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Magdalena Laine-Zamojska

The Role of Small Local History Museums in Creating Digital Heritage

The Finnish Case

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ABSTRACT

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The overall objective of this museological research is to investigate the role of small Finnish local heritage museums in creating digital heritage. The research aims are: (1) to provide a critical overview of virtual museums and digital heritage in the Finnish context, particularly in relation to small local history museums; (2) to bring attention to the potential of small museums in the area of digital heritage, and (3) to provide an insight into the shared qualities of digital heritage in small museums in Finland that can be used in future projects in the area of digital heritage in Finland.

The research examines the following questions: (1) What are the qualities of the online services and portals providing access to digitised museum resources? (2) What are the types of Finnish virtual museums and how do small museums provide access to cultural heritage? (3) What are the common qualities of digital heritage in small local museums in Finland, and how these commonalities can be used to aid the museum community in improving their visibility and presence on the Internet?

In order to answer the research questions and meet the research aims, an exploratory approach was taken. The research is framed within the discipline of museology (Vergo 1989, Vilkuna 2010b), but due to its interdisciplinarity, also methods and approaches from other disciplines such as design, anthropology and action research were deployed. Several separate research activities were planned and carried out: (1) Analysis of portals and services providing access to digitised museum collections; (2) Classification of Finnish virtual museums; (3) Prototyping virtual museum for small Finnish museums; (4) Analysis of digital heritage and small, local museums in Finland, and (5) Ethnographic depiction of representatives of small museums.

While the research is mainly concerned with digital heritage and Finnish museums, it also places them in the broader international context. In the results, three scenarios for Finnish virtual museums in relation to small museums are discussed. Finally, the common qualities of digital heritage in small local museums in Finland, and how they can be used in developing online heritage is discussed.

Keywords: digital heritage; digital museum; virtual museum; small local heritage museum, Finnish museums

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TIIVISTELMÄ

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Pienten paikallismuseoiden rooli digitaalisen perinnön luomisessa: Suomen tapaus
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Tämän tutkimuksen päätavoite on tutkia suomalaisten pienten paikallisten museoiden roolia digitaalisen kulttuuriperinnön luomisessa. Tutkimuksen tavoitteet ovat: (1) tuottaa kriittinen yleiskatsaus virtuaalisista museoista ja digitaalisesta perinnöstä suomalaisessa kontekstissa, erityisesti pienten ja paikallisten museoiden tapauksessa; (2) tuoda esille pienten museoiden potentiaalia digitaalisen perinnön alalla ja; (3) tarjota käsitys digitaalisen perinnön yhteisistä piirteistä suomalaisissa pienissä museoissa, joita voidaan hyödyntää tulevaisuudessa digitaalisen perinnön projekteissa Suomessa.

Tutkimuskysymykset ovat: (1) Millaisia ominaisuuksia on digitoidun museokokoelmiin pääsyä tarjoavilla verkkopalveluilla ja portaaleilla? (2) Mitkä ovat suomalaisten virtuaalimuseoiden luokat ja millä tavalla pienet museot tarjoavat pääsyn kulttuuriperintöön? (3) Mitkä ovat pienten paikallisten museoiden digitaalisen perinnön yleiset ominaisuudet Suomessa ja millä tavalla näitä voidaan käyttää auttamaan museoyhteisön näkyvyyttä ja olemassaoloa internetissä?

Tutkimuskysymyksiin vastaamiseksi ja tutkimuksen tavoitteiden täyttämiseksi on tutkimuksessa käytetty eksploratiivistä lähestymistapaa. Tutkimus on toteutettu museologisessa viitekehyksessä (Vergo 1989, Vilkuna 2010b), mutta tutkimuksen poikkitieteellisyydestä johtuen, myös muita lähestymistapoja ja metodeja eri aloilta, kuten muotoilusta, antropologiasta ja toimintatutkimuksesta on ollut mukana tutkimuksessa. Tutkimuksen osana suunniteltiin ja toteutettiin seuraavia tutkimustoiminnan muotoja: (1) portaalien ja digitoituihin museokokoelmiin pääsyyn tarjoavien palvelujen analysointi; (2) suomalaisten virtuaalimuseoiden luokittelu; (3) virtuaalimuseon prototyyppi pienille suomalaisille paikallisille museoille; (4) digitaalisen perinnön ja pienten paikallisten museoiden analyysi Suomessa ja (5) etnografinen kuvaus pienten paikallismuseoiden ylläpitäjistä.

Vaikka tutkimus keskittyy pääosin suomalaisten museoiden ja digitaalisen perinnön käsittelyyn, se myös asettaa aiheen laajempaan kansainväliseen viitekehykseen. Tuloksena esitellään ja arvioidaan kolme virtuaalimuseon skenaariota pienille suomalaisille paikallismuseoille. Lopussa käsitellään sitä, miten digitaalisen perinnön piirteitä voidaan käyttää ja kehittää digitaalisissa projekteissa.

Keywords: digitaalinen kulttuuriperintö; digitaalinen museo; virtuaalimuseo; paikallismuseo, pieni paikallismuseo, suomalaiset museot

PREFACE

It has been accepted for a long time that museums are not temples, but rather forums (Cameron 1971), or contact zones as James Clifford (1997) proposes. The digital revolution has affected these zones in a way not previously experienced. New digital technologies give enormous possibilities for sharing, representing and negotiating interpretations and meanings that are important for people and societies, who consider them worth preserving for themselves, larger audiences and future generations. With the advent of the World Wide Web, the digital revolution has begun. Many new, user-friendly tools and services have appeared. New media can serve as a space where new forms of dialogue participation are possible. They become extremely popular and find millions of users. These users, defined by Axel Bruns as "produsers" (Bruns 2008), are creatively and collaboratively participating in content production. Despite the availability of the new technologies and new forms of participations, it seems that nowadays museums still have problems in the digital environment. This is particularly visible in the context of small museums. It may be said that they are almost completely digitally excluded and have in some way missed the way to facilitate the new digital technologies in their activities. This may be perceived as a problem, especially in a country such as Finland, which is the first country in the world where access to the Internet is considered as a universal service and has a uniquely dense network of small local history museums, which are very close to their communities.

I started to become interested in new technologies and culture as a graduate student in ethnology and cultural anthropology at the Adam Mickiewicz University (Poznań, Poland). I have been interested in how people share knowledge of the experiences they gain, and consequently how it can be represented in ethnographic work and how digital technologies may be used in these processes. Naturally, I have focused on museums with ethnographic collections, which are repositories of the knowledge embedded not only in tangible artefacts, but also in intangible practices. During my MA studies, I wanted to use new technologies as much as possible. My BA thesis entitled "The Authenticity of Primitive art. The Ethnological Museum in Berlin" (Zamojska 2005) consisted of a written work and a multimedia presentation, which illustrated the thesis. In my master's thesis, I focused on cultural representations produced by anthropologists and I developed my skills in a critical analysis of digital resources. I wished to develop my understanding of new technologies and their relation to culture, and the digital culture programme seemed to be the right place to continue.

My interest in the Finnish cultural and museums sector has started in 2007, when I began to study in a multidisciplinary master's degree programme, called Digital Culture, coordinated by the Department of Arts and Culture Studies at the University of Jyväskylä. However, when I was discussing my research interests with the programme coordinator, Professor of Digital Culture Raine Koskimaa, he suggested that I should meet Professor of Museology Janne

Vilkuna, as my interests were closely related to museums. Professor Vilkuna proposed that doctoral research would be more appropriate way to answer my research questions and develop my interests. During many discussions with the both professors and the Jyväskylä University Museum staff, especially with the museum's chief curator, Pirjo Vuorinen, I was able to gain insight into museum work in Finland and to clarify my research objectives. Finally, my research plan was ready and in 2008 I started my doctoral research and decided to settle in Finland. With my anthropological training, I was convinced that my research must be related to the local conditions and that I needed to learn Finnish quickly to be able to do it.

The time I spent researching and learning about Finnish culture and heritage was very stimulating. However, while I was researching the subject of online museums in Finland, I sadly realised that these museums, run by volunteers, representing rather older generations, have no possibilities to actively participate in the digital environment. Consequently, my personal research motivation was to find out why these wonderful museums do not exist online, and explore whether is it possible to use the new media in order to bring their richness and knowledge of the cultural heritage to wider audiences in the digital world. A lot of work and research is still needed, but I believe that the findings of my research, presented and discussed in this work can help people for whom these museums are important to understand a variety of ways to enter the digital age.

Since 2013 I have been closely collaborating in Poland with the National Institute for Museums and Public Collections (NIMOZ) and through this collaboration with the largest Polish museums. NIMOZ is a Polish state agency operating under the Ministry of Culture and National Heritage with the mission of creating and implementing a national policy for museums and assisting them in their development. I am engaged in its newest project, E-Museums, aimed at developing an information society by facilitating access to the cultural heritage of Poland. The main objectives of the project are: (1) to improve access to the cultural heritage resources collected by Polish museums, (2) to improve collection documentation, and (3) to provide a long-term preservation system. For the purposes of the project, some data on museum portals was collected and analysed. Part of this material and some data were also used in this research.

I hope that in a few years this thesis will no longer appear very relevant and will be used only as a reference to demonstrate the development of the Finnish museums sector in regard to the digital heritage. I have researched the possibilities to design and develop new tools for museums that are almost completely digitally excluded. However, I cannot conclude my research that these solutions are the only possible and right ways to do it. Moreover, I believe that until we try to develop them, we do not know whether they are appropriate and whether people really want to use them. The digital heritage is about the world of values shaped by the members of society and we can only predict in which direction it will go. However, I am convinced there are enough people

who are committed to the care of cultural heritage in Finland. In the Finnish academic context, museology is a small discipline, but I hope it will gradually become more and more influential. With its all limitations, this research is a small contribution in this direction. I hope it will be inspiring and enable fruitful discussions on the issues presented here.

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This research would not have been possible without the help of many people. First of all, I would like to thank professors Janne Vilkuna, who was my main supervisor, and Raine Koskimaa, my supervisor, for supervising and discussing my work. I am confident that the role of the main supervisor was not very easy, as I needed to learn much not only about the issues directly related to this research, but also to understand the Finnish museums sector and Finnish culture. I am truly thankful that Professor Janne Vilkuna had always time to discuss with me these issues I need to thank also Professor Heikki Hanka, who supported and advised me with this project. I would like to thank also Docent of Museology Susanna Pettersson for her in-depth feedback.

Since this research is about museums, or rather about people who are associated with museums, this work would not have been possible without them. A number of museum professionals and representatives offered me their time and contributed in a number of ways, as interviewees, evaluating and discussing digital prototypes, presenting their museums and work, but also agreeing to represent their museums. I am truly indebted and grateful to all of them: Akuliina Aartolahti, Ulla Antola, Leena Hannula, Lea Heikkilä, Jaakko Heiska, Heidi Helkiö-Mäkelä, Marja-Liisa Hyvönen, Paula Härkälä, Leena Kekäle, Minerva Keltanen, Tapani Kotaja, Raimo Kotsalo, Reetta Kuojärvi-Närhi, Pertti Lehtimäki, Eija Pekkanen, Matti Perävainio, Hannu Rinne, Mikko Tolvi, Juhani Vihervuori, Mirja Vuorinen and Pirjo Vuorinen. I would like to thank my colleagues from Poland's National Institute for Museums and Public Collections: Anna Kuśmidrowicz-Król, Kasia Zielonka and Alicja de Rosset, as well as Professor Piotr Majewski, the director of NIMOZ.

In this project I also collaborated with several people. I would like to express my big thanks to my friend, photographer and anthropologist Michał Sita. In the winter of 2012 we visited several museums in the Satakunta region of Finland and Michał portrayed the people who run these museums. He succeeded in showing the beauty of these people and places; the pictures that he took were enthusiastically received by international audiences. I am very grateful that we had an opportunity to work together. During that project, we were hosted by Anitta and Mikko Laine, who also deserve my thanks. I need to thank also Michał's parents, Anna and Kazimierz Sita (who sadly passed away), whose works were used and presented in the research plan.

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Gdynia, 16 September 2016
Magdalena Laine-Zamojska

FIGURES

TABLE

CONTENTS

1 INTRODUCTION

There are many reasons why Finland is an extremely interesting and unique place to carry out a digital heritage research and project. The country has an extremely high number of cultural heritage institutions, as well as very well supported and developed Internet technologies. Finland has one of the densest networks of museums in Europe (NEMO 2003), and since 2010 access to the Internet in Finland has been considered a universal service (Decree of the Ministry of Transport and Communications on the minimum rate of a functional Internet access as a universal service, 732/2009). Moreover, in Finland the information society has been actively developed since 1995, when the first policies were introduced. Finland has also actively followed the European Commission's Recommendation on the digitisation and online accessibility of cultural material and digital preservation (European Commission 2011, 7579).

According to the statistics of Finland's National Board of Antiquities for 2014, there are 152 professionally run museums in Finland, which are responsible for 327 venues open to the public (Museotilasto 2014). Moreover, there are also small, voluntarily run museums, which are open mainly during the summer months. These museums, mainly small local history museums, are much less known or covered by systematic research and statistics. There are around 730 small museums managed by municipalities, foundations or associations and a few hundred private museums (Rakkaudesta kulttuuriperintöön 2012: 19). Both professionally and voluntarily run museums are responsible for the Finnish cultural heritage.

However, the situation of professionally and non-professionally managed institutions in relation to the digitisation of cultural heritage and making it accessible online differs a great deal Surprisingly, even though there are many national initiatives supporting digitisation, digital content production and dissemination, the small museums are rather excluded from these processes. The professionally run institutions have a certain level of expertise and some resources to focus on the digital heritage. Only the largest institutions can afford to start the process of digitisation, to plan and develop an online presence.

Furthermore, as a result of this, online visitors are unable to access an enormous part of Finnish cultural heritage. this means that Finnish virtual museums

exhibit only some part of the heritage. The small museums, open mainly during the summer, are visited by around one million visitors per year. This number compared with the statistics for the professionally run museums, indicates that these local museums reach a significant amount of the audience (Rakkaudesta kulttuuriperintöön 2012: 23).

The aim of this research was to investigate this situation and the role of small museums in digitising cultural heritage and making it accessible online in the Finnish context. This research has been initiated as an attempt to investigate the situation of local heritage museums in Finland. It is important to mention that during the time span of this research, many new digital solutions have been introduced and have become available. The last analysis of digital projects I carried out in 2014, and these concerning directly the situation of small museums even earlier. Simultaneously to the main activities of this research, "the Museum 2015" project, the most important project for the museum sector was being planned, run and completed, as its main tasks were carried out between 2011 and 2015. In 2016, the results, which are the collection management system museums, cataloguing instructions, the enterprise architecture are available to all museums. Even though the project was focused on professionally managed institutions, the results are available to all museums. The small Finnish museums can use the collection management system and open up their collections through "Finna", an online service providing access to the collections of museums, archives and libraries. However, this course of development makes even more visible that small museums function in a different way than professionally managed museums and play a different role in the context of digital heritage.

The research was carried out in the Finnish context and the solutions were proposed for the Finnish museums. However, I used a variety of methods that has been used in large, international projects, so they can be deployed in other contexts as well. Moreover, as the digital technology is global, I believe the findings from the research may be applicable to the museums in other countries. Technologies are changing so rapidly that it seems to be obvious that some of the perspectives, solutions and data will be out of date soon. However, the research is an attempt to contribute to the field of cultural and digital heritage in this particular time.

1.1 Framing the research

1.1.1 The interdisciplinarity of the research approach

Museum studies have found their place among the mainstream disciplines and become one of the most multi- and interdisciplinary areas of the academy today, and "understanding the museum requires moving beyond intra-disciplinary concerns to greater dialogue with others, and to adopting and adapting questions, techniques, and approaches derived from other areas of disciplinary expertise" (Macdonald 2006: 23). Interdisciplinary research (IDR) is defined as a mode of research that by integrating concepts, tools, approaches and techniques from different disciplines aims

"to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice" (Facilitating Interdisciplinary research 2004: 188). The first major interdisciplinary typology was published in 1972; it was prepared to be presented at the first international conference on problems of interdisciplinary research and teaching in member countries of the Organization for Economic Cooperation and Development (OECD) in 1972 (Thomson Klein 2007, 2010: 15). The definitions have been widely accepted and used in the academic world. The OECD defines multidisciplinarity as an approach juxtaposing "separate disciplinary perspectives, adding breadth of knowledge, information and methods. Individuals and groups work independently or sequentially in an encyclopaedic alignment or *ad hoc* mix. They retain their separate perspectives, and disciplinary elements remain intact", while interdisciplinarity "is conventionally defined as a more conscious and explicitly focused integration that creates a holistic view or common understanding of a complex issue, question or problem" (Thomson Klein 2007: 37). The difference between multidisciplinary research and interdisciplinary research is that in the first researchers join together to work on common problem and split apart unchanged when research is done, while in interdisciplinary research they join to work on common questions or problem and interaction may forge a new research field or discipline (Tabak 2004 cited in Facilitating Interdisciplinary Research 2004: 29).

The part of this research aiming at the design of the tool for small museums is cooperative in nature. The stakeholders involved in this project represent different fields and disciplines, such as representatives of graphic design, information technology and museology. The collaboration was planned to occur during the practical part of this research. While each of the participants conducted their own procedures, the interdisciplinarity of this project cannot be perceived as a result of the cooperation of the researchers representing different disciplines. Collaboration is often considered as a synonym for interdisciplinarity, but it is not (Thomson Klein 2007: 44, Thomson Klein 2010: 19). As this research was planned as a museological research, the research responsibility and main role was assigned to the author of this dissertation, called in this research "researcher" or "museological researcher". The interdisciplinarity of this research may be described as methodological interdisciplinarity, which is characterised by using methods and concepts from another discipline (Thomson Klein 2010: 19). In this research, the concepts are borrowed mainly from the discipline of design and the methods that are used are ethnographic.

The most recent authoritative typology of interdisciplinarity distinguishes four "drivers" of interdisciplinary research: (1) the inherent complexity of nature and society; (2) the desire to explore problems and questions that are not confined to a single discipline; (3) the need to solve societal problems, and (4) the power of new technologies (Facilitating interdisciplinary research 2004: 40). In the case of this research, the driver is related mainly to new technologies. The aim of this research is to investigate the possibilities of new media in small museums in Finland that so far have not been very active in the digital environment. The design of the digital product, the online tool to create virtual museums, required expertise from different disciplines. However, the main perspective joining these concepts was museological. Interdisciplinarity is intrinsic to the concept of museological research (Mensch 1992),

especially in the context of new museology and challenges that museums are facing in the digital age. This research demonstrates how certain methods and concepts characteristic of different disciplines are used to solve a problem and design a tool that facilitates the digital presence of small museums.

