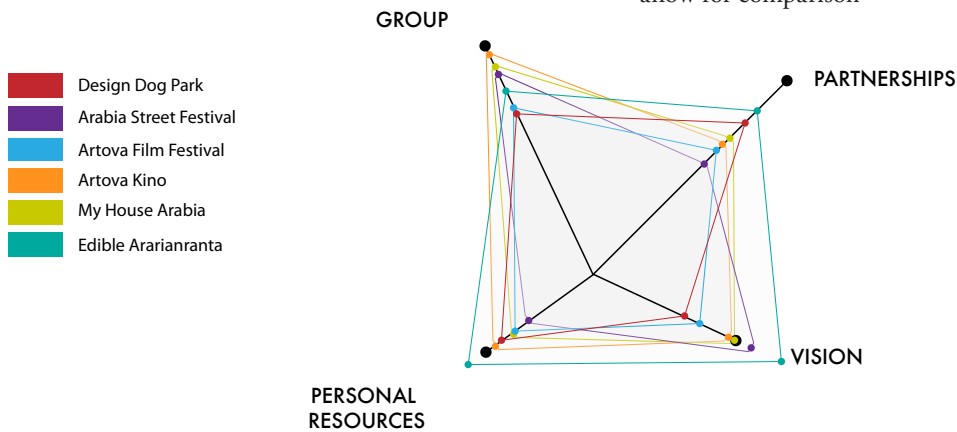
Henki. The board members usually met at the plot to discuss project issues and divide tasks as needed.'

('Urban gardening board' event, Edible Arabia action, June 2011)

The aim of the ArtovaModel visualisation was therefore not to distinguish between good or bad projects but just to show their different nature. In order to avoid this comparison to an '*ideal*' action I rejected some of the sketches where the pilot actions were overlayed on top of each other (see Figure 38). Finally, to highlight their different nature but still give the possibility of comparison I aligned the *(pilot) project visualisations* as small multiples (cf. Tufte, 1990) shown in Figure 39.

Designing the (pilot) project timeline visualisations

The story of the pilot projects was visible in the sequence of events that constituted their project. Time, type of event and team's motivation are the main parameters of this component visualisation. Initially, before the content phase was over, I had the idea of separating the types of events (such as partnerships and group meetings) through icons as seen in Figure 41 – similarly to the way that the Collective Action Toolkit (Frog Design, 2013) divide the action plan to type of activities. However this was not used after all for several reasons. Firstly the events were divided in a way that they included more than one 'event type' at the same time. This is the result of creating these timelines after the events had actually taken place – therefore the exact dates were not available. Secondly, the use of icons would bring a new level of encoding in the already full-of-information visualisation. Thirdly and most importantly, it seemed more interesting for storytelling purposes to connect the *(pilot) project visualisation*, the *overview visualisation* and the *timeline visualisation* through color without over complicating the relations.

Therefore in the final sketches, the 'types' of events that took place were correlated to the ArtovaModel factors instead of having their own categorization. And since the *(pilot) project visualisations* were using the same categorization, it was much easier to get an immediate view on the dispersion of the ArtovaModel factors in a specific pilot action through time (Figure 43).

Time was also a parameter that varied considerably throughout the pilot actions. Some had events spread out in a period of a year whereas others were still continuing after five years. It therefore became apparent that it was preferable to keep the events in an abstracted sequence.

To avoid the feeling of precise measurements, the team's motivation in the diagram was not given visual reference values (such as ticks on an axis). And since the motivation was sampled at an event level it was not interpolated to a continuous curve (as the sketches in Figure X show) but kept as discrete to avoid major inaccuracies for example about the motivation of the period between the events.

Lastly, the idea of showing the timeline vertically with time increasing as the user scrolls downwards was rejected since this would prohibit synchronous viewing of all

ARABIA STREET FESTIVAL · ARTOVA FILM FESTIVAL · ARTOVA KINO

DESIGN DOG PARK · EDIBLE ARABIA · MY HOUSE ARABIA

Figure 38 Top: Chosen method to allow for comparison

Figure 39 Left: Final pilot project visualisation. (Artova Film Festival)
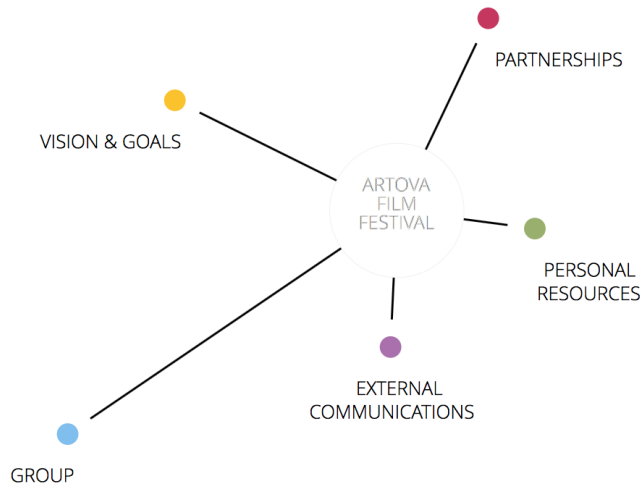
Figure 40 Bottom: Using icons based on the type of events in the timelines (rejected).

PARTNERSHIPS

VISION & GOALS

ARTOVA FILM FESTIVAL

PERSONAL RESOURCES

EXTERNAL COMMUNICATIONS

GROUP

My House Arabia

Timeline (December 2011 - September 2012)

Project Idea (December 2011)

Sponsors/Partners: WDC (December 2011)

First Meeting in Kääntöpaikka (beginning February 2012)

Invitation to houses for participation (March 2012)

Sponsors/Partners: Helsinki Design Week, Open House Helsinki, Open Studio (February 2012??)

Choose Houses that will participate (April 2012)

House Scheduling & Program (April – June 2012)

Some marketing material (April – June 2012)

Several Meetings (in the house space – 6 houses altogether) (April – June 2012)

Online Presence -website (June – July 2012)

Approaching (local) Sponsors/Partners (June – July 2012)

Published Programs (August 2012)

Marketing of event (August 2012)

Common Lunch - meeting of all the houses together (August 2012)

Individual House Meetings (August 2012)

Responsibilities Given Out for event day (August 2012)

Poster Distribution (end of August 2012)

Event (11-16 September 2012)

75

Figure 41 Rejected ideas to show the motivation of the pilot projects through time.
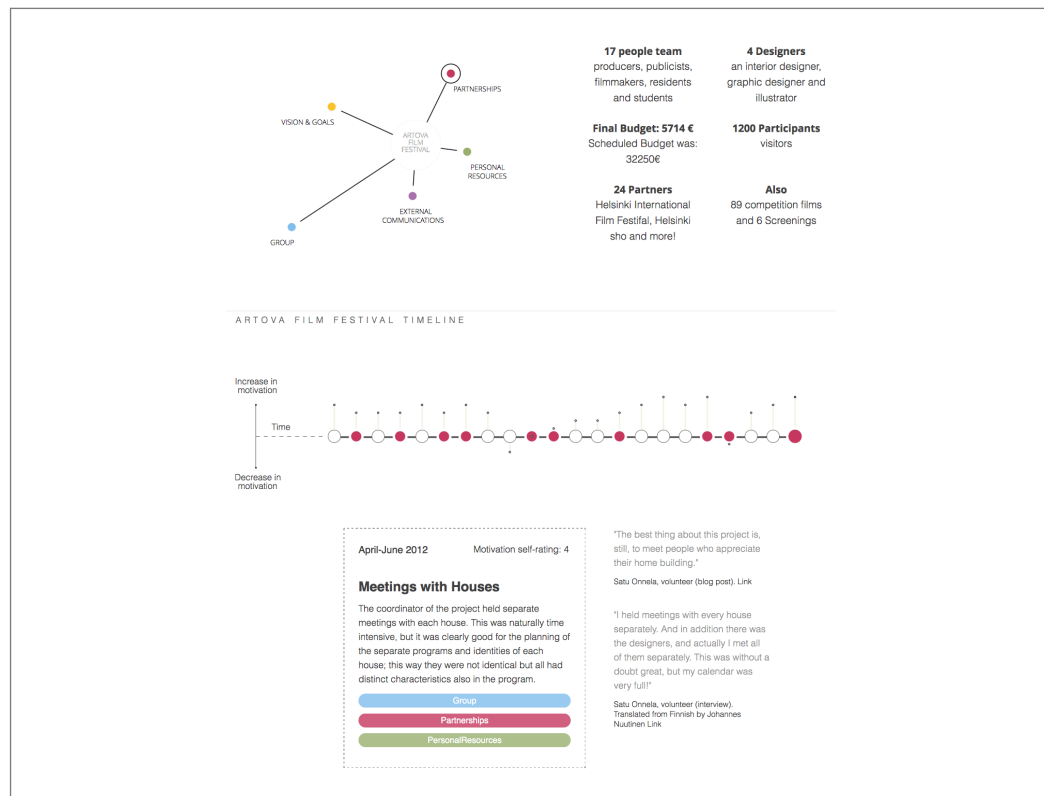
Figure 42 Showing correlation between the project visualisation and the timeline. The factor 'Partnerships' is selected of Artova Film Festival and it highlights all the partnerships events in the timeline (red colour).

the events referring to one factor. Also positive and negative values (here of motivation) are more commonly represented and conventionally understood when shown over-and-under a line rather than left-and-right of it.