1.1.2 New Museology and heritology in Finland

Peter van Mensch, a well-known scientist in theoretical museology, investigated the history of museology (van Mensch 1992). According to his interpretations of the first museological texts, museology gained its status as a discipline in the last decade of the 19th century and since then it has undergone several transitions. At the time of his writing, he argued that it was still emerging as a scientific discipline (van Mensch 1992). However, at the same time a new stage of this development is recognised (Vergo 1989, van Mensch 2004). The term "new museology" has been proposed by Peter Vergo (1989) in comparison with "old museology", which is "too much about museum methods, and too little about the purposes of museums" (Vergo 1989: 3). According to Peter van Mensch, new museology represents new practices and new theoretical concepts (Mensch 2004: 7).

New museology postulates the re-examination of the political and social role of museums within society. This term is widely favoured in international museological discourse and it defines the field "as a specific relation between man and reality, which is expressed by documenting that which is real and can be grasped through direct sensory contact" (Desvallées & Mairesse 2009: 56). This definition is broad enough to cover also new forms of museums, such as cybermuseums, digital museums or virtual museums, which are central to this research, and therefore this definition applies to this research as well.

The advent of new technologies has influenced museums and led to their "re-invention" (Anderson 2004, 2012) or "re-imaging" (Witcomb 2003), while other scholars have acclaimed that museums are experiencing "participatory turn", "paradigm shift", "digital turn", "turn to culture" or "reconceptualization" (Weil 2002, Anderson 2004, 2012, Simon 2010, Runnel et al. 2013, Hooper-Greenhill 2010). Museums become "digital" (Din & Hecht 2007) "engaging" (Black 2005) and "responsive" (Lang et al. 2006). In a special issue of Digital Creativity "Designing for creative engagement in museums and cultural institutions" (2014), scholars and museum practitioners discuss the role of creativity and new technologies in changing museums into more critical and reflective institutions. Recently, also social media have been discussed in museum studies literature. In the anthology entitled "Heritage and Social Media. Understanding Heritage in a Participatory Culture" (Giaccardi 2012), the concept of participatory culture serves as an example for rethinking new forms of participation and interaction between people and heritage institutions. The relations between social media and museums have been investigated and discussed in the anthology "Museum Communication and Social Media: The Connected Museum" (Drotner & Schrøder 2013). The integrative approach of the book allows for the integration of digital technologies with existing museum practices: technologies are perceived as "means of communication, interaction and exchange" (Drottner & Schrøder 2013: 12).

In Finland both new museology and the digital turn have not changed the museological discourse muc, because Finnish museology is considered a new field of science. The first museological position was appointed at the University of Jyväskylä in 1989, and the professorship in 1999. Janne Vilkuna, the first professor of museology in Finland, was apparently also the first who defined museology in the Finnish context (the definition was also used to describe museology as a university subject):

> Museology (heritology) is a science that examines how individuals and communities perceive and control their temporal and spatial environment (1) by taking possession(2) of evidence of the present and past.
>
> (1) Considers both the tangible and the intangible environment
>
> (2) Selecting and marking the boundaries of objects of reality and taking them in possession as cultural reality (Vilkuna 2007: 51)

In his work, Vilkuna (Vilkuna 2010b) refers also to Kenneth Hudson (1916-1999), who used the term "great museum" for the first time. Vilkuna states that this concept has been widely recognised in Finland for a long time:

> Europe is one large museum, where every building, every field and every river and railway contains clues to the past and present of the country concerned, provided the onlooker has the information to understand what he is looking at. Scattered across the Great Museum are the institutions which we call museums. Their main function is to help people to understand the Great Museum. They justify themselves by looking outwards, not inwards. (Hudson 1993 cited in Vilkuna 2010b: 76)

Vilkuna "imported" the term heritology, as it does not limit the subject of the museological research to museums. Heritology is a term introduced by professor Tomislav Šola as an attempt to shift into the general theory of heritage:

> Heritology consists of an entirely of principles, theses and theorems used in elucidating the concept of heritage, the nature of heritage institutions, their practice and their mission, as well as their role in the society. (Šola 2005: 8)

Using this concept is extremely useful, as in Finland museums are perceived as memory institutions, together with libraries and archives. It has been quite early realised that some problems are central to these three sectors, and bringing them together will facilitate problem-solving approach. This trend has been recently strengthened by new ICT initiatives and national policies on the development of the information society.

The development of museology/heritology in Finland can be analysed through academic and institutional development. There are some publications on the history of the development of museology in Finland in articles and museological textbooks (Vilkuna 1993, 2000, 2007, 2010), but the most exhaustive research project was launched in 2005 as a joint project of the Finnish Museums Association, the National Board of Antiquities, the Finnish Museum of Natural History, the Finnish National Gallery (Central Art Archives and Art Museum Development Department KEHYS) and museology at the universities of Helsinki, Jyväskylä and Turku. The objectives of the research were to write a history of Finland's museums. The first outcome of

the project was "Suomen museohistoria" ("A History of Museums in Finland") (Pettersson & Kinanen 2010). It consists of several articles written by Finnish museum professionals and researchers. The publication examines Finnish museum history from three perspectives: (1) museums in relation to society, (2) the museum field, and (3) museum spaces, collections and museum work. In addition to this publication the research material is being constantly gathered. There is a database of material documenting museum history in the form of articles, interviews, books, analysis, reports and other materials.

It has been stressed from an early stage that museology is closely linked to specific institutions (Heinonen 1983 cited in Vilkuna 1998: 175). Museology can be studied at several universities in Finland. At the basic level, it can be studied at the University of Oulu and the University of Tampere; at the intermediate level at the University of Helsinki and the University of Turku (Bachelor-level studies usually consist of basic and intermediate courses), while advanced studies (Master's level studies and the PhD degree) are offered only by the University of Jyväskylä. At the Aalto University's School of Arts, Design and Architecture in Helsinki there is also the "Systems of Representation" research group led by Professor Lily Díaz[1]. The group is focused on research and design projects, as well as educational activities[2] and many of them have been carried out in collaboration with museums.

Professional courses are also organised by the Open Universities and the Finnish Museums Association. The Finnish Museums Association was established in 1923 as the first institution responsible for museums. The Association was founded in connection with the Archaeological Commission (since 1972 the National Board of Antiquities) in order to manage the development tasks for which the State Archaeological Commission was not able to be responsible. The first office was located in the National Museum of Finland. Since its establishment, the Finnish Museums Association has been organizing courses for museum professionals, as well as was being involved in organizing academic courses at the University of Jyväskylä, University of Turku, Åbo Akademi University, the University of Oulu and the University of Helsinki. Another stakeholder, the National Board of Antiquities, which operates under the Ministry of Education and Culture, is involved together with the museums sector in protecting national heritage. Moreover, its responsibilities include a cultural historical national collection, as well as supporting and developing the museum field. The Finnish National Gallery (FNG) also supports the research and development of museums, in this case especially art museums. Another organisation supporting the development of museums by organising training and courses is the Finnish Local Heritage Federation, chaired by Professor Janne Vilkuna, also a chairman of the Finnish Museums Association for the years 2015-2016.

Finnish museum professionals are active in both the academic and museum sectors. They are responsible for research activities in this kind of projects, and serve as experts in national initiatives. However, it seems that professional experience is rather gathered in work experience than in strictly academic research, which illustrates how much the museums sector and the academy are linked to each other.

1 Systems of Representation, http://sysrep.uiah.fi [07-04-2015]
2 Ibid.

Moreover, as they represent different disciplines, the Finnish museological research and initiatives are quite often interdisciplinary in their nature. For example, so far in Finland there have been only five doctoral dissertations in museology since museology got the right (2002) to be a major subject at the University of Jyväskylä. All of them were completed by professionals active mainly in the memory institutions: the first by Hannu Valtonen, director of the Aviation Museum of Central Finland, on the museum value of two Messerschmitt Bf 109 aircraft (Valtonen 2006); the second by István Kecskeméti, head of the Archiving Techniques Unit (digitisation, conservation) at the National Archives of Finland, on conservation management of archival and photographic collections (Kecskeméti 2008); the third by conservator and lecturer at Helsinki Metropolia University of Applied Sciences, Ulla Knuutinen on the heritological functions of conservation research material (Knuutinen 2009); and in the fourth Helena Lonkila, a university teacher at University of Jyväskylä, combines critical heritology, dense ethnography and cultural semiotics to investigate the decision-making processes in relation to the issue of choice in cultural heritage (Lonkila 2016), and the fifth by Nina Robbins, a painting conservator, on deaccessioning and museum collections (Robbins 2016). Naturally, there are other dissertations dealing with a museological subject. One of the newest contributions is Ari Häyrinen's doctoral dissertation "Open sourcing digital heritage: digital surrogates, museums and knowledge management in the age of open networks" (Häyrinen 2012). Häyrinen writes:

> Currently, this work is published under digital culture, but it could have been published - at least partly - under digital humanities, human computing, museum studies, museum informatics or ICT. This interdisciplinarity is necessary in order to address the complexity of the open digital heritage. Traditions of museum work, practices of documentation, technology of documentation platforms, design principles of heritage ICT, ontological issues of semantic computing and long-term preservation issues of digital content are all aspects of digital heritage that must be covered in order to study the phenomena. (Häyrinen 2012: 14).

Interdisciplinarity characteristic of the museum field is demonstrated also through research done in other academic institutions. Design researcher Mariana Salgado (Aalto University School of Arts, Design and Architecture, Helsinki) explored in her dissertation content creation and sharing through interactive pieces in the museum context (Salgado 2009). Her research was based on several shorter projects developed in cooperation with Finnish museums and it is an investigation of interaction design and participatory techniques in relation to museums. In her research, she adopted the concept of "the ecology of participation", which "binds the interactive piece, people, and the practices with the places". Salgado's hypothesis is that:

> by examining the ecology of participation it is possible to support and make use of existing practices, places and different actors in the museum. This thesis emphasises that the quality of the contributions depends on the inclusion and connections within the different components of the ecology. (Salgado 2009: 5)

Although Salgado's research deploys the design theories and methodologies, it has been influenced by the museum studies and museum informatics' perspectives. The literature from these disciplines helped her to understand the problematic from the museum point of view and deploy the concept of ecology of participation. Further-

more, in the final part of her research she gives recommendations for museums: promoting and guiding community created content, listening to and trusting the community and not being afraid of innovation and design experiments (Salgado 2009: 124-128). In another doctoral dissertation, the ecological impact of museums and digital heritage was addressed and a set of design principles for building ecological media infrastructures proposed (Bhowmik 2016). The study is continued as a post-doctoral research and it is aiming at aims to addressing the ecological impact of digital heritage on cultural memory[3].

Researchers from the Aalto University School of Arts, Design and Architecture have been collaborating with museums for several years. The projects have involved both museum professionals and researchers, as well as students. For example, in 2001 the Media Lab of University of Art and Design, Helsinki[4] in collaboration with the Finnish National Gallery launched the MUMMI project (multi modal museum interfaces) (Haapalainen & Mäenpää 2003). The objectives of the projects were to bring the expertise of both institutions to "improve the accessibility of diverse audiences to cultural heritage information" (Haapalainen & Mäenpää 2003: 1). The project resulted in several museum applications and student theses (Haapalainen & Mäenpää 2003: 1). Interrelations between the museums and academe can be demonstrated in the work of museum professional Maija Ekosaari, who is currently working in the Museum Centre Vapriikki in Tampere, and investigated the history of computerisation in the Finnish museums (MA thesis, 2008). Ekosaari has been working for several years towards collections management development in Finland. She is, for example, a co-author of A Checklist for Museum Collections Management Policy (Ekosaari, Paaskoski & Jantunen 2014), published by the National Board of Antiquities as part of the Museum 2015 project.

However, it is important to mention that the subject of museums and the Web has been of interest to Finnish museum professionals for years. The articles on different issues related to the museums and the Web have been discussed in the Finnish Museums Association's "Museum" journal ("Museo"), which is Finland's only periodical museum magazine, examining a wide range of current issues in the museums sector. In addition to several articles about museums and the web, there were also issues devoted to "museums om the Internet" (Museo: Museot verkossa 1/2000), "the electronic museum" (Museo: Sähköinen museo 1/2003) and "technology" (Museo: Tekniikka 1/2012). Moreover, new technologies and their use have interested students in Finland and hopefully we may expect new research in this field in the future. Kalle Kallio, a museum professional, in investigated his master thesis online exhibitions as educational material in history (Kallio 2005).

In relation to research on museums and the web, there is lack of extensive research covering the websites and online initiatives of Finnish museums. Some aspects of bringing museums to the web are also discussed in an edited anniversary volume published by the Finnish Museums Association (af Hällström 2003), which

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3 Samir Bhowmik, http://samirbhowmik.cc/ and http://samirbhowmik.cc/2017/03/02/awarded-finnish-cultural-foundation-grant-2017/ [12-03-2017]

4 The University of Art and Design, founded in 1971, became a part of the Aalto University School of Arts, Design and Architecture in 2010.

gives an insight into the development of museums in the previous 10 years. In a section entitled "Museums and Information Society. Electronic museum" a number of Finnish museum professionals discuss museums and new technologies - the role of the museum object and its documentation in relation to new digital technologies and collection management (Valanto 2003), new projects on bringing museum collections into digital format (Tuulasvaara-Kaleva 2003), a general insight into Finnish museums and their online activities (Vallisaari 2003), or case-focused articles: on mobile service "City Art", which was a joint project of Helsinki City Museum and a Finnish telecommunications company (Mononen 2003) and experiences of implementing PDA at the Postal Museum (Karhu 2003). One of the earliest publications from the early 1990s discusses the first museum websites in Finland (Ylönen 1995). However, these articles provide only general insight into the discussion concerning museums and the Web.

Museologist, Professor Ivo Maroević divides museological research into basic research and applied research. The purpose of basic research is to contribute new knowledge, which facilitates the development of museology as scientific discipline, while applied research solves practical problems (Maroević 1998: 161). It is rather difficult to divide Finnish museological research into these two categories. The research projects on the history of the Finnish museums are mainly basic research. While Kecskeméti and Knuutinen's dissertations have objectives that may be characterised as basic museological research, their studies were conducted in order to solve the problems they were facing in their every-day practices as professionals. Valtonen is also an experienced museum professional, who focused in his dissertation on issues connected to his working experience. The most applied approach represents Salgado's work, but Salgado, as a designer, is more focused on design methodologies and concepts. This research may be characterised as applied museological research, which is directed towards identifying current problems of small museums in Finland.

1.1.3 Anthropology and action research

While the foundations of anthropology and the questions central to it date back many centuries (Harris 1968), as a discipline it has been growing since the 19th century. In the Western context, its institutionalisation was closely related to museums. The museum is one of the most widely adopted western concepts, as illustrated by the ICOM definition of the museum, which is a reference in the global museum community (ICOM 2007). Since the 1940s, the approach in the development of the ICOM museum concept has been changing from the object-oriented, through phenomenon-oriented to the community-oriented approach.

A variety of influences and interrelations between museums and anthropology have been the subject of many studies; on the development of evolutionary museums (Bennett 2004); on museum anthropology (Stocking 1985) and the anthropology of museums (Ames 1992); on revising the role of American museums in contemporary society (Conn 2010); on objects and museums in relation to colonialism (Edwards, Gosden & Phillips 2006; Barringer & Flynn 1998); and on ethnographic museums in Germany (Penny 2002). There has also been a study on the development of

American anthropology in relation to institutionalisation and museums (Hinsley 1981).

These studies and approaches show that anthropologists have again turned their attention to museums in recent years (Bouquet 2001). Collaboration with indigenous societies and extensive fieldwork have shown that the transmission of knowledge differs from society to society and that the Western museum model is inadequate in the context of indigenous societies (Simpson 2006; Kreps 2003). Not surprisingly, there are many examples indicating that indigenous communities have embraced the Western museum model and are transforming it according to their own values and to serve their own needs. Drawing on the literature on the history of the museum concept (Ames 1992; Bazin 1967; Bennett 1995; Duncan 1995; Hudson 1977 and 1987; Pearce 1992; Walsh 1992) and anthropologists specialised in the study of museums, Christina Kreps argues that the idea of the museum is a distinctly Western and modern cultural product, which is deeply embedded in museological discourse and the narratives of museum history (Kreps 2003: 20). In European museology, the museum is defined as an exclusively Western and modern cultural concept. According to Kreps, lately museology has been almost solely dependent on the modern, Western knowledge system, and as a remedy she proposes cross-cultural approaches to cultural heritage and comparative museology as a way of liberating Western museological practices (Kreps 2003: 7). Moreover, the concept of the museum must become more flexible if we want to understand the functions of museums in other than Western societies (Simpson 2006: 156).

Moreover, museum practices are also challenged in a global, digital context. It was the arrival of the World Wide Web in the early 1990s that brought the most radical changes to the use of new technologies in museums from the audience perspective. The Internet and new types of relational databases have shown that Western classifications and documenting standards are not sufficient in relation to other than Western societies. Drawing on two research projects, "Knowledge Objects" and "Themescaping Virtual Collections", Fiona Cameron, who researched digital technologies and heritage collections, and curator and collection manager Helena Robinson jointly examined the traditional concepts related to museum documentation and collection interpretation established in museology. They argue that digital technologies will challenge traditional models and reshape museum practices in the future (Cameron & Robinson 2007). One of the issues raised in their research was "the problem of 'conceptual fit' between cultural meanings and classification schemes in documentation, which highlighted the difficulty of prescribing categories that can be applied universally" (Cameron 2000, cited in Cameron & Robinson 2007: 167).

Digital technologies, and especially the Internet, have challenged museums because collection management systems and access to collections are no longer restricted to a small number of museum professionals and curators. The Internet has given ordinary people an opportunity to interact with things previously hidden, with great care, in museum databases or collection management systems. Moreover, digital technologies have become accessible for ordinary users. Users can share their knowledge through many available online applications and services, of which the most revolutionary ones seem to be social media services. It is no longer obvious how heritage should be documented and represented online. Moreover, it is no

longer clear which model of the museum should be used. Museums are constantly being challenged through a global network because their users represent different knowledge systems and epistemologies. The online presence of museums may be defined as a new genre (Cameron & Robinson 2007). The traditional functions of museums are brought into this new space and they require new approaches and methods. It is not clear how a museum should be present on the Internet and what kind of activities should be focused on.

New digital projects face many problems, not only because of the novelty of the digital environment, but also because they should be able to preserve, disseminate and present the cultural history of different communities. It is argued that museums are going through one of the most dramatic changes in their history, which has altered the relation between them and their source communities, which are defined as the communities from which museum collections originate (Peers & Brown 2003). This relation can be characterised as:

> (…) a two-way process, with information about historic artefacts now being returned to source communities, and with community members working with museums to record their perspectives on the continuing meaning of those artefacts. (Peers & Brown 2003: 1)

In this context, it was extremely useful to deploy anthropology and a more specific form of research, such as participatory research and collaborative research because both the researcher and the source community have an impact on the form of the research, determining and controlling the research outcomes (Peers & Brown 2003: 11).

Community and the cogeneration of understanding are part of the discussion on action research (AR) and participatory action research (PAR). Action research has a very early linkage to anthropology (Drew & Utari & Willigen 2002; Brydon-Miller & Greenwood & Maguire 2003). There is discussion whether AR and PAR are distinctive or synonymous terms, but some authors discuss PAR under the rubric of AR (Drew & Utari & Willigen 2002 drawing on Greenwood and Lewin 1998). In this research, I use the term AR in the same way. Action research is a term coined by Kurt Lewin, who characterised action research as a type of research needed for social practices, which produces not only theoretical knowledge, but also leads to social action (Lewin 1946). Action research is an approach to research and may be characterised as a research process that includes "problem identification, information gathering, mobilisation of community members who are affected, collaborative analysis and critical reflection, collaborative planning, action and new reflection" (Drew & Utari & Willigen 2002: 80). The results and the knowledge are produced in a cooperative process by both the researcher and the community. There are very important consequences of this approach, which challenges a positivistic view of knowledge. It is crucial to recognise that the knowledge is a socially constructed product, and "all research is embedded within a system of values and promotes some model of human interaction" and therefore research should "challenge unjust and undemocratic economic, social and political systems and practices" (Brydon-Miller & Greenwood & Maguire 2003: 11).

While the origins of the development of action research are linked to the problems that anthropologists identified in their fieldwork among the minority groups or

representatives of indigenous groups, AR and ethnographic action research (EAR), a type of AR, have also been successfully used in new media projects. Ethnographic action research makes extensive use of ethnographic methods and principles (Tacchi, Slater & Hearn 2003). New media initiatives involve different stakeholders, from programmers and developers to end-users, and require a very high level of expertise, which makes communication and co-production processes very difficult. Knowledge negotiation and sharing are considered to be extremely difficult processes in initiatives of this kind. Moreover, digital projects are developed in a wider context, following certain recommendations and policies. In the rationale of action research for new media, Greg Hearn, Jo Tacchi, Marcus Foth and June Lennie define three main ways in which action research as a research process is connected to technology design (Hearn, Tacchi, Foth, & Lennie 2009: 18): (1) active participation of the people involved in the project; they should participate in defining the aims and direction of the research, as well as interpreting and drawing conclusions from the research; (2) knowledge is generated by using action-based methods, and (3) the aim of the research is to generate action.

In the digital initiative that is a part of this research, all these problems were relevant, both in relation to the concept of museum and in relation to issues characteristic of new media projects and the AR approach. The prototype of the virtual museum, which was designed as part of this research, represents to some extent the Western museum model. However, it is also a model of the museum. The constraints are defined in a preliminary way, but they can be changed according to the expectations of the users, i.e. the source community.

1.1.4 User-centred design

One concern of this research is a digital artefact shaping, which is considered as an act of design (Löwgren & Stolterman 2004), while by others "the creation of artefacts for future use by others" is central to all design activities (Krippendorff 2007: 69). Krippendorff proposes five activities that define human-centred design:

> Designers invent or conceive possible futures, including its artefacts that they may be able to bring about, imaginable worlds that would not come about naturally. (…)
>
> Designers need to know how desirable these futures are to those who might inhabit them, and whether they afford diverse communities the spaces they require to make a home in them. (…)
>
> Designers experiment with what is variable or could be changed, in view of the opportunities that variability could open up for them and others. (…)
>
> Designers work out realistic paths, plans to proceed towards desirable futures. (…)
>
> Designers make proposals (of realistic paths) to those who could bring a design to fruition, to the stakeholders of a design. (Krippendorff 2007: 71)

All these activities were central to one part of this research concerning the possible future of small museums in Finland in relation to their contribution to the digital heritage area. This part can be also considered as a digital project. A digital project

may be also characterised as a knowledge building process, where the technology is appropriately chosen to support the knowledge negotiation, creation and sharing. In successful digital projects, technology sustains these processes and gives all the interested stakeholders an opportunity to participate. Adequate design is responsible for facilitating this participation and becomes an extremely important element of digital heritage projects as well. Designers often play a crucial role in developing new solutions for museums and their communities. In the context of museums, a very promising design approach is participatory design, which is also focused on users.

Participatory design is a design approach that uses different methods to involve the participants in the process of design, in order to develop the most satisfactory and sustainable design outcome. There are many different techniques and tools used in participatory design projects, but their common aim is to provide designers and users of technology "a way of connecting current and future work practices with envisioned new technologies" (Kensing & Blomberg 1998: 177). The outcomes should meet the needs and requirements of all the stakeholders. Participatory design has its origins in the labour movement in the 1970s in Scandinavia, where it was used as an approach for the development of systems (Bødker: 1996). The goal was to integrate workers with the industrial design processes in order to achieve more satisfactory results. Dissatisfaction with traditional design practices has led to proposing a new approach to design, which is "based on an emancipatory perspective and encompassing both the inner everyday life of skill-based participatory design and the societal and cultural conditions regulating this activity" (Ehn 1993: 42).

In their seminal article "Design for experiencing: New tools", researchers Elizabeth Sanders and Uday Dandavate (1999) investigate how the social sciences have influenced the design process. According to them, the participatory design has its roots in the behavioural sciences (only observable behaviour can be scientifically studied, which has resulted in ethnographic approaches to design), cognitive revolution of the 1960s and 1970s (with focus on an information-processing model of the mind) and cognitive psychology (a theoretical framework for usability research within human computer interface design). According to Sanders ad Dandavate it is possible "to gain access to the world" of the person experiencing the design "only through his/her participation in expressing that experience", and the participatory design approach acknowledges this (Sanders & Dandavate 1999: 87). Experience may be accessed in many ways and helps to construct different types of knowledge and information: explicit knowledge, observable information, latent needs and tacit knowledge (Sanders & Dandavate 1999: 88). Participation in museums has been also widely discussed in recent publications in relation to experience, engagement, interaction and interactivity in museums (Kelly & Russo 2008, Russo & Peacock 2009, Russo et al. 2006, Meisner et al. 2007, Heath & Vom Lehn 2010, Christensen 2011).

Moreover, participatory design includes two radical propositions about design: the moral proposition and the pragmatic proposition. Firstly, the moral proposition is that the people whose activity will be affected by a design outcome should have a right to be included in the process of design. Secondly, the people who will adapt the outcome of the design should be included in the process of design, because in

this way they can present their preferences and perspectives, which might increase the chances of a successful design (Carroll & Rosson 2007: 243).

As it can be seen, the moral proposition is shared by the ethics of anthropology. Moreover, it is nowadays considered standard practice that museums try to represent the voices of different communities and support the groups that are socially and culturally excluded or at risk of exclusion. In this situation, the approach proposed by participatory design is extremely useful. Sustaining initiatives of these kinds is perceived as a priority and the cooperative approach helps to develop the most needed and adequate technological solutions that can be easily deployed in an institution. In the context of museums, it has been used, for example, in exhibition design (Taxén 2004).

Design adopts techniques and tools that are also shared by action research and combining their strategies may be useful in participatory studies (Foth & Axup 2006). In this research, it was important as a part of the research is focusing on the design and development of the online tool for small museums. In this research the technique used to design the digital creation is prototyping, which may be considered as a participatory technique. The prototype may be potentially developed as a working final product. Nigel Cross states that the aim of the designer "is the communication of the specific design proposal", because "pragmatically, the most essential thing that every designer does is to provide, for those who will make a new artefact, a description of what that artefact should be like" (Cross 1989/2007: 33). In this research the prototype was created in order to communicate the specific proposition, and also to discuss how access to cultural heritage in small museums can be improved.

Design activities can be also motivated by many factors, for example by challenges, which are situations or problems that require a solution, and those that "arise from the perception of presently undesirable conditions that seem to defy routine improvement", by opportunities to improve the current situation or by possibilities of introducing new versions of already known solutions (Krippendorff 2007: 70). In this research, the design activity was motivated by the recognition that small Finnish museums and their role in creating digital heritage is relatively low, which is considered to be an undesirable situation.

1.2 Research problems, aims and methodology

1.2.1 Research problems

The aim of this museological research is to investigate the role of Finnish small museums in creating digital heritage. The research examines the following questions:

1) What are the qualities of the online services and portals providing access to digitised museum resources?
2) What are the types of Finnish virtual museums and how do small museums provide access to cultural heritage?

3) What are common qualities of digital heritage in small, local museums in Finland, and how can these commonalities be used to aid the museum community in improving their visibility and presence on the Internet?
4) How can these commonalities be used in developing online digital heritage in Finland?

The first research question on the qualities of online services and portals that provide access to digitised museums resources is addressed in a separate analysis of selected examples. The analysis includes widely known services, but also includes a Finnish service.

The second question is addressed through the survey on the Finnish virtual museums and the discussion on the organisation of the Finnish museums sector. The methodology of the survey has been proposed within the V-Must network project. The survey covers not only small museums, but also professionally run institutions to provide a classification of Finnish virtual museums in general, and therefore the results of the survey partially answer the third question on the current situation of small Finnish museums and their opportunities to provide access to cultural heritage. The diagnosis of their current situation is also addressed in the discussion of the Finnish museums sector and its organisation.

The third question concerns practical application of the results and examines the common qualities of digital heritage in small Finnish museums and how they can be used to improve their current situation. This is addressed in the part that is focused on the design of digital prototype of a virtual museum and the ethnographic research carried out in a number of small museums.

The last question examines the commonalities of digital heritage in relation to the current situation of the Finnish museums sector to demonstrate how they may be used in the development of the Finnish digital heritage online.

1.2.2 Research aims

The research aims are the following:

1. To provide a critical overview of virtual museums and digital heritage in the Finnish context, particularly in relation to small, local history museums;
2. To bring attention to the potential of small museums in the area of digital heritage;
3. To provide an insight into common qualities of digital heritage in small museums in Finland that can be used in future projects in the area of digital heritage in Finland.

The research is mainly concerned with digital heritage and the Finnish museums, but it also places them in the wider, international context.

Research approach, methodology & key terms

The diagram below illustrates how different activities interrelate with each other, what particular research questions they answer and what methods were deployed.

In order to answer the research questions and meet the objectives, an exploratory approach was taken. The research is framed within the discipline of museology, but due to its interdisciplinarity, several separate research activities were planned and carried out. The main elements include:

1) Analysis of portals and services providing access to digitised museum collections;
2) Classification of Finnish virtual museums;
3) Prototyping Finnish virtual museums for small museums;
4) Analysis of digital heritage and small, local museums in Finland;
5) Ethnographic depiction of representatives of small museums.

The first analysis aims at assessing the functionality of online services and portals providing access to digitised museum collections. The qualitative analysis covers 22 portals and services from different countries. The particular goals of the analysis are presented in Chapter 8. The analysis demonstrates that the majority of the examples have the same functionality and are very similar to each other.

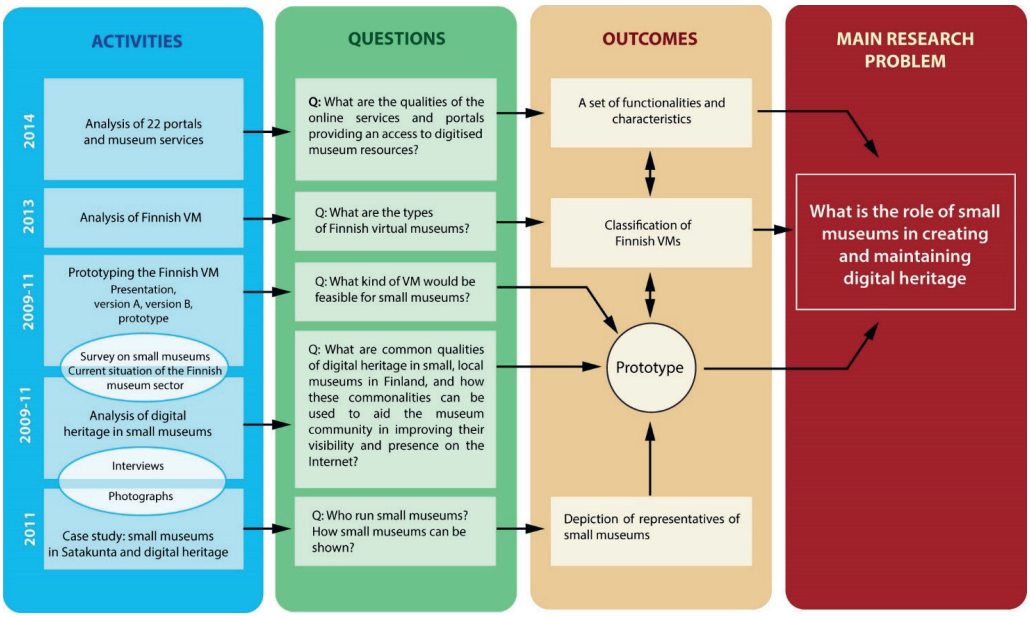

FIGURE 1 Relation between research questions, activities and outcomes

The second activity concerns classification of Finnish virtual museums. In this part, the methodology proposed within the V-Must network of excellence was used (Virtual Museums Transnational Network 2009, Ferdani 2013, Farouk, & Pescarin 2013).

At the time of writing, the V-Must project is still ongoing, but some of the deliverables are already available. Currently, V-Must is the main European research and development initiative of virtual museums. The consortium involves 18 institutions from 13 countries which over the period of 10 years have developed or been involved in the development of more than 50 virtual museums. The overarching objective of the project is to enhance the progress of the research and development within the VM domain, because the sector is fragmented and underdeveloped. To classify the Finnish virtual museums, the V-Must categories were used to analyse the online presence of 52 museums in Satakunta. The analysis was preceded by the review of the Finnish websites carried out in 2008. The categories of VMs that were used (Schweibenz 2004) sufficed only to provide a very general overview of the digital creations of Finnish museums, and thus there was a need to carry out a more in-depth study and the V-Must project's new classification was a suitable analytical tool.

The third important part of the research is related to the VM prototype, which is considered as a research virtual museum (Farouk & Pescarin 2013). The method used in this part was prototyping (Houde & Hill 1997, Gerhards 2001, Guggenheim 2010). Prototyping may be used to select the focus, examine problems and evaluate solutions in design (Houde & Hill 1997). Moreover, as Guggenheim argues

> prototyping is not simply understood as the development of "first forms" or "first strikes" as beta- versions of products as in industrial design, but as a more general mode of doing culture: a mode that is tentative, based on bricolage, user involvement and ongoing change and improvements of products and practices, as "open innovation", rather than on an expert in a closed lab who turns out a finished product to be used by a unknowing user. (Guggenheim 2010: 51-52)

In this research these two approaches were combined. During the first stages of design, prototyping was used to explore several problems related to the area of digital heritage. Furthermore, the prototype was used during the interviews with the representatives of the museums, which is a fourth research area - the analysis of digital heritage and small, local museums in Finland.

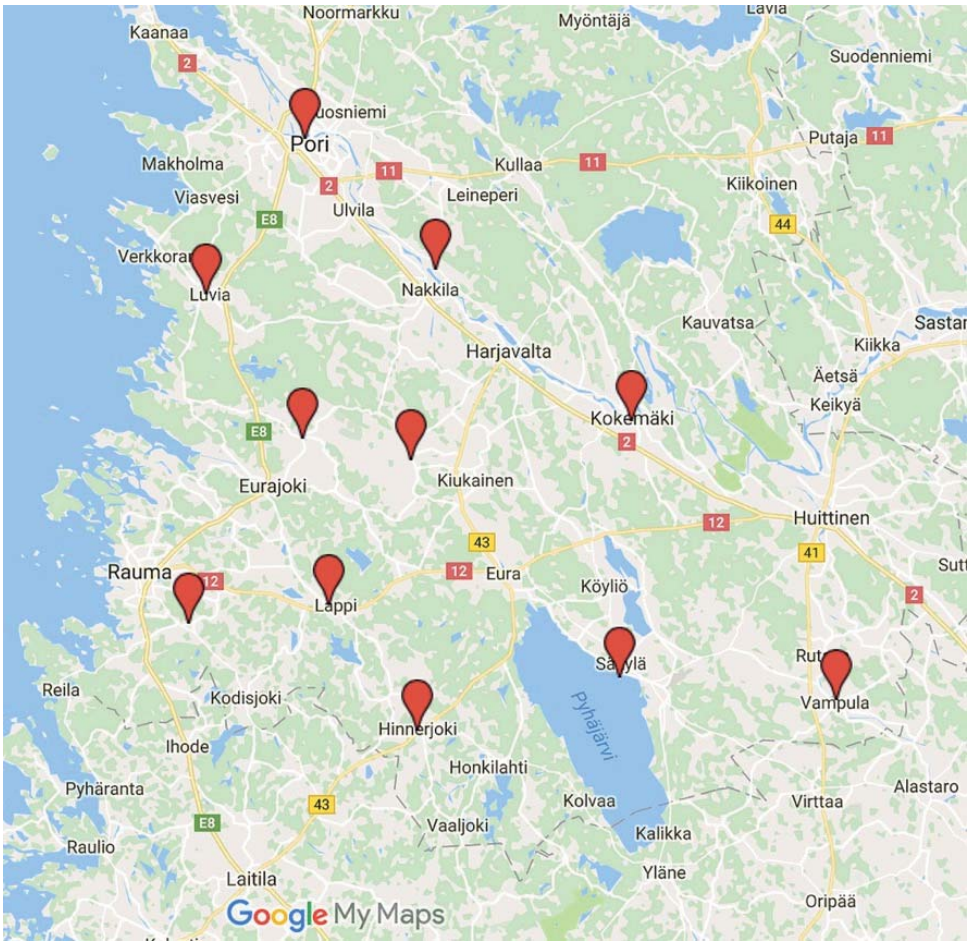

FIGURE 2 The museums participating in the research

The fourth research area included survey on small museums carried out by the Local Museums Committee in 2012 (Rakkaudesta kulttuuriperintöön 2012), review of the current Finnish projects for the museum sector and the interviews with the representatives of the non-professionally managed museums in Satakunta. This research is about the possibilities of new technologies, but the main focus is on people who may be potential users of these technological solutions. During the open, semi-structured interviews[5] the following themes were discussed: (1) the museum's activi-

5 The language of all the interviews done within this research was Finnish. The Finnish language has spoken and written forms and there are several local dialects, which some of the interviewed spoke during the interviews. For these reasons, and the fact that Finnish is not my mother tongue (it is Polish), the transcription was very demanding. It may still contain some misspellings. The most difficult interviews (in the local dialect used in the region of Satakunta) were transcribed by a Finn. Two of the interviews are not transcribed in the Finnish language; when I listen to the recordings, I translated them immediately into Polish. I consulted a Finnish native speaker, fluent in Polish, to check the transcriptions whether there are no mistakes that may change the meaning of the interviews. Moreover, all the citations were checked from the recordings and the cited parts were transcribed in

ties; (2) the upkeep of the museum, and (3) the use of online applications in museum work. During the discussion on the online presence of their museums, the prototype was demonstrated. It was used to evaluate their practices in relation to creation, access, management, sustainability and preservation of digital content within their institutions. In addition, the prototype was discussed as to whether it would feasible to develop it further and whether they would like to use it and why. The results are presented in Chapters 5 and 8. The ethnographic interviews were carried out with the selected museums from Satakunta in December 2011.