Designing the self-reflection visualisation

The *self-reflection visualisation* is the fourth and final component visualisation in the ArtovaModel. It was created to give visual feedback based on the user's answers in the self-reflective questions. Unlike the other component visualisations, which use pregathered data, the *reflection visualisation* changes depending on 'live' data gathered online through the self-reflection questions.

The questions were divided into the five thematic parts, according to the five factors of the ArtovaModel. Therefore it was possible to create a visual correlation between the factors in the *overall visualisation* and the *(pilot) project visualisation* with the self-reflection responses. However, the data collection and quantification of their values was different. The *(pilot) project visualisation* counted frequencies of factors in events, whereas the *self-reflection visualisation* was a simplified point system. The answers for the point system were following the pattern of 'yes – a lot', 'maybe – a little bit' and 'no – not at all' and depending on the question they would score 1, ½ or 0 points accordingly. So a direct correlation between the pilot projects and the self-reflection of current actions was not possible through this data.

To overcome this, the *self-reflection visualisation* would have to have a different variation in its form to show the changes of the answers. I decided not to completely change its form and keep the visualisation in the style of the star diagram changing only some other part of it as seen in Figure 44.

In the end, to give more attention to visualising the answers than trying to show the structure – which I considered as irrelevant here – I decided to keep the factor-circles independently. The point system of the answers would affect the area of the five factor-level circles[33] and their according sub-circles (sub-factors). Moreover, the circles were colored in the same pattern as the *overall visualisation*. The area of the circles (representing the answers) had to be comparable between a maximum and minimum point representing the *'ideal'* circle – reached when all the questions and sub-questions received 1 point. This reference *'ideal'* circle was shown with opacity in the background.

The five groupings of the questions were independent – meaning that each had its own point system that did not affect the other factors. I chose them to be independent in order for the answering action members to only visualise aspects of their

---

33 As a note: I was aware of the recommendation against comparisons through areas in a circle because of the difference between perceived and actual area (Tufte, 1983). However, when dealing with qualitative data and a lot of uncertainty in the answers, I considered it – at that time – a better practice for the visualisation to continue the ambiguity of the data instead of present it so it seems precise or not even visualise it at all.
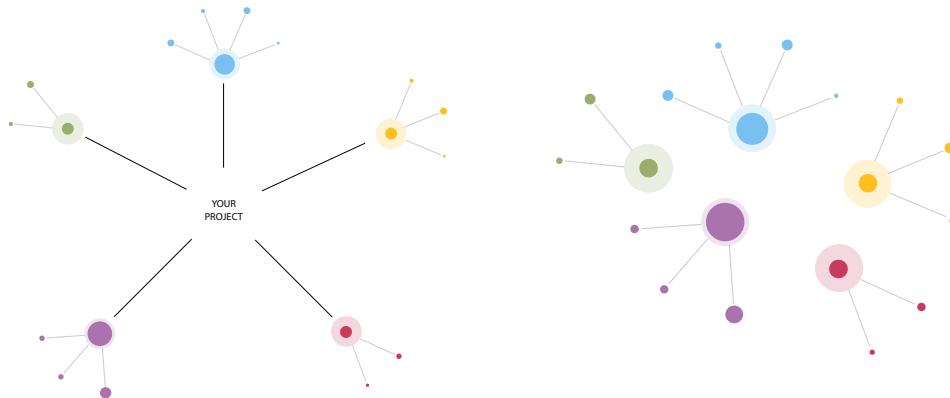
Figure 43 Variations considered for self-reflection visualisation.
(a) the connected factor-circles would change in area (b) the factor-circles would be independent, and change the area accordingly.

projects they see as relevant – and not have to go through all the questions in a row. However, when completing all the 27 questions, the users are presented with their personal visualisation concerning their collective action as inspired by the ArtovaModel. In this personal visualisation, the actions are called to identify if it seems balanced throughout the five factors of the ArtovaModel by comparing the circles.

An example of a personal visualisation from the *self-reflection questions,* can be seen in Figure 45. Figure 45 can be read as the team that answered the questions are group-dependent instead of handing too many responsibilities to one person (since the green circle representing 'Personal Resources' is almost full), and they probably have not spent much time presenting their action to the public (since the purple circle representing 'External Communications' is quite small).

Gluing together the ArtovaModel visualisation

After finishing the designs of the component visualisations it was necessary to create the appropriate layout to present them so that they interact in the most natural way and they communicate the story smoothly and coherently. I had considered the possible combinations of the different views of the ArtovaModel visualisation early on in the form phase, for example by combining the pilot projects in the *overall visualisation* as seen in the sketch in Figure 46. However this idea was not continued further after reflecting on the aims of the ArtovaModel visualisation, since by mixing the pilot actions (the examples) and the derived data, a clear structure of collective action practices would not be clear.

After identifying the stakeholders of the ArtovaModel visualisation and speculating about their most probable tasks, I divided the user interface into the three levels mentioned in the Section 2.4 *The ArtovaModel Visualisation levels*. Each level includ-

What do you see?

Is your project balanced through the factors?

Figure 44 After answering the questions the teams are shown with an overview of their answers such as the one left. This overview is meant to help them recognise the aspects of their actions that might need attention (according to Artova's practices)
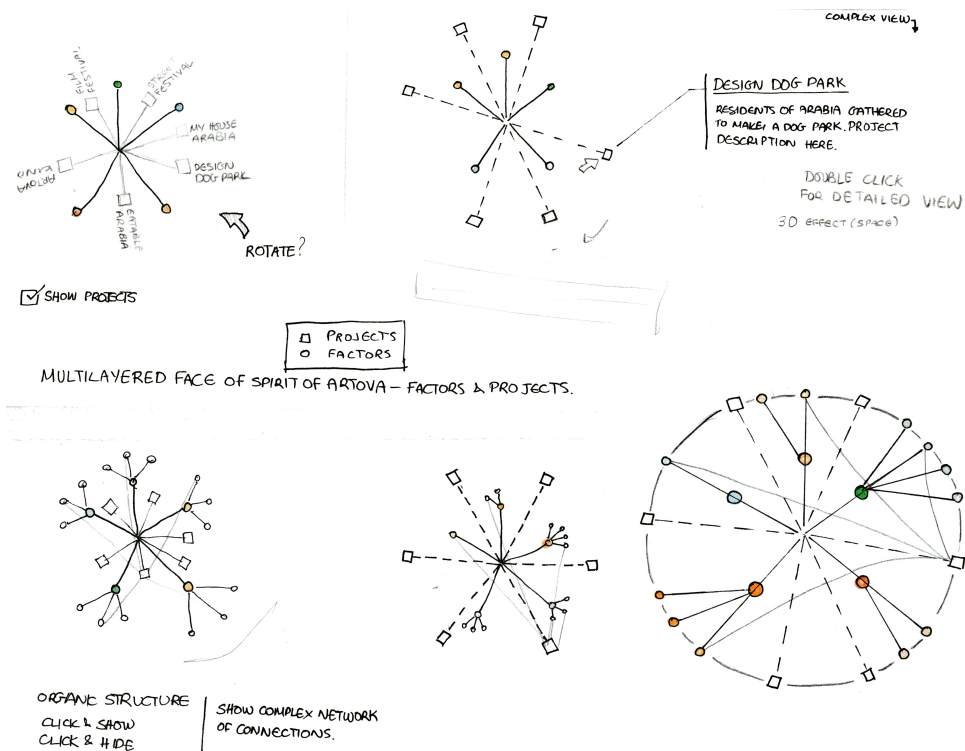
Figure 45 Top: Early sketches for ideas to combine the overview of the ArtovaModel and the pilot projects in the same visualisation.