In this research, the focus was put on several institutions from the Satakunta region, which is one of the administrative regions of Finland. There were certain criteria for this selection. Firstly, I wanted to focus on museums that are not in close proximity to the Greater Helsinki metropolitan area (consisting of four municipalities with city status: Helsinki, Vantaa, Espoo and Kauniainen, and surrounding municipalities), where the density of network of professionally managed institutions is the highest. For small, local heritage museums located in the Greater Helsinki area participation in projects managed by professionally managed institutions is more convenient, the shorter distance permitting, for example, participation in working meetings, training and seminars. Secondly, during the preliminary surveys of websites of Finnish museums, there was no difference between museums from Satakunta or other regions in terms of access to digital resources, so in this term this sample is representative. Thirdly, beside the distance for the Greater Helsinki, I wanted to select museums that are located relatively close to each other to make arrangements easier, as many of them cannot be reached by public transport, as this does not influence the representativeness of this sample.

During six sessions I interviewed eleven museum representatives from seven museums (5 small, local heritage museums and one regional, professionally maintained museum): Jaakko Heiska, Juhani Vihervuori, Mikko Tolvi (Panelia Mills, Panelia), Ulla Antola (Museum in Lappi TI, Lappi), Raimo Kotsalo, Mirja Vuorinen (Säkylä Museum, Säkylä), Matti Perävainio, Lea Heikkilä (Hinnerjoki Local Museums, Hinnerjoki), Tapani Kotaja (Vampula Museum, Vampula), Leena Kekäle (Homestead Museum Muina, Vasarainen) and the regional researcher Akuliina Aartolahti (Satakunta Museum, Pori) from the museums located in Satakunta.

In this research, I refer to the term virtual museum, even though it may seem that it has been replaced with other terms, relating for example to implemented technologies, for example: "online museum" and "digital museum"[6]. However, it has been widely used in conference publications, as opposed to the latter terms. Actually, as a recent publication on a scientific community of digital heritage shows, the term "virtual museum" was popular between 2007 and 2011 (Münster & Ioannides 2015)[7], at the time when this research was conducted (2008-2012). The study

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Finnish and then translated into English. As I do not pursue any kind of discourse or language-focused analysis, I think this method is sufficient for the purposes of this research.

6 Google search results for the following terms: "virtual museum" (31,100,000), "online museum" (271,000,000), digital museum (84,000,000) [23-06-2016]

7 The study included only commonly used keywords (n>20) and years with more than 50 keyword entries in publications between 1990 and 2013. (Münster & Ioannides 2015). The

was based on results from a bibliometric investigation of more than 3,000 articles from major conferences dealing with digital heritage and published in the last two decades (Münster & Ioannides 2015). Furthermore, I use the framework proposed by the V-Must network, and consequently also the terminology, in which the concept of virtual museums is central. The definition of the virtual museum is discussed in Chapter 7, in which I presented results from the analysis of the creations of Finnish museums.

The second important term is "digital heritage". In this research, I use the definition proposed by UNESCO in its Charter on the Preservation of Digital Heritage (UNESCO 2003). It is discussed in Chapter 2 in more details. Digital heritage refers to both digitally born or digitised material. In relation to this material, it refers to digitised museum collections that can be accessed online and to the whole creation.

When using the term digitisation, I refer to the National Institute for Museums and Public Collection's definition, according to which it is a complex process of acquiring, structuring, processing, managing, archiving, protecting, exchanging and use of data on museum objects (NIMOZ 2011).

Prototype, which is an important part of this research, is defined as a first model of the final system. It is a representation of an interactive system or its part. It is limited in some ways, as it may be used for different purposes, for example design, analysis or evaluation (ISO 9241-210:2010, 2010: 2). Prototypes can represent different levels of fidelity, as it may be a drawing or almost fully functional system.

Finally, small local heritage museums must be defined. I discuss them in more detail in Chapter 5, but small, local heritage museum in opposition to bigger institutions is run generally by volunteers and the museum does not receive state subsidies. It is mainly located in villages and municipalities across Finland and it is focused on local heritage. In its collection, there are mainly objects obtained from the community or from that area. The collection is stored and exhibited in old buildings, such as cottages, mills or warehouses.

1.3 Some additional remarks on photographs

The specificity of the small museums that participated in the research influenced the research as well. The interviews were an interesting experience, because the people who run them are passionate about sharing their knowledge on local heritage. In addition, the old cottages are in beautiful surroundings. The concept of a small, local heritage museum is familiar to most of the Finns, but not to foreigners. Whenever I presented my research abroad during international conferences or discussed it with foreign museum professionals, curators, designers or programmers I needed to explain the research background and explain what a small, local heritage museum means and how it functions. When time was very limited, I needed to find a way to give a picture of these museums in another form than text, especially to the interna-

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terms "digital museum" and "online museum" were not such commonly used keywords as "virtual museum", and the authors do not discuss them.

tional audience. I talked about my experience with my friend Michał Sita, who is a freelance documentary photographer and who has undertaken several long-term documentary projects for example in Iraq, Turkey and Poland and who has also academic training in ethnology and cultural anthropology.

In my opinion, images can bring an important dimension to a written dissertation. I tried to find photographs documenting these museums which I could use to illustrate them in my dissertation, articles and conference presentation. Unfortunately, I have not found any interesting visual representations. Typical images represent only material culture: museum buildings and objects. There are also images showing people, but they are from museum events, documenting the atmosphere of the events, and are not very personal. None of these images represent the perspective I have chosen. This research is about the possibilities of new technologies, but the main focus is on people who may be potential users of these technological solutions.

Sita became interested in this topic and during the same winter, in January 2012 we visited the local museums together. I contacted the same persons I interviewed in 2011 and representatives from a few more museums. The aim of our project was to portrait the people who run these museums, or rather personify these museums. We discussed with Sita the way these people will be represented in the images. He knows my approach, so he decided to do portraits when they showed us the museums. What we wanted to catch was the openness and friendliness of these people, as well as the beauty and uniqueness of the places.

I asked following persons whether they wanted to represent their museums and be photographed for the purposes of this research: Jaakko Heiska (Panelia Mills, Panelia), Ulla Antola (Museum in Lappi TI, Lappi), Raimo Kotsalo (Säkylä Museum, Säkylä), Matti Perävainio (Hinnerjoki Local Museums, Hinnerjoki), Tapani Kotaja (Vampula Museum, Vampula), Leena Kekäle (Homestead Museum Muina, Vasarainen), Pertti Lehtimäki (Agricultural Museum, Eurajoki), Hannu Rinne (Cheesemaking Museum, Nakkila), Paula Härkälä (Köyliö Croft Museum, Tuiskula) and Heidi Helkiö-Mäkelä (Luvia Museum, Luvia). They all agreed[8]. Some of them stressed that they are not the most important persons responsible for the museum. They said they "only guided" and "showed" the museum, and that there are many other people who are in charge of the museum. I explained that this perspective will be explained in my research, but I want to present them in my study, because they are also behind these institutions and without them these museums would not exist. Consequently, in the following part I want to present these people and the museums for which they are responsible. I used the interviews, literature and images to create this presentation. I am aware that I have interviewed only a few persons. However, as I wrote, there are more than 700 small museums, which are run by a huge number of people. The second part of Chapter 5 serves as an ethnographic presentation and an appreciation of the engagement of these people, and a kind of tribute to the phenomenon of small, local museums in Finland. These images may also serve as a representation of the phenomenon of Finnish small museums.

8 I obtained permission to use the audio-visual material and the interviews for the purposes of this research from all the participants.

1.4 Introduction to the Chapters

The thesis consists of ten chapters. The first chapters provide a foundation for the further, analytical chapters.

In **Chapter 1: Introduction** I frame the research, present the research approach and explain the main research problems, aims and methodology. Chapter 1 also includes a diagram of interrelation between the research activities and research questions.

In **Chapter 2: Collections Management in Museums** I provide a brief introduction to collections management in museums. The historical overview is given by showing how management has become digitised. In the second part of this chapter I introduce the process of digitisation with focus on metadata. Finally, I address the questions "What is the relation between the digitised collection and digital heritage? Can museum websites be considered digital heritage?"

In **Chapter 3: The Virtual Museum: Origin of the Concept and Research** I introduce the literature on the origin of the virtual museum and present current museological research on virtual museums.

Chapter 4: Trends in the Development of Virtual Museums (2000-2010) is based on a review of current digital projects launched by museums on the Internet. The review consists of both internationally known initiatives as well as Finnish projects.

In **Chapter 5: The Museums Sector and Digital Heritage in Small Museums in Finland** I provided a short characteristic of the Finnish museums sector with focus on small museums. The data used in this chapter comes from two main sources: statistics on professionally managed museums collected every year by the National Board of Antiquities and on a survey of small museums. The latter was conducted by the Local Museums Committee appointed in 2010 by the Ministry of Education and Culture to prepare suggestions for the development of the museum sector in relation to non-professionally administered museums. In the second part of this chapter I introduce the museum representatives from seven small, local heritage museums in the Satakunta region. The chapter is based on my interviews with the representatives of the museum representatives. The chapter also includes pictures of the representatives of the museums taken by Michał Sita, photographer and anthropologist.

In **Chapter 6: Analysis of Museum Portals and Services Providing Access to Digitised Collections** I presented the results from my analysis of 22 museums portals. In this chapter I addressed the question "What are the qualities of online services and portals providing access to digitised museum resources?".

In **Chapter 7: Classification of Finnish Virtual Museums** I addressed the question "What are the types of Finnish virtual museums and how do small museums provide access to cultural heritage?" and focused on both professionally and non-professionally managed museums. I presented the results of my survey on Finnish virtual museums from the Satakunta region. In this survey, I used the framework proposed within the V-Must network of excellence, which at the time of writing was the most prominent European initiative on virtual museums. The results of my sur-

vey were compared with the results from the V-Must surveys. Finally, I explain the correlation between the level of available resources and the complexity of digital creation in relation to small and professionally run museums.

In **Chapter 8: Prototyping a Virtual Museum for Small Finnish Museums** I present the iterative and interdisciplinary process of prototyping virtual museums for small museums. The final prototype was also discussed with the representatives of the museums from the Satakunta region, introduced in Chapter 5. During the sessions with them we discussed the virtual museum for small museums in regard to digital content creation, access, management and administration, sustainability and preservation. These issues are discussed in the final part of this chapter "Prototyping the future with small museums".

In **Chapter 9: Discussion** I present the final results and discuss the current role of small museums in creating Finnish virtual museums. I discuss three scenarios for Finnish virtual museums in relation to small museums, and I address two questions: What are common qualities of digital heritage in small, local museums in Finland, and how can these commonalities be used to aid the museum community in improving their visibility and presence on the Internet? How can these commonalities be used in developing online digital heritage in Finland? Finally, I conclude the research, address its limitations and identify areas of future research.

2 COLLECTIONS MANAGEMENT IN MUSEUMS

2.1 From library cards to computerised documentation

In her thesis, Anna Stow, student of digital heritage, investigated the history of museum cataloguing practices from cataloging cards to digital representation (Stow 2011) and draws on early publications on cataloguing practices, by referring to the work of Edgar Ravenswood Waite. Already at the beginning of the 19th century, zoologist and museum curator Ravenswood Waite wrote in his article "The card-catalogue system adapted to museum requirements" about the difficulties that the natural history museum faced that required changes in cataloguing practices:

> In a thoroughly up-to-date Museum there must always be going on an active exchange of specimens with kindred institutions in other countries. To catalogue the collections in such an establishment may in itself be a matter of some difficulty. (Waite 1900: 217).

In order to keep up-to-date information about the specimens in the museum's collection, he adapted the library card-catalogue system to the museum's requirements. The system was not intended to replace the register, but to become a key to the collection. His description of the system is following:

> A card is issued for every individual specimen, and upon it written the name of the object and all information concerning it; it is in fact a copy of the collector's ticket, together with the registration and other marks, as Gallery, Duplicate, Type. These cards stand on edge in drawers specially constructed to receive them, and may be arranged in any way desired: the height of the card is less than that of the drawer, so that a deeper series may be inserted, these latter, standing up above the others, are to receive the names of the Orders or Families, etc., and may be of distinctive colour. When properly placed, a card or series of cards may be inserted anywhere or a similar series withdrawn without disturbing the general arrangement. (Waite 1900: 218)

The system described by Waite has evolved over the decades, but the main idea of the system remains the same and card systems have been used in museums around the world for decades. In some cases, this kind of a catalogue system is still in use. For example in the early 20th century, the museum cards in Swedish institutions had not only textual information, but also a representation of an object. At the Nordiska

Museet in Stockholm the cards included drawings and watercolour paintings made by Emelie von Walterstoff. A card system with drawings was used also at the Ethnographic Museum in Gothenburg between 1933 and 1948 (Stow 2011: 22).

Adapting library systems to museum requirements was one of the ways to improve collections management. One the most radical changes in collections management practices have been brought with the advent of computing technologies. Computing technologies have been present in museums since the 1960s. The early history of museum computing has been discussed in several works (see for example Anderson 1999, Burton Jones 2008, Jones-Garmil 1995, 1997, Light & Roberts & Stuart 1986, Parry 2007), but in the Finnish context this issue has been researched only to some extent (see for example Ekosaari 2008). The history of the first museum systems is linked to two projects from the early 1960s. One was launched at the Smithsonian Institution National Museum of Natural History (NMNH), and one at the Institute for Computer Research in the Humanities (ICRH) (Jones-Garmil, 1997: 36-37, Burton Jones 2008: 10). The outcomes of these two projects were one of the first museum database management systems: SELGEM (Self Generating Master), which was used at NMNH and GRIPHOS (Generalized Retrieval and Information Processing for Humanities Oriented Studies) at ICRH. Both were used throughout the 1970s (Jones-Garmil, 1997: 36-37). The first solutions were mainframe systems using text data fields and as Vance writes about them: "For a decade literature on United States museums and computers gave systems more attention that the information they process" (Vance 1986: 38, cited in Burton Jones 2008: 10). The Museum Computing Network/IBM sponsored the first conference on computers and their potential use in museums in 1968. Standardisation had started to be perceived as one of the most important issues in museum automation. The first systems were used to computerise collections. However, at that time only the biggest museums could afford to deploy these systems. The majority of museums still used the card catalogue systems.

The late 1960s and early 1970s may be characterised as a time when "standardised practices and the professionalization of collections management" were developed (Parry 2007: 55). Another generation of computing, the generation of microcomputers, was introduced in the 1970s. Microcomputers were less expensive and easier to work with. Consequently, mid-sized museums were able to obtain them and learn to use them, and the museums become more and more interested in their potential use. The second conference on computers in museums was held in 1970 at the Metropolitan Museum of Art in New York (Jones-Garmil 1995: 2).

In the late 1970s and early 1980s computers became available to ordinary users when the second generation of microcomputers appeared. These so called home or desktop computers were not exclusively used by information processing professionals. In the 1980s more projects aiming at museum computing development were launched, as well as networks of museum computing professionals. At the time, new museum professions related to information and data processing were introduced in museums. However, only the largest or professionally run institutions could afford to have these specialists in their teams.

The same trends can be recognised in the history of Finnish museums. The extensive computerisation of the museums sector took place in the 1980s. Museum

professional Maija Ekosaari examined in her thesis the history of museum computerisation in art museums, but she also gave a wider insight into the situation of the whole museum field (Ekosaari 2008). She analysed the memorandum on the IT and museums prepared by a committee appointed by the Ministry of Education (Museoiden tietotekniikkatyöryhmä 1985 in Ekosaari 2008: 39-41). The purpose of the working group was to investigate the need for developing information technology in the Finnish museums sector and to present the possible development activities (Museoiden tietotekniikkatyöryhmä 1985 in Ekosaari 2008: 39). The main focus of the report is put on the development of the information management system, requirements, standards, budgeting, infrastructure and implementation. The decades that followed can be characterised as a period when several collection management systems have been developed.

The early systems were mostly used for cataloguing and managing collections (collection catalogues and collection management systems). They consisted mainlyof text fields, allowing only the textual description of an object, and collections were organised according to well-known systematisations. The computerised systems and databases represented paradigms that were traditional and widely accepted in Western museology. Moreover, each museum had its own practices and, because the systems from different institutions were not integrated, there were different practices of documenting the objects. Access to the data was restricted, and thus only museum professionals and curators could access and modify them. Museums from the time before the Internet age were "bastions of traditional collection practices and the empirical epistemologies which underpinned their foundations" (Cameron & Robinson 2007: 165).

The arrival of the WWW has changed the way museums function. Museums also needed to open up to their audiences in the digital environment. The first websites were developed. Their construction and content were relatively limited due to technical constraints. An interesting account of discussions on museums and their websites is presented by curator and collections manager Richard Sabin in his report "Museums and their Websites: An Examination and Assessment of How Museums are Coping with the Challenge of the World Wide Web" (Sabin 1997). The report is based on several case studies, interviews and discussions with museum professionals. Sabin explains how developments in technology, collection management and interactive multimedia created the circumstances for museums to develop and launch their first websites. Computer technologies offered museum professionals much more efficient methods for data processing and management. Sabin writes: "It became apparent that an opportunity may have arisen to open up the information resources of UK museums." Sabin argues that this was also recognised in the wider museum world. For example ICOM's resolution from 1989 recognised that there is "need for dissemination of information on museum objects and their context to increase understanding of cultural heritage, (…) and that proper documentation of museum objects is essential for their safeguarding" (ICOM 1989, Sabin 1997). In order to explain how new technologies can be used in museum documentation and knowledge dissemination, it is necessary to define the process of digitisation.

2.2 The Process of Digitisation

The nature of knowledge in the digital world in relation to digitisation is explained in following words:

> In the digital world, all knowledge is divided into two parts. The binary strings of 0s and 1s that make up the genetic code of data allow information to be fruitful and multiply, and allow people to create, manipulate, and share data in ways that appear to be revolutionary. (Smith 1999)

In order to understand how this may be done, it is important to understand the practicalities of the digitisation process in relation to cultural heritage. The broadest possible definition describes digitisation as the process of converting data from analogue to digital format. More precise definitions of digitisation are proposed by museum institutions, such as museums associations or institutions helping museums in their development, or within digitisation projects. Brochures, websites and other materials produced by them provide slightly more precise definitions. A definition proposed for the purpose of the "Digitisation Guide" published for museums may serve as an example:

> Digitisation describes the process of transferring analogue data to digital data, for instance in the scanning of photographs. For the purpose of this guide it is the process of capturing a digital reproduction of an object so that it can be made available through a variety of media.
>
> Used in the context of the museum sector, it may encompass management process, in particular relating to the curation of digital assets over the longer term, and publication via the web. (Digitisation guide 2009: 3)

However, this brief definition describes neither the project nor its nature. Another definition was proposed within the Athena Project (2008-2011), with the aim of providing new content into Europeana:

> Digitisation is the process of transformation of original (analogue) material into digital form. There are three distinct types of digitisation:
>
> Reproduction – Digitisation with the aim to reproduce the original material in digital form as accurately as possible. This category includes images, sound, and video.
>
> Retrieval – Digitisation with the aim to find and retrieve original material. This category includes scanned and indexed documents, for example contracts, letters etc. The purpose is not an accurate reproduction, but to increase usage of the material.
>
> Procedural – Digitisation with the aim of capturing information from analogue (paper) museum catalogue systems with the aim to implement automated collection management. (McKenna & de Loof 2011)

In practice, these three types of digitisation may occur simultaneously, as the spectrum of material to be digitised in museum is very vast.