Figure 46 Left: Initial layouts that were later rejected. Layout of overview visualisation and layout of project visualisation.

ed the information and component visualisations that seemed primarily relevant for those tasks.

Moreover, on a cognitive level, the aim was to keep related information visible in a browser's viewport simultaneously to accommodate for the visual working memory capacity (Ware, 2004). For example in the ArtovaModel level, I had initially considered to have all the descriptions of a factor and its sub factors visible at the same time (as seen in Figures 47) – this however meant that the webpage would grow in height and the user would loose sight of the *overall visualisation* while reading through the descriptions concerning it (therefore not allowing for a structural scale (Ware, 2004)). Similarly, the *(pilot) project timeline visualisation* is visible when clicking on a factor in the *(pilot) project visualisation* so they communicate to tell the story of the ArtovaModel factors in the pilot actions.

The inter-level interactions happen for the most part starting from the ArtovaModel level; digging down to the details of its creation in the pilot actions (though the given examples) as well as going to the self-reflection questions (higher abstraction layers). The quotes in the timeline also link back to their origin – giving access to the 'raw' data.

Altogether, the ArtovaModel visualisation is optimized for exploration in many levels, starting from an overview of the model and continuing deeper into to its origins. The occlusion of irrelevant at the time information allows for less visual clutter or information overload (Tufte, 1983; Shneiderman, 1996); it is achieved by utilizing the hyperlinked nature of dynamic online systems.

Designing the context of the ArtovaModel visualisation

Throughout this design process, even toward its end, I was still discovering new aspects of these actions; often making me re-think what needed to be included in the visualisation or how it could be used. Some of those 'late' realizations were added in the final visualisation, such as the self-reflection questions; however it was not possible to incorporate all.

After discussing with Artova, we decided, instead of having a webpage including only the visualisation, to design a maintainable website dedicated to collective action practices and the ArtovaModel. The visualisation would therefore only be one part of this online space. The vision was to integrate other methods of collaboration in the same web-space such as commenting spaces, a blog and other similar research as well as the ArtovaModel visualisation.

This website came to be the artovamalli.fi (English light version: artovamodel.fi) and it is maintained by the Artova neighborhood association. The final version included all the original blog posts from the pilot actions as well as some of my recorded interviews from the research phase so as to allow for further research on the subject

by others[34]. It also included links to other resources (such as information about city permits, on how to get financing, examples of grant applications, digital tools for collaboration) as well as a blog where a discussion on the ArtovaModel practices could flourish through commenting. The original vision of creating an active node in the documentation of collective actions was never realized to the fullest, possibly because its design was not thought through as thoroughly as the actual ArtovaModel visualisation – due to lack of time.

Form phase outcomes

The form phase concluded with a series of sketches, layouts and interface designs for the ArtovaModel visualisation and the artomalli.fi website containing it. Some of these designs went on to be developed. The interactions between the elements were also decided before the development, however the small animations and movement between the views of the ArtovaModel visualisation were prototyped and decided upon during the developing process[35]. Reflecting on the aims of the visualisation that appeared in the research phase:

> (1) Explain what the Artova association might do differently to other collective actions in order to promote pleasurable collective actions.
>
>> An *overview visualisation* in the shape of a graph, whose nodes act as entry level points to the ArtovaModel report. The nodes contain the description of the Artova association's practices and approaches divided into factors, including links to examples from real projects and self-reflection questions to understand them better.
>
> (2) Tell the story of the Artova pilot projects — indicate the team's satisfaction.
>
>> In three parts: firstly the stories of the pilot projects are shown all together for comparison, then individually each project is described first with a small description of their vision and outcome, then in facts and later in a *project visualisation.* The *project visualisation* was created to compare which ArtovaModel factors were more evident for that pilot project. Lastly the pilot action is shown through a timeline including their motivation and quotes at each event.

---

34 As mentioned in the Section 1.4 in the introduction of this thesis work, for reasons of transparency, the ArtovaModel visualisation also links to these blog posts and interviews through the quotes in the timeline visualisations.

35 My web development skills and time constraints also posed limitations on the final decisions on the animations and overall fluidity of the result.

(3) Show how the ArtovaModel might affect or relate to other collective actions.

> The self-reflection questions are online both as a printed version as well as in a questionnaire-form where the answers are visualised. The answers are visualised to give an overview of the aspects (in the collective actions) they might need to pay more attention to. The questions and later recommendations are both based on Artova's practices, namely the ArtovaModel.

The threat on the level of visual encoding and interaction in the nested visualisation design model (Munzner, 2009) is that the chosen encodings and interactions do not effectively communicate the abstractions (from the previous step) to the users. As validation methods, Munzner (2009) proposes formal and informal user studies measuring parameters such as the time needed and number of errors when performing a task with the visualisation[36]. However, she also recognizes the problem of needing an already implemented (functional) visualisation in order to conduct these studies.

For the ArtovaModel visualisation, I did not conduct formal user tests, however the paper and digital sketches created were shown and discussed with the pilot actions in a feedback session as well as with Janne Kareinen and several other non-archetypal[37] users in informal settings. These discussions for example helped identify issues in the terminology and wording used in the ArtovaModel visualisation.

4.5 Process Evaluation

In my opinion there are two types of threats for the ArtovaModel visualisation design. The first threat relates to the ArtovaModel visualisation as an interactive software tool that needs a user interface to do tasks; namely it includes problems such as misleading user interface design, poor structure or misspecified features. These threats are relatively easy to identify by testing specific tasks to people (not necessarily archetypal users). An example of such a task would be to find the motivation of the team in the beginning of the Design Dog Park action – to check for usability. Another example to check the features of the visualisation is to see how a user would try to approach the interface to learn about a task of their own action.

---

36 There are other methods for testing interactive systems besides those Munzner (2009) proposes, such as paper prototyping (Snyder, 2003) and low-fidelity prototyping. These are prototypes that can be modified, augmented and later iterated swiftly based on user feedback. For more information on the use and comparison on the use of high and low-fidelity prototypes to discover usability issues see (Virzi, Sokolov, & Karis, 1996).

37 Archetypal users where (1) Artova members, (2) Artova collective actions and (2) other collective actions as discussed in the Section 4.2 *Research phase outcomes*.

The second type of threat is related to the effective visual representation of the dataset and more specifically how it communicates the information to the user. In the ArtovaModel case, the question would be how much of a good representation is the star-like graph of the ArtovaModel factors deriving from the ArtovaModel practices[38].

To be able to come to some conclusions concerning these two threats, I sent out a series of questions to ten members of other collective actions in the Helsinki area. These questions were created and sent after the ArtovaModel visualisation had been developed; hence their purpose was to evaluate and learn rather than re-iterate the visualisation. I was not present when they were using the ArtovaModel visualisation, which limits the conclusions about usability to only those they articulated – excluding for example in-depth data about exploration paths for a task that becomes evident only when observing the users. However, this detached interaction could possibly allow for more honest feedback[39].

The first part of the questions was asking these collective actions to use the ArtovaModel visualisation to find information about some task that they are currently dealing with. They would continue to explain if they found it, how fast it was, if it described something they didn't already know. I also included a rating of 'easy to complicated', 'intuitive to confusing' as well as 'fun to boring' concerning the use of the visualisation in that task. The second part included similar questions but focused on the use and understanding of the self-reflection questions and their *self-reflection visualisation*. Lastly, another two open questions were related to how well they believe that the information they found was represented in the visualisation. The final two questions were posed in order to understand if the graph of the *overall visualisation* was a good representative of the ArtovaModel or not, referring to the second threat mentioned above.

Finally, I only received four answers, which is not a large enough number to measure successful features but it is enough to recognize mistakes or misunderstandings. Something that became apparent was that even though they all agreed that the self-reflection questions are useful to very useful; the visualisation, however, of their answers (the growing circle) was either not noticed or not understood by any.

I therefore realized that possibly three variations for similarly styled component visualisations were too much to distinguish effectively. Alternatively, the self-reflection questions could have had a totally separate visualisation with more discrete features and distinct reactions when receiving answers; or even more, I should assess whether a visualisation of these answers is even needed – since the their purpose was to trigger

---

38 A good representation is dependent on the vision of the designer as well, for example, in this case I was more focused on enhancing memorability and engagement with the ArtovaModel visualisation rather than creating a representation that would be more intriguing aesthetically but at the same time be complicated to explore in depth.