Digitisation can be also defined as an automated measurement process capable of producing digital data with constant and well-defined parameters and technical

metadata, but also as a complete and complex process that includes acquiring, processing, managing, archiving, protecting, exchanging and using data (NIMOZ 2011). As it shows, digitisation as a process can be discussed in relation to several aspects, for example: organisation and management, techniques, methods, methodologies and standards to mention only a few. It is particularly important that digitisation, as a process, can be thoroughly planned and implemented. The process can be divided into several steps:

- defining the objectives of the process and selecting the objects;
- defining technical parameters and identifying technical metadata to be collected;
- identifying and selecting descriptive metadata to be collected;
- selecting digitisation methods and equipment;
- planning the process: the security and movement of the objects, organisational structure and human resources, scheduling, organisational and technical infrastructure;
- implementing the digitisation process: data capturing, processing information into raw data, providing technical and descriptive metadata, protecting raw data, processing data into usable formats;
- controlling and monitoring the process: equipment, data and process;
- long-term preservation of data;
- providing access to digital content and disseminating it further. (NIMOZ 2011)

Defining the objectives of the process is crucial in order to proceed with the further steps. Digitisation, as a process of automated measurement process, can be also perceived as a method with several purposes. The overarching goal is to document, disseminate, provide access to digitised materials, to document them and engage with the audience. During the first steps the museum needs to evaluate its collection and to prepare criteria for the selection of the objects to be digitised. These criteria may focus on several aspects, for example the value of the objects, their importance to an audience and physical condition, as digitisation can accompany, support or require other museum processes, for example conservation. The following is a series of questions that should be answered to select the materials to be digitised:

- Should they be digitised? Is the collection important enough, is there enough audience demand, and can sufficient value be added through digitisation to make it worth the cost and effort?

- May they be digitised? Does the institution have the intellectual property rights to permit legal creation and dissemination of a digital version?

- Can they be digitised? Will digitisation achieve the goals of the project, given the physical nature of the materials and their organisation, arrangement, and description? Does the institution have the technical infrastructure and expertise to create digital files and make them available to users now and in the future? (Gertz 2007)

In order to answer these questions, the decision-maker needs to assess a number of issues. The main and basic question is: “Does the content of the material merit the

expenditure of effort and resources? Specific definitions of value and importance vary from institution to institution but cluster around intellectual, historic, and physical characteristics." (Gertz 2007). In order to evaluate whether the materials should be digitised, further questions are posed:

- How do the materials relate to the institution's collecting policy and to its other digital resources?
- Are they rare or unique?
- Do they provide accurate information in their subject area or contribute to broader or deeper coverage? Do they relate to areas poorly documented online?
- Is there a legal need to preserve the materials and make them widely accessible?
- Are they important for the functioning of the institution?
- Do they support current or new high-priority activities?
- Are they aesthetically appealing? Will they display well on-screen? (Gertz 2007)

The audience demand is essential and in order to assess it, the following questions are posed:

- Is there an active, current audience for the materials?
- Is current access to the original materials inadequate, perhaps owing to heavy use of popular items or to restricted access to fragile or costly items?
- If current demand is low, will digitisation attract enough new viewers to justify the cost? (Geertz 2007)

Digitisation should also offer added value. This may be achieved by deploying several techniques, for example by improving searching capabilities. Moreover, combining related materials into one online collection may facilitate usage that a single institution is not able to provide. The materials that are usually hidden in the museums due to their fragility or other restrictions can be safely displayed in the digital environment and they can reveal new information due to technical manipulations (Gertz 2007).

In order to answer the second question, the museum must know whether it is the owner of the legal rights so that the material can be digitised and disseminated. It requires that the museum knows the legal status of all its objects. This may be quite difficult in relation to some objects that for example have been donated many years ago, and there are no receipts or any other documents stating that the legal rights are assigned to the museum. Many digitisation projects start with the process of clearing up the rights to objects.

Answering the last question requires that the decision-maker understands the process of digitisation and all its constraints and steps. It means that there should be necessary expertise to evaluate the condition of the objects and to propose appropri-

ate techniques and methods. Furthermore, the results of the digitisation must be sustained and preserved (long-term preservation).

Skills and knowledge related to the process can be divided into three groups:

- digital representation (techniques, methodologies and equipment);
- metadata (administrative, descriptive, preservation, technical and use);
- management (processes and procedures).

One of the most important issues that needs to be considered is the method of obtaining a digital representation. A very popular way of acquisition of digital representations is digital imaging (MacDonald 2006), which also encompasses several techniques and methods. Imaging is one of the most popular techniques, because it evolved from traditional photographic techniques. In recent years, 3D techniques have become widely investigated, researched and used in the area of cultural heritage documentation (for example Pavlidis et al. 2007, Ikeuchi & Miyazaki 2008, Sitnik et al. 2010). Generally, the most recent research and projects are discussed at the conferences and published as proceedings (for example Ioannides et al. 2006, 2008, 2010, 2012). Each method requires different equipment and determines many steps of the digitisation process, for example the formats of files, data capturing and processing methods. It means that the museum must have certain competencies to be able to undertake a proper digitisation process.

Another important aspect is metadata, as several steps of the process concerns metadata:

> [Metadata] is a construct that has been around for as long as humans have been organizing information, albeit transparently in many cases, and today we create and interact with it in increasingly digital ways. For the past hundred years at least, the creation and management of metadata has primarily been the responsibility of information professionals engaged in cataloging, classification, and indexing; but as information resources are increasingly put online by the general public, metadata considerations are no longer solely the province of information professionals. (Gilliland 2008: 1)

In the context of museums, metadata is a term familiar to all museum professionals involved in the digitisation processes. Table 1 (Gilliland 2008: 9) presents different types of metadata and their functions.

TABLE 1 Types of metadata (Gilliland 2008: 9)

Type	**Definition**	**Examples**
Administrative	Metadata used in managing and administering collections and information resources	- Acquisition information - Rights and reproduction tracking - Documentation of legal access requirements - Location information - Selection criteria for digitization
Descriptive	Metadata used to identify and describe collections and related information resources	- Cataloging records - Finding aids - Differentiations between versions - Specialised indexes - Curatorial information - Hyperlinked relationships between resources - Annotations by creators and users
Preservation	Metadata related to preservation management of collections and information resources	- Documentation of physical condition of resources - Documentation of actions taken to preserve physical and digital versions of resources, e.g. data refreshing and migration - Documentation of any changes occurring during digitization or preservation
Technical	Metadata related to how a system functions or metadata behaves	- Hardware and software documentation - Technical digitization information, e.g., formats, compression rations, scaling routines - Tracking of system response times - Authentication and security data, e.g., encryption keys, passwords
Use	Metadata related to the level and type of use of collection and information resources	- Circulation records - Physical and digital exhibition records - Use and user tracking - Content reuse and multiversioning information - Search logs - Rights metadata

The types of metadata and examples demonstrate that there is a huge amount of metadata that may, or rather should, be created and collected within a digital information system. Gilliland explains the roles that metadata play in a networked environment, where access to information is unmediated:

- certifies the authenticity and degree of completeness of the content;
- establishes and documents the context of the content;
- identifies and exploits the structural relationships that exist within and between information objects;
- provides a range of intellectual access points for an increasingly diverse range of users; and
- provides some of the information that an information professional might have provided in a traditional, in-person reference or research setting. (Gilliland 2008: 6)

It requires that all types of metadata are accurate and up-to-date. Several areas of expertise take part in the process of creating and identifying metadata.

Finally, the museum must be able to manage the whole process. The collection management process can be also standardised. SPECTRUM 4.0: The UK Museum Collections Management Standard (Collections Trust 2011) can serve as an example. This standard has been widely used and developed by the international museum community. Its current, fourth edition, is used by more than 7,600 museums in 40 countries to improve the management, sustainability and use of collections (Poole 2013). The first edition was published in 1994. The standard is developed on the basis of constant feedback from the international community. The standard consists of 21 procedures that describe the activities connected to collections management. The publication is accompanied by SPECTRUM 4.0 Appendix 1, Information Requirements (Collections Trust 2011b) containing information that must be collected in each procedure. There are 45 groups of information, and each of them includes several detailed items of information. In collections management systems that are compliant with the SPECTRUM standard, these information units are included and can be filled in by users (metadata). In Finland, this standard has been also adopted and used to prepare cataloguing instructions as part of the Museum 2015 project[9] and the unified system must be SPECTRUM compliant.

The goal of the standard is to help museums ensure that they follow the best practice in the management and use of their collections (Collections Trust 2011). The procedures describe all the activities related to the management of objects and collections such as: acquisition, loans in, loans out, cataloguing, use of collections, etc. Each procedure consists of a definition and a diagram illustrating workflow. The workflow diagram shows all the persons involved in the procedure, the process, linked procedures and information requirements for each procedure. Digitisation is not a separate procedure, but it is included in several procedures and several persons are engaged at different steps.

Moreover, the development of the museum practices shows that there is a need to expand management processes and cover not only digital files created to document objects, but also all digital materials created and owned by the museum which are digital assets. In museums, digital assets may be for example all types of image, audio, video and text files. Also, the results of digitisation, representations of objects,

9 Tietoa ohjeesta, Luettelointiohjeet, http://www.luettelointiohje.fi/tietoa-ohjeesta/ [25-01-2015]

are digital assets (NINCH 2002). Traditionally, digital material was produced only within the digitisation processes and knowledge was stored in collections management systems (CMS). Nowadays, every museum professional produces a vast number of digital material that is relevant to whole institution and its audience. All these assets can be stored and managed in a digital asset management system (DAM). The new approach to digital assets has been also recognised by the Collection Trusts. In 2013 SPECTRUM Digital Asset Management was published (Collections Trust 2013). It serves as a best practice guide for museums that want to integrate their digital materials management into a collection management practice, based on the SPECTRUM Standard: "In the broadest sense, DAM refers to the processes and practices involved in the creation, description, storage, discovery, re-use and preservation of digital assets." (Collections Trust 2013: 7)

In an introduction to DAM published by the Canadian Heritage Information Network we can read about the activities that DAM includes:

> Digital Asset Management (DAM) includes activities associated with the creation, cataloguing, storing, retrieving and backing up of these assets. The purpose of DAM is to integrate best practices within workflows to improve access to resources and make them available for reuse. (…) DAM is normally undertaken to improve efficiency not only in file management, but all of the following areas:

- file management
- metadata management
- workflow
- policy tracking and enforcement
- access[10]

DAM changes the way digitisation is perceived. It is no longer considered as the only process resulting in digital material that should be managed and preserved: "As museums have learned to value the impact digitised collections make on their audience, they have also come to value the digital surrogate itself as an asset worth tracking and maintaining" (Waibel 2006).

It is quite difficult to compare collections management systems and digital asset management systems, as they may have different functionality and purpose within the organisation. One of the most important differences is a difference in the approach towards digital assets within the museum. A museum can have CMS and manage other digital assents in separate systems or use different tools or solutions, or integrate them into one system, which is DAM. It may seem that DAM is a more advanced approach to management in museums, as it is more integrative and complex. However, some institutions may use many different systems for different purposes, such as conservation, research, rights management, storage or publishing, while some complex CMS's can have the functions of those systems as well. What the advent of DAMs illustrate is that

10 Digital Asset Management in Museums, An Introduction, CHIN's Professional Exchange, http://www.pro.rcip-chin.gc.ca/contenu_numerique-digital_content/fiches_techniques-tip_sheets/gestion_contenus_numeriques-digital_assets_management-eng.jsp [12-12-2014]

digitisation has influenced all museum practices and increasingly complex systems have been developed and used to manage digital content. What is the most important is that the museum must have competencies to be able to manage collection information, regardless what system is used in the institution.

In a project carried out by the Collections Trust with the British museum sector, the Collections Management Competency Framework was proposed: "[it] defines the Collections Management skills and behaviours which a museum needs to develop, manage and sustain collections so that they can be used by the public" (Collections Trust 2014). 14 competencies are grouped into 4 clusters defined as following:

> Audience Focus: maintaining a user focus which responds to audience needs, enhances the use of the collections and validates the museum as authoritative, accountable and efficient;
>
> Technical Knowledge and Practice: Committing to the use of appropriate and up to date standards and practice in the management of the collections;
>
> Communication: Building positive and collaborative relationships, both internally and externally, which advocate for the effective and creative management and use of the collections;
>
> Context: Assuming responsibility for ethical, legal and organisational contexts in the management of collections (Collections Trust 2014)

All these areas are very important in museum work and in professionally managed institutions these competencies are divided among many professionals. In small museums it is much more difficult to have all of them within the team. While small museums have competencies related to audiences, communication and context, technical knowledge is very often limited.

2.3 The relation between digital material and digital heritage

The previous part of this chapter has demonstrated that for the last decades museums have been changing their documentation practices due to the advent of computing technologies. The last years have brought the changes that affected museum collections management practices to the level previously unseen. Museums produce a vast amount of digital material that is related to their collections. In this part the relation between digitised material and digital heritage is discussed. What is the relation between a digitised collection and digital heritage? Can museum websites be considered to be digital heritage?

A definition of digital heritage is presented in the UNESCO's Charter on the Preservation of Digital Heritage:

> The digital heritage consists of unique resources of human knowledge and expression. It embraces cultural, educational, scientific and administrative resources, as well as technical, legal, medical and other kinds of information created digitally, or converted into digital form from existing analogue resources. Where resources are "born digital", there is no other format but the digital object.

> Digital materials include texts, databases, still and moving images, audio, graphics, software and web pages, among a wide and growing range of formats. They are frequently ephemeral, and require purposeful production, maintenance and management to be retained.
>
> Many of these resources have lasting value and significance, and therefore constitute a heritage that should be protected and preserved for current and future generations. This ever-growing heritage may exist in any language, in any part of the world, and in any area of human knowledge or expression. (UNESCO 2003)

Furthermore, "Article 7 – Selecting what should be kept" of the Charter specifies how selection definitions should me made:

> As with all documentary heritage, selection principles may vary between countries, although the main criteria for deciding what digital materials to keep would be their significance and lasting cultural, scientific, evidential or other value. "Born digital" materials should clearly be given priority. Selection decisions and any subsequent reviews need to be carried out in an accountable manner, and be based on defined principles, policies, procedures and standards. (UNESCO 2003)

In this sense, all digital materials produced within the museum and managed in a collections or digital asset management system can be defined as digital heritage if they have lasting value and significance. Moreover, not only digital materials, but also digital systems used to manage these materials can be defined as digital heritage, if they meet certain criteria. According to Fiona Cameron, these criteria are past-oriented:

> Digital heritage according to the UNESCO charter is made on the premise of something to save and preserve rather than something that is created or built. It represents a shift in value - new works so conserved only have value in relation to the past. Nothing is deemed more valuable than that which is inherited from the past. In this sense the idea of digital heritage is a paradox, one which refers to newly created object or media and also to discourses of loss. (Cameron 2007b: 173)

Consequently, one may assume that a digitised collection is already worth preserving as digital heritage, because the objects had been evaluated prior to the digitisation process. It means that they had been classified as objects that should be saved and preserved. In addition, the collection is also made up of objects that went a previous selection. According to the UNESCO definition, a collection that has already been digitised can be defined as digital heritage, even though it seems to be political (Cameron 2007b).

The issue is slightly more complicated in relation to other digital creations, such as websites or virtual museums. In this regard, it is important to consider whether these digital creations are considered as worth preserving. In the European context, mandated institutions are recommended to preserve digital content, also web-content. In the Commission Recommendation 2006/585/EC of 24 August 2006 on the digitisation and online accessibility of cultural material and digital preservation Member states are recommended to "establish national strategies for the long-term preservation of and access to digital material, (…) which contain specific action plans outlining the objectives and a time-table for the specific targets to be met" (European Commission 2006). The implementation of the recommendation is monitored by the Commission and national reports are available online[11]. In Finland digitisation, dissemination and long-term

11 Digitalisation and Digital Preservation, Digital Agenda for Europe - European Commission, http://ec.europa.eu/digital-agenda/en/digitisation-digital-preservation [14-05-2015]

preservation of resources from memory institutions is covered by the National Digital Library, which is a realisation of the national policy and key culture infrastructure[12]. In 2010 a long-term preservation project (LTP) was launched and since then it has been managed by the CSC – IT Center for Science (Pitkäaikaissäilytys. Digitaalisten aineistojen laajuus ja säilytysmenetelmät 2011, Kansallisen digitaalisen kirjaston pitkäaikaissäilytysratkaisun toteuttamissuunnitelma 2012*)*.

"The National Digital Library" project creates a unifying structure that joins activities of different memory and research institutions in relation to digitisation, dissemination and promoting access to cultural material. The Digitisation Policy of the National Library of Finland defines the selection criteria of material to be digitised in relation to its content as follows:

> Selection based on content can emphasise the educational, cultural, historical, aesthetic or entertainment value of items. The criteria in such cases can be defined in the framework of national or international digitisation initiatives or agreed upon with interest groups. Content selection should also take into account the fact that digitisation provides global access to unique and valuable cultural items.[13]

The online material is regularly collected and archived by the National Library of Finland with the use of the method of web harvesting done by an automatic crawler or with the help of the publishers,[14] and it is an implementation of the National Library of Finland's Preservation Policy[15]. There are two types of harvesting: annual and thematic. During the annual harvesting, online material using "fi" and "ax" domains and other domestic webpages are collected. The thematic harvesting is focused on materials related to a variety of materials, for example important or unexpected events, natural disasters, global politics and material disappearing soon after the event (for example sports and cultural events). In addition, also memory and research institutions cooperate in thematic harvesting.[16] This means that museum websites or projects (such as virtual museums) can be harvested. Consequently, they may be defined as digital heritage because they are considered worth preserving.

In the next chapters I present the landscape of virtual museums and their online presence as well as the main research trends. The overview will demonstrate the spectrum of digital creations that have been developed by museums and how the concept of the virtual museum has been defined over decades. Another goal is to show how digitised content may be used in digital creations and the purposes of providing access to digital heritage.

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12 Finland Progress report 2011-2013, Digital Agenda for Europe - European Commission, http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=4493 [30-06-2016]

13 The Digitisation Policy of the National Library of Finland, p. 7, National Library of Finland, http://www.kansalliskirjasto.fi/attachments/5v5daJ8e3/5uhdIBk6X/Files/CurrentFile/NLF_Digitisation_Policy.pdf [25-01-2015]

14 Web harvesting, The National Library of Finland, http://www.nationallibrary.fi/publishers/deposit/webharvesting.html [25-01-2015]

15 Preservation Policy, The National Library of Finland, http://www.kansalliskirjasto.fi/attachments/5v5daJ8e3/5pzFQo6pJ/Files/CurrentFile/NLF_Preservation_Policy.pdf [25-01-2015]

16 Ibid.

3 THE VIRTUAL MUSEUM: THE ORIGIN OF THE CONCEPT AND RESEARCH

This chapter discusses the problematics of virtual museums, answering following questions: How is the origin of the virtual museum discussed in the literature? How is the virtual museum defined? What are current research trends regarding virtual museums?

3.1 The virtual museum, its origins and research

The concept of virtual museums has interested scholars since the beginning of the 1990s. In the early 1990s the Internet became accessible to wider audiences and many museums joined the World Wide Web. However, the origins of the virtual museum may be identified much earlier, in the 19th and 20th centuries (Huhtamo 2002, Sviličić 2010). Both Erkki Huhtamo, a new media archaeologist, and Nikša Sviličić, a communications researcher, who has also investigated Croatian virtual museums (Sviličić 2005), defined the notion of the virtual museum in relation to milestones in the history of media, art and culture. However, while they both propose the same significant influences, which are presented in this section, Huhtamo contributes much more to this discussion. He argues that the origins of the virtual museum are related to the avant-garde movement, the emergence of exhibition design as a new medium, and to the redefinition of the viewer's role.

The historical foundation of virtual museums can be dated back to the late 19th century, when H. G. Wells' book "The Time Machine" was published. In this book, he introduced the term "World Brain" (Huhtamo 2002: 1, Sviličić 2010: 588), which was later developed in a collection of essays, written in the years 1936-1938 and published under the title "World Brain" (Wells 1938). H. G. Wells popularised the idea of the global database storing a complete knowledge of the whole world, with microfilm as a possible storage of the information from other media, such as books and articles (Huhtamo 2002: 1, Sviličić 2010: 588). Brian R. Gaines considers the World

Wide Web as "a primitive implementation of the information highway", and there is a line of continuity between the concept of "world brain" and the World Wide Web (Gaines 1996).

Both Huhtamo and Sviličić identify the role of futurism as a theoretical assumption preceding the development of virtual museum. Sviličić argues that futurism, as a movement, was one of the important preconditions that ideologically preceded the creation of the museum on the Internet (Sviličić 2010: 588). He considers Filippo Tommaso Emilio Marinetti's "Futurist Manifesto" to have been an important intellectual contribution to the discussion on the development of the idea of the virtual museum, because it is based on the renewal of human sensibility caused by technological inventions (Sviličić 2010: 588). However, Huhtamo goes further in considering the impact of futurism, because art based on these new technological developments was "obviously not easily compatible with existing cultural institutions and the ideologies on which they were grounded" (Huhtamo 2002: 4).

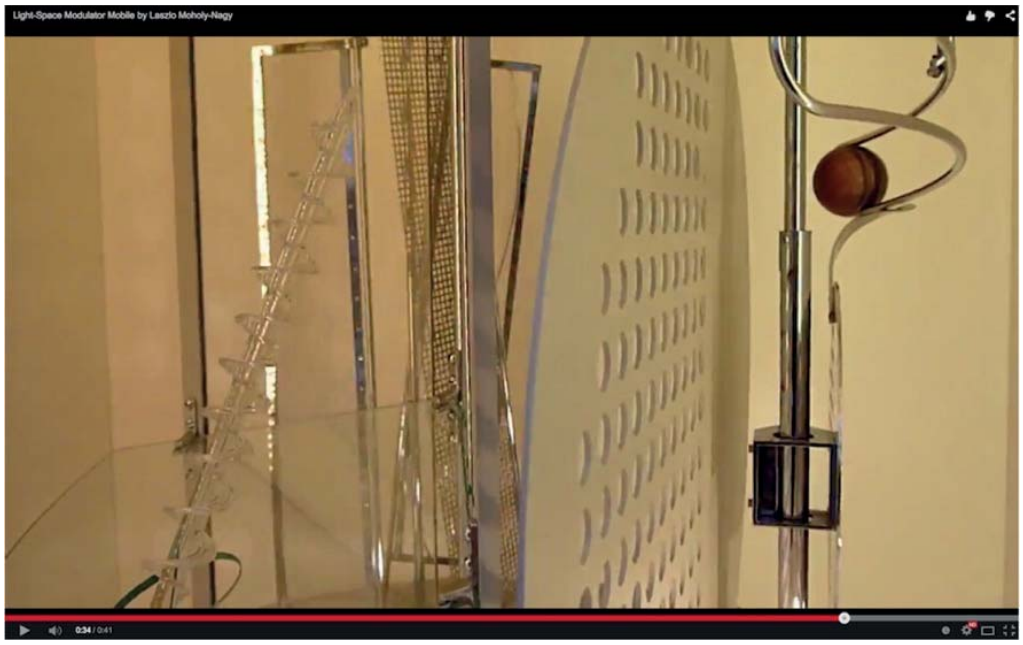

FIGURE 3 The Light Space Modulator

László Moholy-Nagy The Room of Our Time with the Light Space Modulator. Commissioned by Landesmuseum, Hannover, 1930. An early example of multimedia exhibition design. http://youtu.be/hAXBL8bDyr0

In the early 1920s some avant-garde artists were searching for new ways to display their work, and accordingly the key factor in respect to the origins of virtual museum was "the emergence of exhibition design as a new medium" (Huhtamo 2002: 3). Huhtamo argues that the first avant-garde artists-designers, as he describes them, such as László Moholy-Nagy, El Lissitzky, Herbert Bayer and Frederick Kiesler, who used new technological inventions, changed the ways of perceiving and conceiving

the world. They examined the possibilities of new technological media and redefined exhibition design in relation to the viewer's experience. The visitor was an active participant, surrounded completely by integrated exhibits and the display. The participant was encouraged into "a dynamic relationship with the space and all its dimensions and elements" (Huhtamo 2002: 6), and "the technology was used against collective consumption typical of mass media and for individualised and customised experience" (Huhtamo 2002: 9).

Another milestone identified by Huhtamo and Sviličić are the ideas of Walter Benjamin and André Malraux, as well as the concept of "memex" coined by Vannevar Bush and the Xanadu model. In "The Work of Art in the Age of Mechanical Reproduction", Walter Benjamin (1936) announced the arrival of a future museum, which made use of special techniques to multiply and disseminate knowledge to everyone. The original was seen to be disappearing, as it was replaced by numerous copies (Sviličić 2010: 588, Huhtamo 2002: 3). Mechanical reproduction and the spread of photography also inspired André Malraux, who questioned the traditional role of the museum and invented the "imaginary museum without walls" (Malraux 1947 in Huhtamo 2002: 3, Sviličić 2010: 588).

At the same time, Vannevar Bush, in the article "As We May Think" published in the Atlantic Monthly (Bush 1945) presented the concept of "memex", which has influenced the development of the World Wide Web (Huhtamo 2002: 1, Sviličić 2010: 588). Bush defines the concept of memex as a hypothetical

> device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory. (Bush 1945).

Bush also describes the essential feature of the memex: an associative indexing, "the basic idea of which is a provision whereby any item may be caused at will to select immediately and automatically another" (Bush 1945). For Sviličić, the memex and the associate indexing "were the first serious guidance to the structuring, processing and distribution of multimedia documents that made foundations for the development of the online museum" (Sviličić 2010: 588).

However, Sviličić admits that there was also another conceptual model that may be considered as a more "realistic assumption for the nonlinear structure of the information used today" (Sviličić 2010: 588). It was the hypertext project founded by Ted Nelson in the 1960s, called "The Xanadu model". The Xanadu model is described as "an alternative paradigm for a computer universe" or "a mental model" representing the architecture of interlinked digital content (Nelson 1999: 2). The memex is considered by the hypertext community "as the cornerstone of their heritage" and it still inspires scholars (Davies 2011). There is a strong connection between the concept of the memex and the development of the World Wide Web (Gaines 1996). Huhtamo illustrates how the idea of the networked hypertext was investigated in the museum context in the exhibition entitled "The Museum Inside the Telephone Network" organised in 1992 by the Project InterCommunication Center, founded by the Japanese telecom organisation (Intercommunication 91 in Huhtamo 2002: 2). The exhibition was meant as a model for an "invisible museum" and was accessible to home users through telephone, fax and in a limited sense computer

networking. It was moved later to the Web (Intercommunication 95 in Huhtamo 2002: 2).

While both Huhtamo and Sviličić present the same milestones as important for understanding the origins of the virtual museum, only the last example, "The Museum Inside the Telephone Network", is actually an attempt to use new technologies in constructing new forms of virtual museums. It is difficult to evaluate how the selected milestones actually influenced the development of virtual museums. In many museums, the first technologies were introduced to manage collection information. With the advent of widely accessible Web technologies museums opened up their collections in a new way. As further examples show, it was definitely the availability of new technologies that influenced the development of the virtual museums.

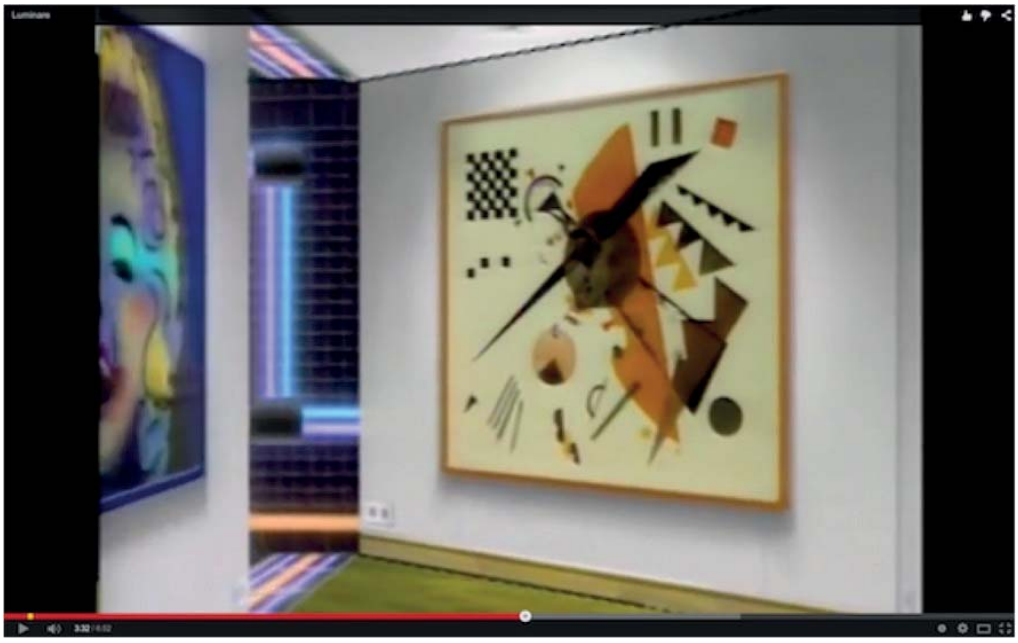

FIGURE 4 Screenshot from Luminaire; virtual gallery.

In 1985, a bit earlier than "The Museum Inside the Telephone Network", another example of the "virtual gallery" was created by Dean Winkler and John Sanborn (Huhtamo 2002: 4, Sviličić 2010: 589). "Luminaire"[17] was a videotape work lasting 6:54 seconds, combining 3D computer graphics, dance, interactive digital video effects and a representation of art gallery. At the time, 3D technology was regarded as very spectacular and there were other projects demonstrating the possibilities of this technique in museums. The first virtual museum, the CD-ROM "Virtual Museum", was developed as a research project by Apple Computers. The "Virtual Museum" was in QuickTime Virtual Reality (QTVR), in which the user could walk around to look at objects (Gere 1996: 9). The project was launched at the SIGGRAPH in Chicago in 1992. Soon after its premiere, a number of CD-ROMs were produced by museums,

17 Luminare, uploaded 19 Jun 2009 by dean358, http://youtu.be/8lp3yC2KdpU [26-10-2012]

such as the Musée d'Orsay, the Louvre and the Hermitage. Because CD-ROM has much more capacious successors, such as DVD and Blue Ray, Sviličić predicted that the introduction of "new, faster and safer storage media will most likely affect the technological progress of online museums" (Sviličić 2010: 590).

Huhtamo gives also an example of the historical precedents, such as an interactive work by Jeffrey Shaw created in 1990 and entitled "The Virtual Museum"[18]. The installation consists of a motorised rotating platform and a large screen. Both the platform and movement on the screen were controlled by the user, who could "virtually" walk through the museum spaces. Huhtamo writes:

> For Shaw, the virtual museum is a location that transcends the physical space, opening up new possibilities for both art and its display. For him, merely replicating existing physical space does not make any sense. Last but not least, Show's work also shows that there is a line of development connecting interactive media art installations with the innovative exhibition design by Moholy-Nagy, Kiesler and others. (Huhtamo 2002: 13)

FIGURE 5 Jeffrey Shaw, "The Virtual Museum", 1992.

Screenshot from the movie presenting the installation, http://www.jeffrey-shaw.net/movies/088_001.mov

18 Jeffrey Shaw, http://www.jeffrey-shaw.net/html_main/frameset-works.php [26-10-2012]

Shaw has continued his exploration of new media, which resulted in a number of installations that have influenced the cultural heritage field. His most recent immersive exhibits are presented below in this chapter.

In this context, it is important to demonstrate how the concept of the virtual museum was defined by practitioners in the museum context. The first virtual museums were developed by the biggest museums as separate CD-ROM products. The term "virtual museum" was discussed for the first time in a practical context in a paper presented by Dennis Tsichritzis and Simon Gibbs (computer scientist at the Centre Universitaire d'Informatique, University of Geneva) at the International Conference on Hypermedia and Interactivity in Museums in Pittsburgh in 1991. In their paper entitled "Virtual Museums and Virtual Realities", Tsichritzis and Simon define the notion of the virtual museum, describe the implemented technologies and finally propose a prototype of the virtual museum (Tsichritzis & Gibbs 1991). According to them, the virtual museum is defined in relation to the traditional museum, which is a setting allowing people to admire artefacts. The virtual museum is "a virtual setting accessible from a telecommunication network in a participatory manner", while a virtual setting is "a computer model of a setting" (Tsichritzis & Gibbs 1991: 18). The operation of traditional, real museums is characterised by constraints that may be eased in the virtual setting. First, the artefacts are supposed to be real. In the virtual museum, the real artefacts may be replaced by multimedia representations stored in a database accessible through computer programs. Traditionally, the setting within which the artefacts are displayed is also real, but it may be also a virtual setting, within which the multimedia representation of the real artefacts (virtual artefacts) may be displayed. The third constraint is the proximity to the artefacts, which in the virtual museums does not play a role. Finally, in the virtual setting the artefacts may be "active" so the visitors can activate them, which is impossible with the real objects in the real setting.

According to Tsichritzis and Gibbs, the technologies used to construct a virtual museum include high band networks, multimedia workstations, hypertext (hypermedia), interactive 3D graphics, groupware and active objects (Tsichritzis & Gibbs 1991: 19-20). They proposed the scenario of the virtual museum they were working on within the research project. The virtual museum can be a 3D model of a real or imaginary museum setting, with floor and artefact localisation plans. Most of artefacts can be represented with high resolution images and video clips, because "most artefacts would be too complex to handle as 3D objects (plus data would be very time-consuming to acquire)" (Tsichritzis & Gibbs 1991: 20). Users can activate and learn about artefacts through textual description, graphic or video. Moreover,

> a museum server may allow multiple clients, i.e., groups may enter the museum. In this case the server coordinates and broadcasts group state information (such as the localizations of all members of the group) (Tsichritzis & Gibbs 1991: 20).

Finally, Tsichritzis and Gibbs discuss how this kind of initiative should be organised and what stakeholders should participate in constructing virtual museums, as the museums have "raw data", but they lack technological facilities. They perceive the role of the museum as assuring "proper historical and scientific control of what is displayed" (Tsichritzis & Gibbs 1991: 24).

This definition includes several technological descriptions, which may sound very naïve 20 years later. There are some important aspects of Tsichritzis' and Gibbs' definition, which are very relevant to other definitions. Firstly, the virtual museum is defined in relation to a real, physical museum. It is quite usual to think about virtual museums as a distinct "setting" and to define the virtual museum using the characteristics of a physical museum, such as "artefacts", "display" and "exhibitions". Secondly, the virtual museum is defined by the technologies used to create it, and to the advantages, disadvantages and challenges of certain technological solutions. Thirdly, an important element of the definition of the virtual museum is how visitors behave in virtual museum as separate visitors or groups, and how they may interact with each other and with artefacts. Finally, Tsichritzis and Gibbs argued that there is concern about control over the resources, how museums may disseminate the knowledge on the collections in the digital environment and role of the museum as a stakeholder in a digital initiative. Similar technology-oriented definitions, are relevant in more recent projects, such as a project entitled "Virtual Museums", a research project conducted by the Human-Computer Interactions and Virtual Reality Research Group at the Department of Informatics of the University of Athens (Charitos et al. 2000). The aim of the project was to create a virtual reality environment and to enable online visitors to view and manipulate the museum's 3D exhibits (Charitos et al. 2000: 2).

Tsichritzis and Gibbs, however, have not addressed the potential of the Internet as a tool combining resources from different sources and facilitating networking. This has been addressed by museum professionals George MacDonald and Stephen Alsford in their paper delivered at the American Association of State and Local History 54th Annual Meeting in Omaha in 1994:

> (…) the collections of information in diverse forms held by heritage institutions can be seen as the dispersed physical pieces of a gigantic puzzle which, if converted into electronic format, could perhaps be put together to present us with new perspectives on human history. (MacDonald & Alsford 1994).

Consequently, for them the virtual museum is:

> (…) much more than the electronic dimension of any given institution. It is where knowledge resources of multiple institutions come together, seamlessly (as far as the knowledge seeker is concerned), in the virtual space of the Infobahn to make possible unprecedented explorations of heritage. (MacDonald & Alsford 1994)

This trend has been very visible in museums or museum projects that are trying to connect the resources of different museum by making their collection data open and interoperable. The idea of a virtual museum as a vehicle to disseminate knowledge of collections in the digital environment has been explored by many other researchers, and has strongly influenced the discussion on the design of and research on virtual museums. Moreover, information generation and acquiring, preservation, organisation and dissemination are of concern to all museums (MacDonald 1992: 161). Werner Schweibenz, a researcher working in museum documentation and new technologies, draws on the earlier research on virtual museums (Andrews and Schweibenz 1998) and proposes the following definition of the virtual museum:

> [The virtual museum] is a logically related collection of digital objects composed in a variety of media, and, because of its capacity to provide connectedness and various points of access, it lends itself to transcending traditional methods of communicating and interacting with the visitors being flexible toward their needs and interests; it has no real place or space, its objects and the related information can be disseminated all over the world. (Schweibenz 1998: 191)

Museologist Andrea Witcomb argues that due to "electronic technologies", museums are facing a move from objects towards information (Witcomb 1997). Moreover, she suggests that:

> Taken to the museum, this means that the move from objects towards information, a movement which is associated with electronic technologies, should lead critical analysis away from a focus on questions of representation towards a concern with articulation – how the museum is connected into and operates through other channels of communication, such as television, the Internet, and film. (Witcomb 1997)

Witcomb elaborated on this idea in her further publication, in which she defines the virtual museum "as an electronic media space in which images of museums, collections and displays precede or become superimposed on actual museum objects and displays" (Witcomb 2003: 119).