39 I have come to realize, through my limited experience, that when I am conducting user tests on my own designs (and the person asked is aware of that fact) the feedback is often biased for reasons of perceived courtesy.

self-reflection and not to evaluate the answers. Besides the user's replies, I see now that the self-reflection visualisation is also bad practice for the visualisation world as well. Legends, comparison through areas as well as understanding of what it represents and how it functions are all things I would add or redesign in another iteration of the ArtovaModel visualisation.

The answers referring to the good representational value of the ArtovaModel visualisation were either single worded – 'yes' – or no answer at all. Therefore, no conclusion can be drawn, and the representational value of the visualisation would need to be explored in depth of time. My impression is that since the data of the visualisation (the ArtovaModel) was still unexplored (in an accessible form) before the beginning of this thesis work, it is hard to assess how much its visual encodings are representative until there is another reference point – another representation.

As a comparison I will use the graphs from the Frog Design's Collective Action Toolkit (Frog Design, 2013) (Figure 48), and the Community-Centered Collective Action Design Framework (Arauz, 2010) put together by Mike Arauz (Figure 49). They have different approaches, and data; namely, the Collective Action Toolkit describes activities and it is presented as an action map. Similarly the Community-Centered Collective Action Design Framework tries to answer the 'what'-'who'-'why' and 'how' of collective actions using wording very close to that in the ArtovaModel (Figure 50).

Despite their different data, their 'overview' representation has a similar circular shape broken down into connected factors that all together form a view on collective actions – very similar to the design of Artova's model[40]. Probably, this is the case since, conceptually, the idea of parts forming a whole is close to the reality of collective actions and their practices.

––––––––––––

40 However, the ArtovaModel visualisation gives more the (visual) impression of factors deriving from Artova where as the other two examples give the feeling of the relation in reverse – the actions come to form the goals.

Figure 47 Visualisation of the action plan from the Collective Action Toolkit. Frog Design (2013, p.3)

Figure 48 Community-based collective actions framework, screen capture from Arauz's presentation on Design for Networks (Arauz, 2010, p. 30)
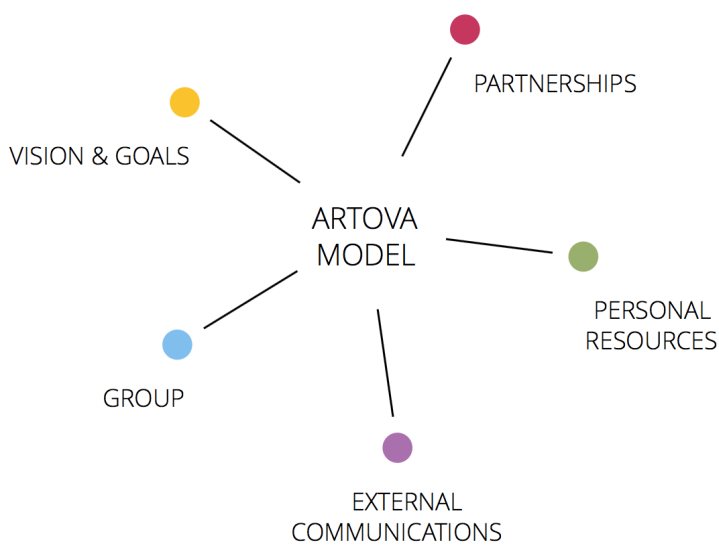

Figure 49 The ArtovaModel represenatation of collective action practices.

5 Conclusion

Figure 50 The ArtovaModel visualisation launch workshop.

This thesis illustrates the process of designing a visualisation of collective action practices, through the case of the ArtovaModel visualisation. My purpose was through this visualisation to help Artova enable further pleasurable collective actions, engage people in a discussion on collective actions or even just provide common grounds of communication.

I aimed to achieve this vision by firstly helping to compile a vocabulary, a structure and a database of real-life examples from Artova and later making it accessible by visualising it in a way that it is transparent and modifiable. The approach of how to keep it transparent has been discussed initially in the Section 3.4 *From (qualitative) data to Knowledge* and later in more depth throughout Chapter 4. To keep it modifiable, I have used computer-generated graphics to form the ArtovaModel visualisation, gave access to the data I collected, as well as shared the source code that generates it[41].

Concerning the theoretical framework, I have helped to compile the common *constitutional* and *collective choice rules* of Artova actions. I later used human-centered design approach to identify how these *rules* – here called practices – might be of use to other (future or past) collective actions and the Artova association members. To accommodate for these potential uses, I also helped compile other information surrounding these practices (such as motivation, examples and self-reflection questions). I designed and developed an online interactive visualisation to communicate the gathered information based on visualisation methods, identifying the risks at each stage based on a nested model for visualisation design. Finally, I have reflected on this journey, drawing some lessons learned about visualising collective actions; hopefully they might be of benefit for others. Listed here:

> (1) Even if data visualisation practices call for reference points to compare data, when visualising collective actions the use of 'ideal' situations should be avoided. On the contrary highlighting their changing nature to achieve their visions could benefit them more.
>
> (2) Allowing for simultaneous views of different actions seemed to effectively start a discussion between the organizing teams. The appeal of comparisons is evident, just not to a hypothetical ideal action but between real-life projects.
>
> (3) Keeping the visualisation tangible could be an issue. Reminding the viewers that these actions comprise of people and are not just numbers in a spreadsheet. My approach was to include the team's motivation and their quotes as well as use a personal tone of language in the ArtovaModel and use real-life examples for its factors.
>
> (4) As a tool for collective actions to use, the context of use should be considered carefully when developing. I believe that an interactive online

---

41 The source code is hosted on Github in the following link:
github.com/FourCoffees/ArtovaModel-visualisation

visualisation offers a lot of freedom to tailor the visualisation to the user needs. However, questions concerning when they would use it, alone or in the team and how often they would refer to it are important and should be considered. For example, with more time I would have made the visualisation work better on tablets and smart phones so it can be used collaboratively – instead of the current solution of only providing some parts of the visualisation to be printed.

(5) Though I do not have data to support it (nor disprove it), I believe that giving access to the abstractions steps to form generalizations about collective actions is empowering and democratic; and similar to the attitude often held by collective actions. It allows for multiple opinions to arise and does not imply an all-knowing authoritarian designer.

I cannot say how much the visualisation as such managed to act as a boundary object since its use is (at the time) personal and the impact it has had on an individual who uses it is unknown to me. However, I can say that the process of *visualising* collective actions has at least made Artova members and Artova team members more aware of their actions. This visualising process – in all its incarnations from idea to sketch to prototype – created a framework for them to communicate their actions to others based on which they were inspired to even create workshops, training sessions and other material. In my opinion, it is the process of visualising (including collecting data, meeting the people, structuring, offering multiple views as well as the final result that have been mentioned above) that has acted as the unifying 'object' that helped to set common grounds for a discussion about collective actions; not just the result itself.

I also speculate that this visualisation might work better as part of a session or event where groups come together to discuss their actions. Out of context, i.e. for the individual interacting with the visualisation in his/her own space it might not offer much, however as a tool in a joint workshop it seems to work well – just as it happened in the workshop where the visualisation was launched.

Figure 51 The ArtovaModel launch worshop. Notes about the model from a participant.

You are often reminded, as a designer, to embrace the ambiguity of the design process and to allow yourself to explore without even knowing if you are heading in the right direction (IDEO). I realized that when trying to design something *for (or with* or *about*) self-organized collective actions such as the Artova actions, this direction cannot be measured as the *right* direction even after the end of the process.

In information visualisation literature on the other hand, you are called to specify the tasks (Munzner, 2009) and wanted outcomes of the user's interaction with the visualisation as well as provide clear and precise representations of the data to amplify cognition (Shneiderman, 1996; Ware, 2004). Information visualisation literature calls for a goal.

This inconsistency has made me realize that when creating an information visualisation of collective actions, one has to both set concrete *aims* and allow for their *ambiguity*. To an extent, I tried to incorporate both aims and ambiguity in the ArtovaModel visualisation, by for example writing scenarios of use on one hand and not following strict visualisation recommendations for accuracy on the other. On a higher level, embracing a similar pattern of generalization and reasoning, I visualised both the final factors of the ArtovaModel as well as where they derived from.