The relation between the real and the virtual museum has been relevant to the discussion on the definition of the virtual museum since the definition proposed by Tsichritzis and Gibbs. Very often on-site and online museums have been seen as opposite entities, and this has affected museum professionals, who have been afraid that the possibility of online visits will reduce the number of visitors to the real institution. Immediately, there were also opposing voices stating that the Internet should not be perceived as a challenge instead of a threat:

> … it should be recalled that online facilities are complementary to traditional museum services; "virtual museums" will not replace real museums, but instead should be used as a tool which encourages actual visits to actual museums" (Bowen 2000: 7).

Moreover, it has been stressed that these two entities, online and on-site museums, are changing each other and redefining the museum (Müller 2002: 31). Even more technologically oriented researchers have admitted that virtual museums do not replace on-site museums:

> [virtual museums] can be characterized as "digital reflections" of physical museums that do not exist per se, but act complimentarily to become an extension of physical museum exhibition halls and the ubiquitous vehicle of the ideas, concepts and "messages" of the real museum. Their primary aim is (or should be) to investigate and propose models for the exploration of the real purpose and conceptual orientation of museum. (Styliani et al 2009: 526)

It seems that new mobile technologies have changed this discussion radically, because the distinction between on-site and online has been blurred. This has resulted in a new, critical approach to the virtual museum. Museum professional Kevin Sumption discussed the concept of the ubiquitous museum that replaced the concept of the virtual museum and critically approached the discussion between the virtual and the real: "the ubiquitous museum seeks to open new channels for face-to-face

mediated interaction, as well as automated dialogue". Museum combines both analogue and digital media to establish a new kind of interaction between visitors, museum media and museum staff:

> the ubiquitous museum makes no distinction between virtual and real visitation: instead, it seeks to provide opportunities and technology to support the continual and cyclical use of the museum's entire knowledge arsenal. (Sumption 2006)

Sumption concluded that a number of techniques and technologies are used in order to "nurture a symbiotic relationship between both physical and virtual museum domains" (Sumption 2006).

In the last decades, the most important contribution to the debate on virtual museums has been made by the researchers from the V-Must network of excellence. The network is focused on virtual museums and its objective is to research and develop tools and methodologies to create sustainable, educational and enjoyable virtual museums. The project was launched to overcome the dispersion of theoretical and practical research and initiatives on virtual museums to develop this area (Virtual Museums Transnational Network 2009: 3). Within the network, the current definitions of the virtual museum have been reviewed (for example Andrews & Schweibenz 1998, Djndjian 2007, Antinucci 2007, as well as widely known and used definitions from Wikipedia, The Free Dictionary and Encyclopaedia Britannica) and three versions of a definition of the virtual museum were proposed by researchers Augusto Palombini, Victor Menchero Lopez and Sofia Pescarin (Ferdani 2013, Farouk & Pescarin 2013). According to the third version or a working definition, VM is defined as:

> (…) a communication product that is accessible by the general public and which focuses on the topics of tangible or intangible heritage. Such use various forms of interactivity and immersion for the purpose of education, research, enjoyment, or enhancement of visitor experience. In digital heritage the concept of Virtual Heritage is mainly intended to be used to refer to digital creation. (Pescarin, Clay & De Luca 2013: ix, Farouk & Pescarin 2013)

Most importantly, the definitions have been a starting point for the further work and investigation of a wide spectrum of digital creations, not only online VMs, but also digital creations that are developed to function in a museum's physical environment, such as kiosks, immersive systems, virtual theatres and so on:

> [it] should allow us to reach a new, more analytical and objective definition of VM, for the identification of a larger number of VMs in the world. (Menchero Lopez & Grande 2012: 2)

In the further work the main categories of VMs have been identified and used to classify a virtual museum. VMs are classified in relation to their content, interaction technology, duration, level of communication, level of immersion level of sustainability, type of distribution and scope. This is the first extensive research on virtual museums of such broad definition and the first methodology proposed to develop sustainable, educational and entertaining digital creations for the heritage sector. This demonstrates that currently we have reached a new step in discussion and research on virtual museums.

In this research, the last definition (Pescarin, Clay & De Luca 2013) is adopted. The V-Must network's categories and terminology have been also used in this research. The classification of the Finnish virtual museums is presented in Chapter 7. It is important to mention that in the Finnish context there is very little research or literature on the subject. In 2003 Sanna Järvinen (student at the School of Art and Design who investigated museum digital services in her Master's thesis) argued in her article "Verkkomuseo, verkkonäyttely vai digitaalinen tietokanta" ("Online museum, online exhibition or digital database") for a more precise use of these terms (Järvinen 2003), According to Järvinen, the online exhibition is defined as an exhibition created specifically for the Internet, the digital database is an online catalogue of museum collections, and the virtual museum is superimposed on the physical museum and its virtual spaces can be visited by the online visitor, in the same way as the physical building (Järvinen 2003).

To conclude, as these examples show, the origins of the virtual museums are related not only to the development of the World Wide Web, but rather to wider cultural, artistic, technological and intellectual innovations. Consequently, the virtual museum as a concept depends on the context within it is defined and on the historical challenges that it faces. As a result, the virtual museum is a very vague concept. For media archaeologist Huhtamo, it is an institution at the early stage of its development that was anticipated by innovations in the fields of exhibition design and interactive media art. It is an intellectual concept that has been investigated by early avant-garde artist-designers and embodied in their works. The emergence of exhibition design as a new medium redefined the role of the viewer, who became an active participant. The experience was designed for individuals, not for the masses. However, it is difficult to evaluate how they really influenced the development of virtual museums.

In the discussion on virtual museums in the museum world as presented earlier in this chapter, two trends can be recognised. On the one hand, there are strictly technological definitions, describing the technologies and elements used to develop the virtual museum, and these have emerged with the advent of the World Wide Web. These definitions hardly ever discuss the proposed model of the virtual museum from the museological point of view. On the other hand, there are attempts to define the virtual museum in relation to the museum institution and its role. These definitions abandon technological constraints. Instead, they are very often focused on communication and on the dissemination of information on collections. It has been also recognised that knowledge of collections is not only in the catalogues that can be dispersed in the digital environment, but also depends on the persons that maintain museums. Moreover, the digital heritage projects developed in the first decades of the 21st century that are discussed later demonstrate that digital tools should facilitate not only the dissemination of knowledge, but also negotiation and creation. Knowledge negotiation and creation are processes that involve many participants, not only people involved in museum work. This tendency has been strengthened by social media tools. An important contribution to the discussion and research on VMs is connected to the broad European network of excellence aiming at the creation of a new, shared paradigm for the creation and deployment of VMs. The network proposes a new definition of VM that incorporates all aspects that have

arisen in the debate on VMs in the last decades. Most importantly, the project proposes a new methodology and terminology to analyse and develop VMs.

3.2 Summary

The literature on the origin of the concept of the virtual museum (Huhtamo 2002, Sviličić 2010) shows that several milestones from the area of art and emerging technologies can be identified, dating back to the late 19th century. The historical foundations of the virtual museum are linked to a concept of "world brain" (Wells 1938), which is also considered as preceding the World Wide Web (Gaines 1996). The ideological preconditions of the creation of the online museum are connected to the Italian avant-garde art movement - Futurism (Huhtamo 2002: 2-4, Sviličić 2010: 588). Avant-garde artists and designers experimented with new technologies, which, in consequence, led to redefining exhibition design in relation to the experience of the viewer, who became an active participant. Another milestone is marked by Walter Benjamin's ideas on special techniques used to disseminate knowledge, André Malraux's concept of the "imaginary museum without walls", as well as the concept of "memex" coined by Vannevar Bush and the Xanadu project founded by Ted Nelson (Huhtamo 2002, Sviličić 2010). But it is difficult to evaluate to what extent they influenced the development of virtual museums, as many of them evolved from the collection information management, not artistic explorations.

The first virtual museums developed with and for museums as separate products were created in the early 1990s, but still artistic explorations preceded many of the digital heritage projects. The first virtual museums were developed only by the largest museums. In the literature on the subject, the first definitions of the virtual museum were proposed also in the early 1990s in connection with conferences on new technologies and museums (Tsichritzis & Gibbs 1991). The first definition was highly technical and descriptive (Tsichritzis & Gibbs 1991), and the virtual museum is considered an additional part of a physical institution. These characteristics can also be seen in more recent definitions proposed in technology-oriented projects (Charitos et al. 2000). Further definitions (for example MacDonald & Alsford 1994, Witcomb 1997, 2003, Bowen 2000) stressed the potential of the Internet as a tool providing access to resources from many institutions and facilitating communication between the museum and its audience. The virtual museum is not an additional, electronic dimension of an institution, and does not replace it. Instead, it is a complementary extension of physical institution (Styliani et al. 2009), or even the distinction between them was blurred and the both concepts were replaced with "the ubiquitous museum" (Sumption 2006), which combines both analogue and digital media to facilitate interaction between visitors, museum media and museum staff.

The important voices in the debate on the virtual museum come from the European network of excellence, the V-Must project. The project's objective was to develop tools and methodologies to create sustainable, enjoyable and educational virtual museums. The project was proposed to develop research and initiatives concerning virtual museums both in theory and practice, because the area was consid-

ered by the project proposers to be fragmented and underdeveloped (Virtual Museums Transnational Network 2009: 3). The working definition of the virtual museum proposed within the network defines the virtual museum as a product accessible to the public that focuses on both tangible and intangible heritage, and different forms of interactivity and immersion that are deployed serve several purposes (Pescarin, Clay & De Luca 2013, Terminology, Definitions and Types for Virtual Museums 2013). Furthermore, the working definition is used to investigate not only online virtual museums, but all kinds of digital creations functioning within heritage institutions. The project proposes not only definitions, but also a framework and terminology to develop sustainable, educational and entertaining virtual museums. The project has taken the discussion on virtual museums to the next level.

4 TRENDS IN THE DEVELOPMENT OF VIRTUAL MUSEUMS (2000-2010)

4.1 Introduction

This chapter presents several digital projects developed with and for museums. This part answers the following question: What are the current trends in creating and presenting cultural and digital heritage online?

The selection of the projects presented here is based on a set of criteria. First, a number of projects were selected in order to illustrate the concepts of the virtual museum. These projects were an attempt to create virtual museums, or illustrate how virtual museums are practically constructed. The selection is not systematic in terms of spatial coverage. This is partly due to the characteristics of digital projects. While they are global and constantly accessible from every place in the world, they are still very context-dependent. There are many factors that determine whether the project can really be understood by all visitors, who do not e.g. know the language of the project. Consequently, the selected initiatives are mainly in English. However, one of the most important criteria behind the selection of these projects is the availability of information on them. Some of them were also research projects, and thus followed by publications. Many of them were also presented at museum conferences, which means that there was some information available on them. I am aware that this selection may exclude some interesting and important developments, but as they are not widely known, they can neither influence nor inspire many museum professionals or developers. In this part, also the Finnish projects are presented. These initiatives are not so obviously focused on virtual museums, but are important for illustrating the development of virtual museums in Finland. In the review of non-Finnish projects, I focus more on influential and widely known projects that illustrate certain trends in the museum world. It is certainly obvious that Finnish projects (accessible to a rather small audience due to the language) are not so widely known. However, it is important to present this Finnish background in order to place the prototype within this context.

Digital projects are by their nature constantly changing and this has complicated this review. I started this review in 2008 and a few years later some of the projects became obsolete. Even though there are some screenshots presenting the initiatives, or it is possible to receive them, it is rather hard to recover the way the website was designed to function and the users can no longer experience it. Thus, this review does not focus on the interactivity of the project. Instead, it is an attempt to demonstrate certain phenomena of museums and the Web and how these projects contribute to the idea of the virtual museum. In relation to temporal coverage, the selected projects have been mainly launched between 2000 and 2010, but there may be some important exceptions, from the early 1990s or the newest initiatives. In 2016 I updated this chapter and added newer examples of museum projects based on big data, artificial intelligence and machine learning.

4.2 Companies and museums – excitement and experience

The second decade of 21st century has brought a number of initiatives that have been developed not only by museums, but also by companies cooperating with museum professionals. These examples are quite important for demonstrating that technologies developed in a commercial environment can be used in a museum setting as well. It also shows that even though most of the museums would not be able to afford to use these technologies and develop projects of this kind on their own, this is achievable in cooperation with companies.

Widely known technology, such as Street View used in Google Maps has also been applied to cultural heritage, in a project called the "Google Art Project". Launched in 2011, the "Google Art Project" is a collaborative project of Google and famous museums and art galleries from around the world. The project consists of virtual gallery rooms made with Street View technology, panoramas and high-resolution digital images of the artworks. The artworks were digitised at such high resolution that they may be explored at the level incomparable to the experience offered during a real visit to the museum. All the details that cannot be studied in the gallery and that are not visible even from a short distance, are available to the online user who can zoom in on the artwork. The artworks include additional information – "viewing notes", tags, "artist information" and links to external sites, for example to the museum's own websites or to Google Scholar. There are also additional media, such as embedded movies from the museum's own YouTube channels and from the Google Art Project's channel. Some videos have been made in collaboration with the Khan Academy (Harris & Zucker 2012). The users can make their own galleries and share them with others.

There has been lively discussion about the "Google Art Project" in the museum world (Proctor 2011) and was also presented and discussed at the Museum and the Web 2011 conference[19]. Some of the concerns were related to collaboration model

19 Sessions, Museums and the Web 2011 (MW2011), http://www.museumsandtheweb.com/mw2011/sessions.html [07-08-2014] There are several posts on Google Art Project, for example: Museums and the Web – in praise of

between Google and the museum, which seems to be quite closed: for example, museums cannot use Street View technology in temporary exhibitions or to make their own tours, and web statistics are not public. The general reception of the project was positive, as it convinced museum professionals, for example curators, that new technologies have great potential for museums. According to Beth Harris and Steven Zucker from the Khan Academy "The Art Project" succeeds because the museum expertise plays an important role in content creation – reliable information [20] and connects resources from different institutions. They see enormous educational potential in the project, because the resources from different countries can be easily accessed, compared and used by its users, and what is most important, the users can also create and share galleries.

The participating museum's directors are very optimistic about the impact and possibilities that the "Google Art Project" has given to their institutions. According to them, this collaboration is a unique opportunity to disseminate the knowledge of their collections by making their resources accessible at a scale that has not been possible before, attract new visitors and encourage them to visit the physical museum, as well as it creates a new kind of experience (Google Art Project Press Site 2011). In 2012, the artworks from the Espoo Museum of Modern Art and Ateneum in Finland could be explored online. The Ateneum's motivation to join the project was also connected to educational opportunities:

> Our point of view is primarily educational: Google Art Project is an excellent way to make art available for those who are unable to visit museums and see the works there. Ateneum is the Finnish national gallery, and it is a fundamental aspect of this status to make our collection known and accessible to audiences beyond our museum premises as well. (Ateneum Art Museum 2012)

Interestingly, the "Google Art Project" has not been extensively discussed in museological literature and there are only a few academic publications on this project, such as "Seeing Syntax: Google Art Project and the Twenty-First-Century, written by a scholar of visual culture Kim Beil's article Period Eye (Beil 2013). Beil argues that high-resolution images can be considered as tools of historiography, as "visual texts" (Beil 2013: 22), which tells not about their subject, but the context of creation. We can see that we value specific qualities of reproduction, such as their high resolution, sharpness, high contrast and interactivity, even though they cannot be achieved in a physical environment. It shows that we value these attributes, because we have been trained to do it thought constant experience with digital images and computers (Beil 2013: 25-26). Other publications are students' dissertations (Panagiotopoulou 2011 and an article based on this thesis - Panagiotopoulou et al. 2014, Bayer 2014). Media student Ioanna Panagiotopoulou investigated whether virtual art spaces such as the "Google Art Project" globalises and democratises the art experience. The results

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Google Art, Museum Musing, Julian Bickersteth (2011) http://bickersteth.blogspot.com/2011/04/museums-and-web-in-praise-of-google-art.html, Google Art Project: the launch / Tate, James Davies (2011), http://www.tate.org.uk/context-comment/blogs/google-art-project-launch [07-08-2014]

20 Re-imaging museums, Beth Harris and Steven Zucker, 30.05.2012, Comment, Museums Association, http://www.museumsassociation.org/comment/30052012-why-the-google-art-project-is-important [07-07-2016]

show that the main audiences are from the West, well-educated and may be considered as the global art elite. For the younger generation, also the edutainment nature of the project is highly valued, as they do not obviously consider these museum spaces as cultural. Through navigating the site and critical engagement, experiencing virtual museum may be also stimulating, evoking memories and emotions, and encouraging visitors to experience more and more art in both virtual and physical environments (Panagiotopoulou et al. 2014). The Google Art Project is also studied as a project that may help art institutions open up, but also as a commercial initiative that may dominate other voices (Bayer 2014).