During this process, I jumped from design practices to data visualisation practices, eventually creating a hybrid of both. I believe there is much to learn in this combination, yet my steps between those two fields were mapped only along the way. In hindsight and concerning the design process, I would have wanted to get closer to the pilot action teams, just like I did with Janne Kareinen and Artova, and possibly even design this visualisation in a more participatory way. Visually, I would have wanted to incorporate more of the adaptive nature of collective actions in the visualisation. For example, the visualisation presentation could be more modular – so as to allow for a mix-and-match of information tailored for each action, similarly to the Collective Action Toolkit (Frog Design, 2013).

Further work could even highlight their adaptive nature, by creating a system that would let other collective actions also document their practices thus adding new practices discovered or adopted. Creating a repository of actions, could aid the whole community, similarly to how GitHub[42] enhances collaboration to create software.

As a final remark, this whole thesis project was a learning process for me, one that made me appreciate the power (and complexity) of groups with a vision.

References

Ackoff, R. L. (1989). From Data to Wisdom. *Journal of Applied Systems Analysis , 16*, 3–9.

Anscombe, F. J. (1973). Graphs in Statistical Analysis. *The American Statistician , 27* (1), 17–21.

Arauz, M. (2010, June 3). *Mike Arauz – The Blog.* Retrieved March 20, 2015, from Community Centered Collective Action Design Framework: https://mikearauz.wordpress.com/2010/06/03/community-centered-collective-action-design-framework/

Arauz, M. (2010, May 31). *Presentations.* Retrieved May 21, 2015, from Mike Arauz: http://www.slideshare.net/mikearauz/design-for-networks

Artova Kuvat. (2012, September 15). *Flooranaukio1_15091227.* Retrieved March 21, 2015, from Flickr: https://www.flickr.com/photos/60521068@N05/8074801475/in/set-72157631739885904

Artova Kuvat. (2011, September 1). *IMG_0409.* Retrieved March 21, 2015, from Flickr: https://www.flickr.com/photos/60521068@N05/8259591000/in/set-72157632206813203

Artova Kuvat. (2012, May 12). *IMG_2831.* Retrieved March 21, 2015, from Flickr: https://www.flickr.com/photos/60521068@N05/8162384238/

Artova Kuvat. (2012, May 12). *IMG_2677.* Retrieved March 21, 2015, from Flickr: https://www.flickr.com/photos/60521068@N05/8162390426/in/album-72157629725695247/

Artova Kuvat. (2011, September 9). *IMG_4518.* Retrieved March 21, 2015, from Flickr: https://www.flickr.com/photos/60521068@N05/6132683394/in/set-72157627506378623

Attride-Stirling, J. (2001). Thematic networks: an analytic tool for qualitative research. *Qualitative Research , 1* (3), 385–405.

Burch, M., Lohmann, S., Pompe, D., & Weiskopf, D. (2013). Prefix Tag Clouds. *2013 17th International Conference on Information Visualisation* (pp. 45–50). London: IEEE.

Boonstra , B., & Boelens, L. (2011, July). Self-organization in urban development: towards a new perspective on spatial planning. *Urban Research & Practice , 4* (2), p. 99–122.

Bostock, M. (n.d.). *http://mbostock.github.io.* Retrieved March 21, 2015, from Github: http://mbostock.github.io/d3/talk/20111116/bundle.html

Botero, A., Paterson, A., & Saad-Sulonen, J. (2012). *Towards Peer-production in Public Services: Cases from Finland.* Helsinki, Finland: Aalto Univeristy, School of Art, Design and Architecture.

Bresciani, S., & Eppler, M. (2009). The Risks of Visualization: a Classification of Disadvantages Associated with Graphic Representations of Information. In P. H. Schulz, *Identität und Vielfalt der Kommunikations-wissenschaft* (pp. 52–65). Konstanz, Germany: UVK Verlagsgesellschaft mbH.

Cairo, A. (2012). *The Functional Art: An introduction to information graphics and visualization.* Berkeley, CA: New Riders.

Card, S. K., Mackinlay, J. D., & Shneiderman, B. (1999). *Readings in Information Visualisation: Using Vision to Think.* San Francisco, CA: Morgan Kaufmann.

Carroll, J. M. (2000). *Making Use: Scenario-Based Design of Human-Computer Interactions.* Cambridge, MA: MIT Press.

Collins, C., Viegas, F., & Wattenberg, M. (2009). Parallel Tag Clouds to Explore and Analyze Faceted Text Corpora. *IEEE Symposium on Visual Analytics Science and Technology* (pp. 91–98). Atlantic City, NJ: IEEE.

Cooper, A. (2004). Designing for Pleasure. In A. Cooper, *The Inmates Are Running the Asylum: Why High Tech Products Drive Us Crazy and How to Restore the Sanity.* New York, NY: Pearson Higher Education.

Dant, A. (2010, October 19). *UK spending review 2010: you make the cuts.* Retrieved March 21, 2015, from RecursiveFlow.com: http://www.recursiveflow.com/2010/10/uk-spending-review-2010-you-make-the-cuts/

Dant, A., Scruton, P., Rogers, S., & Sedghi, A. (2010, October 19). *Comprehensive spending review: you make the cuts.* Retrieved from The Guardian: http://www.guardian.co.uk/politics/interactive/2010/oct/19/comprehensive-spending-review-cuts

Dörk, M., Collins, C., Feng, P., & Carpendale, S. (2013). Critical InfoVis: Exploring the Politics of Visualization. *alt.chi 2013: Extended Abstracts of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2189–2198). New York, NY: ACM.

Frigg, R. a. (2012, Fall). *Models in Science.* Retrieved March 18, 2015, from The Stanford Encyclopedia of Philosophy (Fall 2012 Edition): http://plato.stanford.edu/archives/fall2012/entries/models-science/

Frog Design. (2013, January). *Frog Design.* Retrieved March 20, 2015, from Frog Collective Action Toolkit: http://www.frogdesign.com/work/frog-collective-action-toolkit.html

Guba, E. G. (1981). Criteria for Assessing the Trustworthiness of Naturalistic Inquiries. *Educational Communication and Technology , 29* (2), 5–91.

Gray, J., Chambers, L., & Bounegru, L. (2012). *The Data Journalism Handbook: How Journalists Can Use Data to Improve the News .* Sebastopol, CA: O'Reilly Media.

IDEO; Martin P. (n.d.). *Embrace Ambiguity.* Retrieved March 21, 2015, from Design Kit: http://www.designkit.org/mindsets/5

Inselberg, A. (1985). The plane with parallel coordinates. *The Visual Computer , 1* (2), 69–91.

ISO 9241-210. (2010). ISO 9241-210:2010 Ergonomics of human-system interaction — Part 210: Human-centred design for interactive systems.

Hullman, J., & Diakopoulos, N. (2011). Visualization Rhetoric: Framing Effects in Narrative Visualization. *IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS , 17* (12), 2231–2240.

Hess, C., & Ostrom, E. (2007). Introduction: An Overview of the Knowledge Commons. In C. Hess, & E. Ostrom (Eds.), *Understanding Knowledge as a Commons: From Theory to Practice* (pp. 3–26). Cambridge, MA: The MIT Press.

Hernberg, H. (2012). *Helsinki beyond dreams: Actions towards a creative and sustainable hometown.* Helsinki, Finland: Urban Dream Management.

Holten, D. (2006). Hierarchical Edge Bundles: Visualization of Adjacency Relations in Hierarchical Data. *IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS , 12* (5), 741–748.

Juuti, T. (2014, March 30). *Artova Kuvat – MinunTaloni_kartta_2012.* Retrieved March 21, 2015, from Flickr: https://www.flickr.com/photos/60521068@N05/13510414294/in/album-72157643155082425/

Knutson, T. (2014, January 23). *Comparing Arsenal Midfielders + Explaining CM Radar Charts.* Retrieved March 21, 2015, from StatsBomb: http://statsbomb.com/2014/01/comparing-arsenal-midfielders-explaining-cm-radar-charts/

Kofka, K. (1935). *Principles of Gestalt Psychology.* New York: Harcourt-Brace.

Kosara, R. (2010, May 13). *Parallel Coordinates.* Retrieved March 17, 2015, from eagereyes. Visualization and Visual Communication: https://eagereyes.org/techniques/parallel-coordinates

Krippendorff, K. (2006). *The Semantic Turn: A New Foundation for Design.* Boca Raton, London, New York: CRC Press.

Lee, B., Riche, N., Karlson, A., & Carpendale, S. (2010). SparkClouds: Visualizing Trends in Tag Clouds. *IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS , 16* (6), 1182–1189.

North, C. (2006). Toward Measuring Visualization Insight. *Computer Graphics and Applications , 26* (3), 6–9.

Munzner, T. (2009). A Nested Model for Visualization Design and Validation. *IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS , 15* (6), 921–928.

Masud, L., Valsecchi, F., Ciuccarelli, P., Ricci, D., & Caviglia, G. (2010). From Data to Knowledge Visualizations as transformation processes within the Data-Information-Knowledge continuum. *Information Visualisation (IV), 2010 14th International Conference* (pp. 445 – 449). London: IEEE.

Mattelmäki, T. (2006). *Design Probes.* Helsinki: University of Art and Design Helsinki.

Meinzen-Dick, R., Di Gregorio, M., & McCarthy, N. (2004, July). Methods for Studying Collective Action in Rural Development. *CAPRi WORKING PAPER NO. 33* .

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action.* New York, NY: Cambridge University Press.

Palmer, S., & Rock, I. (1994). Rethinking perceptual organization: The role of uniform connectedness. *Psychonomic Bulletin and Review , 1* (1), pp. 29–55.

Sandler, T. (1992). *Collective Action: Theory and Applications.* Ann Arbor, MI: University of Michigan Press.

Segel, E., & Heer, J. (2010). Narrative Visualization: Telling Stories with Data. *IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS , 16* (6), 1139–1147.

Shneiderman, B. (1996). The Eyes Have It: A Task by Data Type Taxonomy for Information Visualizations. *Proceedings of the IEEE Symposium on Visual Languages* (pp. 336–343). Washington, WA: IEEE Computer Society Press.

Snyder, C. (2003). *Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces (Interactive Technologies).* San Franscisco, CA: Morgan Kaufmann.

Sokolnicki, M. (2012, February 5). *Arkisto – WDC- viikonlopun koirapuistotempaus!* Retrieved March 21, 2015, from ArtovaMalli: http://www.artovamalli.fi/2012/02/05/wdc-viikonlopun-koirapuistotempaus/#more-1096

Star, S., & Griesemer, J. (1989, August). Institutional Ecology, 'Translations' and Boundary Objects: Amateurs adn Professionals in Berkeley's Museum of Vertbrate Zoology. *Social Studies of Science , 19* (3), pp. 387–420.

Tufte, E. R. (1983). *The Visual Display of Quantitative Information.* Cheshire, CT: Graphic Press.

Tufte, E. R. (1990). *Envisioning Information.* Cheshire, CT: Graphics Press.

Tufte, E. (1997). *Visual Explanations: Images and Quantities, Evidence and Narrative* (5th Edition ed.). Cheshire, CT: Graphic Press.

Tulikukka, P. (2012). Learning peer-to-peer practices step-by-step: 3 cases from suburban Helsinki neighborhoods. In A. Botero, A. Paterson, & J. Saad-Sulonen, *TOWARDS PEER PRODUCTION IN PUBLIC SERVICES: CASES FROM FINLAND* (pp. 76–87). Helsinki: Aalto University publication series.

TagCrowd.com, P. g. (2011, March 5). *File:State of the union word clouds.* Retrieved March 21, 2015, from Wikipedia Commons Media Repository: http://commons.wikimedia.org/wiki/File:State_of_the_union_word_clouds.png

Ware, C. (2004). *Information Visualization: Perception for Design.* (2nd Ed.) San Francisco, CA: Morgan Kaufmann.

Wijk, J. J. (2006). Views on Visualization. *IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS, 12* (4), 421–432.

Wijk, J. J. (2005). The Value of Visualization. *Visualization, 2005. VIS 05. IEEE* (pp. 79 – 86).

Virzi, R., Sokolov, J., & Karis, D. (1996). Usability problem identification using both low- and high-fidelity prototypes. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 236–243). New York, NY: ACM.

Appendix A
The ArtovaModel

How do self-organized initiatives work? What makes them successful: the result or the pleasure of doing?

Since 2007 Artova has been working as an incubator for self-organized initiatives and helping volunteers bring their visions to action. To document these activities Artova has created the ArtovaModel, in which the main elements of self-organized initiatives have been identified and analyzed. This model describes how volunteers have been bringing their ideas to life while enjoying the procedure!

The model is based on six Artova projects with different themes that have been tracked over during last 1-4 years. Together with these six projects we have created a self-reflection tool for similar initiatives to use in order to identify their strengths and weaknesses or change exhaustion and bitterness to pleasure.

The ArtovaModel is a first attempt to document and share practices and it is by no means complete! However, we hope to spark off conversation and the analysis will be continued further by sharing experiences of other self-organized initiatives around the globe!

1 Vision & Goals

One of the main principles in ArtovaModel is the shared and common vision of the group. Vision is the wider aim that each group defines for the project. In Artova, projects tend to address much larger issues than the actual result/event/intervention originally was aimed to do.

The way in which groups define their vision - their goals - usually changes a lot depending of project. The goals might change but the vision remains, it defines why groups even want to do this in the first place.

For example in Design Dog Park (DDP) they are not just aiming to build a dog park but are envisioning their whole project as "a source of new models of cooperation between the residents, the city officials and even commercial partners" (see the description of the example projects for more details).

The concrete goals (i.e. building a dog enclosure) defined in the beginning of the project are shaped and managed because of the changing situations (i.e. resource availability, city collaboration problems) and might change during the project (i.e. building a pop-up dog park instead of a permanent dog park).

1.1   Defining the vision & the goals
-- start with everybody's ideas! --

There is no one clear way how the Artova projects create their vision. The procedure is different in each project. Some of the example groups formed their visions in a self-directed manner (see DDP) or the vision came from inside the Artova activities (see MHA, AFF, ASF) or from individuals outside the Artova environment (see EA) or even from the city officials (see AK).

But a common, shared vision should be established in the very beginning of the project because individuals may naturally have distinct understandings of the issue and the ways in which it should be dealt with.

To do that, Artova organizes facilitated sessions where people interested in the ideas come together. In those sessions the goals of the project are left open for interested participants to incorporate their own ideas. This has proven to be the great strength of the facilitation sessions: incorporating people and ideas in a project. When everybody feels that their opinions are heard and they have the chance to influence the outcome, they commit more deeply to the project as they feel that it entails a bit of them. (see also GROUP "forming a group" for more on these sessions!)

1.2   Goal management
--- It is the People who define the Project ---

Even though the initial goals have been set, the group needs to have the flexibility to react to changing circumstances, set-backs, and arising opportunities throughout the process.

Also, it is good to keep projects open to be influenced. Then, new people added to the group get the opportunity to also shape the project in their way. This also applies to the partners! (See Partnerships for more info).

Therefore it is important to understand that the focus is not on the result but on the people making it. There are no expectations in self-organized initiatives (there is the "do as much as you want to" attitude) which results in the pleasure people involved feel when they are doing something together.

Of course, the group must also acknowledge the practical limitations, and estimate the viability of their ideas, based on their resources!

In the example groups the openness of the project meant that some projects ended up getting much bigger than anticipated (see ASF, EA). But on the other hand, some teams with time constrains and significant obstacles ended up scaling down their goals and expectations (see DDP).

1.3   Fulfillment of the vision

As mentioned before, since there are no expectations, Artova tries to promote the pleasure of doing rather than a goal-oriented production. This has become true since even in the example projects that did not manage to fulfill their initial goals (see DDP) they still mentioned their satisfaction on this type of self-directed work. Of course the feeling of achievement also contributes to the pleasure, but it is not exclusive!

Compare motivation through the projects as comparison to their results!

2   Personal Resources

In Artova projects, it is emphasized that enthusiasm is what matters the most – the willingness to take part, ask about what you don't know and learn by doing during the process.

But of course all volunteer projects are shaped by the individuals that implement them. Not only when creating a vision but also through the practical skills, expertise and networks that each individual brings to the project.

Throughout the process, the volunteers' flexibility is a key factor – the ability to adjust to changes in the workload, and to have a flexible attitude towards setbacks and uncertainties.

2.1   Personal Skills
--- There are no special skill requirements ---

Volunteers are not recruits! They get to choose in what way they want to be involved, often not through their professional skills but because of their interests.

Of course each group member brings their expertise, skills and networks to the use of the group. In all the case projects, the group members had a large variety of skills that where beneficial for the group.

Personal networks are often invaluable for the project. Contacts can be used to get good deals on materials or for dealing with bureaucracy. In the case projects contacts were used to acquire sponsors or other partners for the project. Personal networks were also used for gaining media attention and publicity for the project, which in turn can be useful in attaining sponsors.

But these skills were not a pre condition to start. Each project was formed around those individuals and what they know, or would like to know how to do!

2.2   Flexibility
--- Group dependent not Individual ---

Volunteer projects require a great deal of flexibility from the volunteers. The workload and responsibilities tend to vary throughout the project and become more time and energy consuming towards the end. Sometimes the intensity of these variations is difficult to foresee or can be completely unexpected. This can put a strain on the volunteers.

Respecting people's personal flexibility is important. Artova projects try not to make the projects dependent on individuals, but on the group. This is achieved by for example sharing all the information of what is happening with all the group members (more about communication in GROUP). This gives volunteers the opportunity to contribute according to their abilities.

In a personal level, group members benefit from a flexible attitude towards uncertainties and setbacks, which are to some degree inevitable in every project. And yet these concerns are probably managed better in a group than by an individual!

3   Group

In the ArtovaModel, the group is considered as the owner of the project. Group has the power as well as the freedom and possibility to form their project and organize themselves as they see fit. This results in different groups taking different approaches on forming, decision making, internal and external communication strategies.

To assist, Artova has discovered some practices, techniques and tools that seem to help groups with their tasks.

3.1 Forming a Group
--- Listen Louder ---

Groups can be formed in various ways, and often these (ways) are closely related to how the vision was formed.

Artova has found that facilitation sessions are a useful way to form teams of people interested in similar issues and share a common vision on how to deal with them. These sessions can start with presenting previous successes of voluntary action to create an atmosphere of empowerment.

Later, by asking simple questions the group can be formed: who's here, what do we want to do, what kind of skills do we have and what kind of skills would we need, what should be done next and who's going to do what?

Facilitation sessions have very clear goals but they should be structured so that participants are able to share their thoughts and promote flexible actions. The general attitude is "Listen Louder". By listening louder, participants respect each other, consider everyone's point of view and emphasize the listening, keeping in mind that every individual has an idea, skills and perspective that are vital for the project.

With this kind of attitude, even in the case projects (such as events) that had identity from the past, the new volunteers were able to influence the project goals and became full members of the project.

Different type of projects need different number of people in the core organizing team. And though there are examples of projects being driven by individuals, experience shows that it is more satisfying to work in a team. But this works also in reverse: too many people can have a hard time to get organized and make decisions!

3.2 Decision-making and sharing responsibilities
-- Delegate! --

In any kind of group work, one of the most essential things is the sharing of power and responsibilities. Depending on the participant's abilities and desires some want to stay in the background and some take over bigger tasks.

Artova has discovered that the roles of the individuals (in the group) become clearer when they are described. In this way the responsibili-

ties become more solid and easier to commit to. Describing responsibilities is not always possible, but helps to avoid confusion between the group members but also to external partners.

Also, the ArtovaModel promotes open criticism and opinion equality. This becomes clear even though most projects end up having some sort of leadership (either assigned or emerged). The role of the leader in self-directed actions is not the typical one found in business cycles. The leader here is one of the volunteers, and his/her main purpose is to make sure all people are heard and delegate tasks. Leader's aim is not to possess power, skills or knowledge exclusively, but to share them.

3.3   Internal Communication
--- Openness and Transparency --

Openness and transparency are major factors in the ArtovaModel. The groups are encouraged to share everything on the project between the group members. This promotes open and democratic decision-making, enhances the group's flexibility (e.g. to incorporate new members) and helps create best practices (e.g. for following projects).

Artova for example uses an Intra* as an internal communication tool between the group members. An Intra provides a platform to gather all project related information in one place which is accessible by all group members.

The way how the information circulates in the team is not as important (intra, emails, Facebook etc.), in the end each team uses its own methods of communicating that suits them best. But keeping everyone easily informed has been experienced important in Artova projects!

The Intra is used along with face-to-face meetings, which are usually effective due to their more personal and direct nature. Still the frequency of these meetings varies between projects but also between project stages. In the pilot case projects face-to-face meetings were usually held in Kääntöpaikka, a local community center.

*Intra is an online working space where signed-in members can co-create documents, upload images and add comments, effectively creating a permanent common-pool working environment.

3.4 Time Management

Time management plays fundamental role in self-directed projects. Such groups have a lot on their plates, so having an idea about what should be done and when, is essential. This can save the team from trouble and stress later on in the process. Time management is linked to the roles and shared responsibilities within a group. So how can time be managed effectively in such projects, what makes the burden easier?

Since these are voluntary projects, there has to be a balance between the personal time each individual invests. This should be taken into account when planning the tasks, for example by not making the scheduling too tight.

The characteristic in the ArtovaModel is that when a common action or goal is agreed on, the action owners are decided quickly and activities are started immediately. Ideas, visions and goals are transformed into action with no delay. This contributes to a 'culture of doing', an important attribute in the model.

And ultimately, this makes the handling of tasks easier: the tasks are done faster because they are fresh in mind, and no one needs to coordinate and remember all the specifics for many weeks.

4 Partnerships

Partners can be considered any external individuals, local businesses as well as the city that the group approaches during the project.

Partners are important because they can help the projects with resources, expertise but even legitimacy (in the case of the city).

Building solid and well-thought partnerships is one of the building blocks of a successful project in the ArtovaModel, and sufficient focus on partnerships from the very beginning pays off later on.

4.1 Partnerships strategies
-- Discussion to find common aspects --

If the partnership is of value and the partner is the best way to achieve the project's goal, it is clearly worth pursuing. If the partnership strategy is not discussed, partnerships can be formed ad hoc and in the worst case they will simply add on the teams workload without bring-

ing any real value to the project. Clearly this is only one side of the equation. 'What's in it for the partner?' should directly follow the partnership strategy, it can range from a common ideology, area or it can be based on added visibility.

The most successful partnerships are based on constant communication with the partners. In Artova projects, long lasting partners have been given the chance to influence the projects and act as active stakeholders in the activities (see also "vision management VISION"). Nevertheless, the success of projects does not necessarily depend on a great amount of partners, instead a few actively engaged partners seem to work well.

Projects organized under the ArtovaModel, and with Artova as the official organization behind them, seem to carry a "quality label" which makes partnerships easier to make!

4.2   The city as a partner
-- Keep in touch and Ask! --

The roles of the city are multiple: it can be seen as an enabler (or a disabler), a funder, a co-organizer or a content producer. Similarly, different type of projects need different interactions with the city.

Artova always encourages the groups to contact either the city or other experts to get informed on what exactly is needed in each situation! This method can dissolve many uncertainties.

In projects with a temporary outcome (such as events) cooperation seems to be simpler and possibly limited to permits. But even those permits depending on the event might require heavy contact with the city (see ASF for an example!).

On the other hand, projects with more permanent city outcomes need the city as a key partner. This cooperation can be challenging since municipal processes are often quite slow, compared to the fast-paced self-organized actions. The city offices have both trustees and officers and it is important to be in contact with both of them.

In general, communication can be easier in face-to-face meetings with the city officials. Face-to-face meetings give more space for expression and can ultimately be much faster than emails!

5 External Communication

Since, self-initiated projects mostly deal with issues that concern more than just the group, communicating their message to others is necessary, even just to attract visitors to the event.

In Artova projects, external communication is based on four separate elements that are present in almost all of them. These elements are media relations, the projects' web pages, Facebook communication and the visual identities of the projects. Depending on the project nature, these were emphasized differently in example projects to form an effective way of communicating to the "general public".

External communications can become quite time consuming, so in order not to overload individuals, and in the spirit of role-delegation, it might be useful to create a sub-group focused only on that. Some example projects had a separate communications team which had clear-cut responsibilities determining who takes responsibility and an idea of which media to use (see AFF).

5.1 Media Relations

Media relations are crucial in some types of projects, e.g. when marketing events (see ASF, AFF) and when raising awareness of an issue in order to influence decision-makers (see DDP).

This can be even done in small scale by approaching local magazines. For example in the pilot project, the local neighborhood magazine Kuohu, provided easy media access geared towards the area.

When marketing an event through the media, it is best to pre-plan when to contact them so as to make sure the event gets the marketing coverage needed but also that it is timely!

This is also made easier when the team organizes some text describing their project, their contacts and any other important information concerning it.

5.2 Web presence

A project's web presence can be formed through blogs, websites and social media such as Facebook. For more complex events (see MHA), it is useful to have a distinct webpage, while other projects can rely on a more straightforward blog type web page.

However, in the example projects, there was an interesting mix of marketing the event through a website and of documenting the process in a blog. This added a personal touch to the project's web communication. Such a mix also emphasizes the personal and voluntary nature of self-initiated projects and gives something extra compared to professional and commercial projects. The role of Facebook and other social media, in successfully communicating voluntary projects cannot be stressed too much. Voluntary action should be shared and marketed in the personal level, and that is where the Facebook is a good tool.

5.3   Visual Identity

Like any other professional events and projects, volunteer projects also benefit from having a distinct visual identity. This at least includes a logo, but it can include a design for every form of external communication such as webpage, posters, handouts etc.. A visual identity makes it easier for the casual observer to distinguish the various projects from each other and get a quick understanding of the nature of the project.

Appendix B
Self-reflection Questions

This is a tool for self-reflection. If you want to make your actions more pleasurable and less stressful or you are in a dark spot in your project or not sure what exactly is going on, you can ask yourself some questions that might help you structure your thoughts and process.

Naturally, the recommendations are based on the Artova's experience and are not exclusive solutions. They are just things you can keep in mind to help you map your plan! At any point you can refer to the actual ArtovaModel to read more and understand how these questions were formed (your answers till now will be saved)!

They are divided through the 5 factors of the ArtovaModel, and you can choose the ones that are the most relevant to your situation.

Vision and Goals

1. Do you have a shared, clear idea of what you would like to achieve in the big picture (your vision)?

You can test that by trying to explain it in a sentence or two. e.g. I/We would like to influence recycling practices in our neighborhood.

⊙ No

⊙ Somehow

⊙ Yes

2. Are your initial goals clear enough?

e.g. (Our group)/We will host an event in the area where we invite people to make art from their recyclables collectively.

⊙ No, there still is some vagueness,

⊙ Yes, we know what we want to do

3. Have you included everybody in the group in the shaping of the goals? Has everybody's ideas been heard?

⊙ Some but not all,

⊙ Yes, everybody has a say in what we do

4. Do feel like your project is flexible / open?

i.e. Imagine something were to come up at this moment (be it opportunity or obstacle) do you think your group would easily manage to reshape it's goals to encompass the opportunity or overcome the obstacle?

⊙ No not really,

⊙ Somehow,

⊙ Yes, we are flexible!

5. Are your goals truly viable regarding the group resources and limits?

i.e. can you translate it in a plan?

⊙ No not really,

⊙ Some parts are still not sure,

⊙ Yes, we have a realistic plan of action

Personal Resources

6. Everyone has something to offer to the group. Have you asked to see how people can and want to get involved?

⊙ No, not yet,

⊙ Most of them,

⊙ Yes, we've covered that

7. Are the group members satisfied with the way the tasks have been distributed?

⊙ No or don't know..,

⊙ Most of them,

⊙ Yes!

8. Consider a situation where one of the group members can no longer be involved in project Can the project still continue?

If not, your project might be too person-dependent rather than group dependent.

⊙ No not really,

⊙ Somehow,

⊙ Yes, we've covered that

Group

9.   Have you managed to form a group that is just the right size for you?

eg. Are there too many tasks and too few people? Then you may need more hands on board. Or are there too many to communicate affectively? Maybe you should form subgroups to deal with that!

⊙ Yes,

⊙ No,

⊙ Not sure..

10.   Are you continuing in a project that has been done before? If so, do you feel you have the possibility to influence on the project?

⊙ Yes,

⊙ No,

⊙ This is an unrepeated one [not applicable]

11.   If someone were to join the project now, do you think they would be able to shape/influence the outcome?

⊙ No not really,

⊙ It depends on the person (and if we anyway need their skills),

⊙ Yes, we are open enough in that way

12.   Have you divided the tasks in concrete set of things to be done?

i.e. Contact the local company X to ask if they can provide the things Y, design the poster for the event, document the meeting outcomes, etc

⊙ Yes,

⊙ No,

⊙ Not so clearly

13.   Are the tasks shared equally among group members?

⊙ Yes,

⊙ No,

⊙ Somehow

14. Does everyone in the group know their responsibility area?

i.e. Try this example. Think of a task: "Informing the newspaper X for the event". In your current settings who would be assigned to do that? Is it clear and immediate? If not then maybe your roles are a bit intertwined which might cause confusion in the group dynamics.

⊙ Yes, the roles are well defined

⊙ No, we improvise as things come up.

⊙ They are defined but not completely.

15. Do you see your project as open / transparent?

i.e. Consider the last meeting or decision that was made, is it documented somewhere in a way that someone who wasn't present could understand it?

⊙ yes,

⊙ no,

⊙ maybe

16. Do you have a clear method of internal communication that everybody can participate?

i.e. for fast directed questions: Facebook, for longer texts: emails + intra etc.

⊙ Yes,

⊙ No,

⊙ Maybe

17. Do you have a preliminary schedule of what is to be done and when?

⊙ Yes!

⊙ Not clearly defined,

18. Have you taken into account the personal time of the group members?

ie. if someone does not have time to contribute for a specific time period, would that be easy to overcome?

⊙ Yes,

⊙ Not really..

⊙ Somehow

Partnerships

19. Do you have a clear idea of what you would expect from a partner organization or individual? This can be funding, material, promotion, service etc.

   ⊙ Yes,

   ⊙ No,

   ⊙ Somehow

20. Have you recognized the type of benefits you can offer to the partner?

   ⊙ Yes,

   ⊙ No

21. Do the partners you have (or will acquire) have the possibility to influence your activities?

   ⊙ Yes,

   ⊙ No,

   ⊙ Not sure..

22. Have you analyzed what kind of interaction you will need to have with the city?

If you need permits then you have to discover which ones. If it's a stronger collaboration, do you know which department you would need to address?

   ⊙ Yes,

   ⊙ Nothing, we have no idea!,

   ⊙ Some but not all

23. Have you gathered relative information from any other similar projects?

It is good to ask and not need to re-discover everything from the beginning!

   ⊙ Yes,

   ⊙ No,

   ⊙ There are no similar projects.. [not applicable]

External Communication

24. Have you defined the marketing strategy for your project?

In short: who do you want to inform, and which is the best way to do that. It also includes defining who in the group will be responsible for that.

⊙ Yes

⊙ Not yet.

⊙ Some parts but not all..

25. Do you have all the material that is needed to describe your project / event / intervention written down and easy to provide to anyone interested?

This is useful since there might be a need to quickly pitch your project to anyone interested and then refer them to some text (online or not) for further detail!

⊙ No,

⊙ Yes, We are ready to present to anyone!

26. Have you defined if your project / event needs a dedicated website or a blog or both?

For example, events with many scheduled happenings might need a website, projects that are more about the process (see EA) are fine with a blog. But ongoing, more general projects (like DDP) might benefit from both!

⊙ Yes!

⊙ We haven't decided yet,

⊙ In the process..

27. Have you used social media such as Facebook, to promote your ideas on a personal level?

You can make dedicated social media pages, groups, posts everything!

⊙ Yes,

⊙ No,

⊙ Probably not enough.

Appendix C

Motivation
Self-rating

We have documented the following events to describe your project. Each of them has a title, a description, factors it corresponds to and quotes from interviews or blog posts.

It also has the MOTIVATION (as increased or decreased) of that particular event in the team. The variation of motivation is represented with the scale of -5 to +5. 0 means neutral motivation (the variation is illustrated with the quantity of + or – symbols).

WHAT IS MEANT WITH MOTIVATION:

Motivation is somewhat an abstract name and to each it may mean something different. So when grading your "motivation" we are mostly trying to figure out how the team pleasure was at that specific time-frame.

Try to imagine the scale is from

       - "this project feels like a burden" (-5)

       - "This had to effect on us" (0)

       - "really enjoying what we are doing" (+5)

(and all the corresponding in between values)

Of course we realize that this is asked after the events have taken place which makes your ratings more or less positive depending on the outcome! Still, it would be great if you could try to remember the described situations and answer as accurately as you remember!

WHY?

This is an important part of the visualization because it gives validity to the "Artova Model" and reminds the viewers that real teams are behind the described projects!

On a second level, it shows visually that all projects have ups and downs, which in turn might reassure other teams during their projects!

Lastly, we might even discover "motivational patterns" between the projects, for example between events in June, or in events that are

dealing with partners etc..