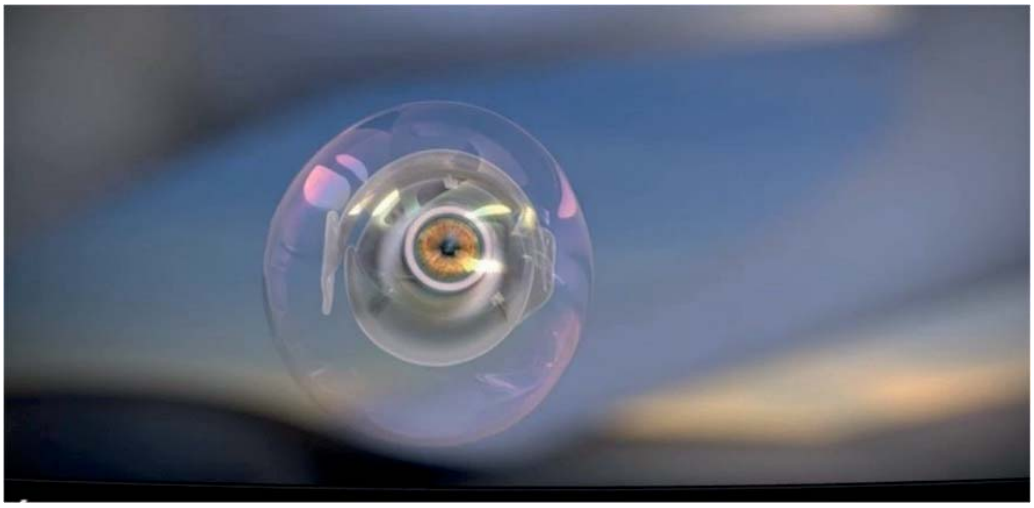

FIGURE 6 The Adobe Museum: a guiding device

The "Google Art Project" is not the only digital project that has been launched to make art more accessible with new technologies. In 2011, Adobe launched the "Adobe Museum of Digital Media". The museum was designed as a 3D virtual gallery space for displaying new media artworks. Unlike the digital representations of the physical museums created by the "Google Art Project", the "Adobe Museum" exists only in the digital environment. The mission of the "Adobe Museum" is:

> to showcase and preserve ground-breaking digital work and expert commentary to illustrate how digital media shapes and impacts today's society. Open 365 days a year, 24 hours a day, and accessible everywhere, AMDM is a place to reflect on the importance and impact of digital media in our lives. The museum is an ever-changing repository of eclectic exhibits. Shows will be curated by leaders in art, technology, and business to inspire fresh conversation about our constantly evolving digital landscape.
>
> (AMDM, http://www.adobemuseum.com)

The "Adobe Museum of Digital Media" is an embodiment of the already presented definition of the virtual museum as the "digital reflection" of the physical museum, functioning to become the ubiquitous vehicle for communicating the ideas, concepts and messages of the real museum (Styliani et al. 2009: 526). This has not been re-

searched in relation to this museum, but it has been in the context of the virtual museums and galleries in Second Life and their museum practices – or rather "museum-like" practices, as the authors define them (Urban & Marty & Twidale 2007). The Adobe Museum has been developed by artists. It is as a "repository of eclectic exhibits"; it is also "dedicated to the medium"; and reflects "on the constantly evolving digital landscape". It reminds us of the avant-garde artists and their explorations (Huhtamo 2002).

Interestingly, the Adobe Museum could no longer be accessed in 2014. The website informs that the resources are being redirected to Adobe's global corporate responsibility initiatives, and the same text is still online in 2016[21]. The project cannot be accessed through Internet Archive Way Back Machine[22] either, because it was implemented in Flash technology. It shows how fragile virtual museums are and how difficult it is to fulfil the museum's mission in the context of its digital creations.

4.3 Museums and new realities

While the "Google Art Project" and the "Adobe Museum of Digital Media" have explored to the same extent the relation between the virtual and the real, there are projects that have been focused on the solutions that are exploring and combining these two dimensions. Museums are very actively experimenting with, for example, augmented realities. Mobile apps have become recently very popular and it seems that the number of them will be growing. Maria Economou and Elpiniki Meintani, academic researchers investigating new technologies in museums, evaluated mobile applications, and as part of their research listed mobile apps developed by museums (Economou & Meintani 2011). In 2010, they identified 71 museum mobile apps with interactive and multimedia features, and 7 applications having features of augmented reality developed by museum institutions (Economou & Meintani 2011: 89).

There are many examples of mobile virtual museums, for example: "Street Museum" (Museum of London 2010) "Street Museum Londinium" (Museum of London 2011), apps developed by the Museum of London in cooperation with the Brothers and Sisters creative agency. The objective behind the development of two applications for the Museum of London is to disseminate information on the collections in a provocative manner (Museum of London 2010). The apps are based on digitised content from the collections. There are also apps developed within larger projects, such as "Matera Tales of a City" (2012)[23] coordinated by CNR ITABC and consisting of a website, cultural content and mobile apps created for visitors to the Italian Matera's historical centre (the World Heritage Site).

Mobile virtual applications with their way of deploying new technologies can be characterised as the ubiquitous museum (Sumption 2006). Technology is used to

21 Adobe Museum of Digital Media, http://www.adobemuseum.com [07-08-2014]
22 Internet Archive Way Back Marchine /Adobe Museum of Digital Media, http://web.archive.org/web/20140401000000*/http://www.adobemuseum.com [07-08-2014] and [07-07-2016]
23 Matera Tales of a City, http://www.materacittanarrata.it/homepage.asp [07-08-2014]

provide constant access to information on the collections and to establish new ways of using it. The museum may be seen as dispersed: traditional museum practices are not limited to on-site visitation, but can take place in any environment where the user is. In this sense, the distinction between the online and on-site museum is no longer valid. Museums exist in different spheres, which cannot be easily separated. However, there is a strong tendency in museum studies to consider them as distinctive spheres. Drawing on the constructivist theory of learning museum researcher Lynda Kelly, (Hein 1991, 1998 in Kelly 2011) developed the model of the constructivist museum, which is clearly divided into three spheres: physical exhibition, online ("website and social media") and mobile apps. She uses the model to "frame how learning could be structured across each sphere" (Kelly 2011: 12). Technology dependent models and definitions are constantly questioned because new technologies are changing very rapidly. They may be useful in a certain place at certain time, but they do not take into consideration this technological development.

Augmented reality projects, for example, may be considered as combining both spheres. Augmented reality projects are represented by projects such as "Layar" and Powerhouse Museum[24], "ARtours"[25] of the Stedelijk Museum in Amsterdam or "Situated Simulations". For example, fitting "Situated Simulations" into one of these three spheres used by Kelly would be quite problematic. "Situated Simulation" is a research project led by Gunnar Liestøl (Professor at the Department of Media & Communication, University of Oslo, Norway) as a part of the larger research "Inventio Project". The project aims at developing a new kind of mobile augmented reality system, which the project researchers call "situated simulations". The designed system is used to augment specific places by providing additional information about the environment. The situated simulation combines the mobile and physical spheres. Augmented reality applications are relatively new for museums, but redefine traditional museum practices and pose new questions. The situated simulations have been researched in order to analyse how their composition and organisation may improve learning (Liestøl 2011: 3). Consequently, the "Inventio Project's" objective is "to explore and shape the pedagogical and expressive forms of emerging digital technology" (Liestøl 2011: 11).

Developing mobile applications can have an educational impact on museums as well. The goals of the "ARtours" are:

> to explore the potential of new media technology and to find innovative ways in which the museum's collection of modern and contemporary art and design (90000 objects) can be presented, in addition to re-examining how the stories and interpretations that surround these objects can be shared. (Schavemaker et al. 2011)

It focuses on the possibilities of augmented reality in the museum and how the museum collection may be presented both in the museum building and in other places, such as streets, squares and green areas of Amsterdam (Schavemaker et al. 2011). Moreover, its goal is to address new audiences and to tie them to the museum. The project is divided into phases and includes technology oriented activities (construct-

24 Powerhouse Museum: Layar, http://www.powerhousemuseum.com/layar/ [26-10-2012]
25 ARtours, Stedelijk Museum, http://www.artours.nl/?page_id=2 [26-10-2012]

ing the platform/content management system for augmented reality tours) as well as some theoretical and artistic investigation. While augmented reality technology is perceived as "exciting playgrounds for curators and museum educators", there are several questions posed: what augmented reality has to offer the museum and what kind of experience does it produce (Schavemaker et al. 2011). Also in this case the artistic investigations are redolent of the avant-garde movement: technological novelties require new approaches and explorations, which traditional scientific disciplines and fields of studies cannot offer. In this project the collection has been taken to the streets and then back to the museum building in order to redefine the experience within the museum space.

FIGURE 7 Luostarinmäki Adventure

Technology Research Centre at the University of Turku,
https://www.youtube.com/watch?v=sVmjF4N67E4

Also in Finland, there are projects aiming at the development and research of augmented reality. The newest is two year "Futuristic History" project, implemented in cooperation with University of Turku and VTT Technical Research Centre of Finland[26]. The goal was to develop augmented reality solutions and analyse business models for the museum context. Within the project several historical sites were selected, researched and recreated: Holy Ghost Church in Turku, Luostarinmäki Handicraft Museum and Louhisaari Manor. The sites meet the criteria for an aug-

26 Futuristic History, Technology Research Center, http://trc.utu.fi/ar/research/futuristic-history/Futuristic_History.aspx [18-08-2014]

mented reality application in terms of "historical knowledge, public interest, business opportunities and usability" (Viinikkala et al. 2013: 122).

FIGURE 8 Place-Hampi installation

Experiments with space, technology and cultural heritage have also been continued by the artist Jeffrey Shaw, who created the first virtual museums discussed in a previous chapter. Together with digital heritage researcher Sarah Kenderdine, he codirects the Applied Laboratory for Interactive Visualization and Embodiment (ALiVE), where they experiment and research interactive and immersive experiences for museums and galleries. Their innovative projects, combining achievements of art and science demonstrate how technology and cultural heritage may be experienced in new ways. They developed interactive applications placed in large-scale immersive visualisation systems. Immersive installations such as "iTürkiye", "Eye of Nagaur", or "Place-Hampi" are results of research and artistic explorations of possibilities to develop new interfaces, modalities and interactions for cultural heritage. For example, in the "Place-Hampi" project[27], users can experience the UNESCO World Heritage site of Vijayanagara, the ruined medieval Hindu imperial capital in Karnataka (India), which is still an active cult site associated with various elements of Hindu mythology. "Place-Hampi" is an immersive installation, consisting of a circular screen 9 metres in diameter, a rotating platform, which acts as a single-user controlling device, 3D imagery projected on the screen, and an acoustic system. Users can explore the landscape and buildings of the Vijayanagara site through high resolution augmented stereoscopic 360-degree panoramas including animations of mythological events and characters, such as Hindu gods, related to the site.

27 Place-Hampi, http://alive.scm.cityu.edu.hk/projects/related/place-hampi/

These technologies create an immersive experience that combines real and virtual spaces - visitors get the kinaesthetic impression of being physically present at the Vijayanagara site (Kenderdine et al. 2008: 276). The research is placed within the area of virtual heritage, but it is strongly connected to research on the physical cultural environment. The aims of this research are an investigation of digital narrative and the creation of cultural presence in immersive cultural heritage environments (Kenderdine et al. 2008: 278, 280).

Immersive on-site installations have been also developed in Finland. Two projects "Rediscovering Vrouw Maria" and "Mapping Modernism" were developed by designers and researchers in collaboration with museums. The design and development process of "Re-discovering Vrouw Maria" project required contribution of knowledge that was in possession of several communities. Consequently, concepts of knowledge transfer, communities of knowledge (CoWs) and communities of practice (CoPs) have been researched, asking what the choices are in the design of the system, using multimodal, embodied representations that support knowledge transfer from closed communities of specialist to the general public through their interaction (Díaz 2013)?

4.4 Data and virtual museums

Many of the virtual museums developed in the second decade of the 21st century are three-dimensional online reconstructions and models of historically or archaeologically significant sites. Data acquisition and processing technologies are advancing rapidly, and especially 3D models can be much easier obtained and processed, and thus their use has been spreading in the last two decades. These developments may be illustrated by the models of ancient Rome[28], Isa-Bey Tekija (Dervish House) in Sarajevo[29], Aquae Patavinae[30], the Villa of Augustus' wife at Prima Porta in Rome[31] or the Roman Forum[32]. For example, the purpose of Virtual Rome, which served as a testbed in the V-Must project, was to create an online 3D, GIS-based, reconstruction of the archaeological landscape of Ancient Rome. Despite the additional functions that they provide, all of them make extensive use of cultural heritage data, mostly evidence created within excavation, digitisation, research or conservation. In addition, new data is created within the digital reconstruction process and modelling. Consequently, a vast amount of metadata on cultural heritage objects becomes available.

28 Virtual Rome 2.0, Virtual Museums, V-Must, http://v-must.net/virtual-museums/vm/virtual-rome-20-2014 [20-08-2014]
29 Isa-Bey Tekija, Virtual Museums, V-Must, http://v-must.net/virtual-museums/vm/virtual-reconstruction-isa-bey-tekija [20-08-2014]
30 Aquae Patavinae, Virtual Museums, V-Must, http://v-must.net/virtual-museums/vm/aquae-patavinae-vr-2011-12 [20-08-2014]
31 LIVIA'S VILLA web3d, Virtual Museums, V-Must, http://v-must.net/virtual-museums/vm/livias-villa-web3d-2014 [20-08-2014]
32 Digital Roman Forum, UCLA, http://dlib.etc.ucla.edu/projects/Forum/ [20-08-2014]

FIGURE 9 VIRMA

In Finland, archaeological evidence and research data have been also used to create virtual museums. One example is "Virtuaalimuseo"[33] ("Virtual Museum") launched by the Helsinki City Museum[34] in 2000, which is also one of the earliest virtual museums developed in Finland. The online project followed the archaeological excavations in the city of Helsinki. The website presents a representation of Merchant Henrik Govinius' site, which is located in the city centre. The site may be explored through a 2D map of the site and a 3D model representation[35]. The level of offered interactivity in this project was relatively low, and thus, another project with the improved interactivity was launched (Harju 2000: 1). "VIRMA"[36] is a three-dimensional model of the city centre with the Market Square in 1805, based on the results of archaeological excavations. The 3D representation of the city is enlivened with a number of avatars representing historical persons. The project was launched in 2003, but it has not been developed since then.

At the beginning of the 21st century in Finland, the use of cultural heritage data was mainly connected to research on the semantic web. Data from the Finnish museums have been used in the "FinnONTO" projects series (2003-2012), to goal of

33 Virtuaalimuseo, http://www.virtualhelsinki.net/museum/english [26-10-2014]
34 Helsinki City Museum, http://www.hel.fi/hki/Museo/en/Etusivu [26-10-2012]
35 As the project is relatively old, I could no longer access the 3D model.
36 Virma, Historiallinen virtuaalikaupunki, http://www.virtualhelsinki.net/museum/virma/index.html [26-10-2012]

which was to develop a basis for national metadata, ontology services, as well as a linked data framework in Finland[37]. A continuation of "FinnONTO" was "Linked Data Finland", a joint project of Aalto University and University of Helsinki. It was scheduled for the years 2012–2014 and aimed at developing new technology for harvesting, publishing and utilising open data. The project uses the Linked Data approach and semantic web technologies[38]. The cataloguing systems from more than 84 museums were connected to the main demonstrator of the project, "the National Ontology Service ONKI" (Hyvönen 2012)[39]. As part of these projects, several ontology services, tools and pilot applications within the museum sector have been developed: the "MuseoSuomi"[40] semantic portal (2004), "KulttuuriSampo"[41] (2009) and a prototype of a mobile contextualised system called "TravelSampo"[42] to create guided tours inside and outside museum spaces. These projects have been developed for years and are accompanied by a number of research publications and awarded demonstrators[43].

Besides the semantic web, the importance of data is important in relation to its openness. At the European level, the general legislative framework has been set out as early as in 2003, when the Directive on the re-use of public sector information was launched (Directive 2013/37/EU) and in the museum sector complemented by policies for the digitisation of cultural heritage and the development of Europeana (European Union: European Commission 2011: 5). In relation to museums and digital heritage projects, the Open Knowledge Foundation has played certainly a significant role. The Foundation was established in 2004 as a world-wide non-profit network promoting the opening up of data and turning it to open knowledge[44]. The activities are managed by local groups, and the Finnish chapter registered as the Open Knowledge Finland non-profit association has been actively involved since 2012[45]. One of their initiatives, OpenGLAM (GLAM stands for galleries, libraries, archives and museums) is particularly focused on promoting free and open access to digital heritage held by the GLAM institutions[46].

The Finnish group, AvoinGLAM, has been running several projects: "Kohti avointa kulttuuria" ("Towards open culture" 2013-2014) [47], "AvoinGLAM" ("OpenGLAM" 2014-2015)[48], Hack4FI – Hack your heritage (2015-2016)[49]. The over-

37 FinnONTO, National Semantic Web Ontology Project in Finland (2003-2012), Semantic Computing Research Group (SeCo), http://www.seco.tkk.fi/projects/finnonto/ [26-10-2012]
38 Lined Data Finland (2012-2014), Semantic Computing Research Group (SeCo), http://www.seco.tkk.fi/projects/ldf [26-10-2012]
39 Ontology Library Service, http://onki.fi [26-10-2012]
40 MuseoSuomi, http://www.museosuomi.fi [26-10-2012]
41 KulttuuriSampo, http://www.kulttuurisampo.fi [26-10-2012]
42 TravelSampo, http://www.seco.tkk.fi/applications/travelsampo/ [26-10-2012]
43 The extensive lists of publications are available on the project's websites, cited earlier.
44 Open Knowledge Foundation, https://okfn.org/ and Our impact, Open Knowledge Foundation, https://okfn.org/about/our-impact/ [11-07-2016]
45 About Open Knowledge Finland, Open Knowledge Finland, http://fi.okfn.org/about/ [11-07-2016]
46 AvoinGLAM, http://avoinglam.fi/ [11-07-2016]
47 Kohti avointa kulttuuria -hanke, AvoinGLAM, http://avoinglam.fi/kohti-avointa-kulttuuria-hanke/ [11-07-2016]
48 AvoinGLAM-hanke 2014-2015, AvoinGLAM, http://avoinglam.fi/avoinglam-hanke-2014-2015/ [11-07-2016]

arching objectives of the projects are to support memory institutions in opening up their collections to different audiences, and to facilitate collaboration between different organisations and actors. Within the projects, several institutions participated in surveys (OpenGlam Benchmark Survey[50]), training sessions, workshops, hackathons, networking and sharing their collections. Consequently, AvoinGLAM inspired museum professionals[51] from the TAKO museum documentation group (more about this group in the next chapter). The result of the collective effort of 12 museums was a project "Suomi syö ja juo" ("Finland eats and drinks"; scheduled for the years 2012-2016) that aimed at documenting the culture of eating and drinking in Finland[52]. People were asked to share their stories and photographs, later documented in the Picture Collections of National Board of Antiquities[53]. The photographs are also available as an open dataset[54] and on Flickr[55] and social media[56]. These examples show that an important asset of any digital project is data on collections.

The latest trend would not spread with heritage data and is related to artificial intelligence and its sub-area of machine learning. Through experience, computer systems can improve automatically and are able to handle new situations (Mitchell 2006). Machine learning has been recognised as one of the key trends in the last years that influence museums (Michaels 2014, Johnson et al. 2015, TrendsWatch 2014). These technologies transform performance of our current tools and devices. In museums, it means that new systems may be able to handle museum data in new ways, generate and develop new knowledge. Moreover, it may help to connect museum data to other sources of data, for example related to health, educational attainment, employment, satisfaction and life conditions to understand its audiences or be able to understand the museum's impact (TrendsWatch 2014: 29). This means that these new technologies can influence all spheres of museum activities, from collection documentation, through exhibiting and interaction with audiences, to evaluating the museum's own performance and wider impact. However, a prerequisite for any of these activities is digital data.

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49 Hack4FI – Hack your heritage -projekti 2015-2016, AvoinGLAM, http://avoinglam.fi/hack4fi-hack-your-heritage-projekti-2015-2016/ [11-07-2016]

50 OpenGlam Benchmark Survey, https://outreach.wikimedia.org/wiki/GLAM/OpenGLAM_Benchmark_Survey [11-07-2016]

51 Suomi syö ja juo – kattaus arkistojen aarteita kahdestatoista museosta, AvoinGLAM, http://avoinglam.fi/suomi-syo-ja-juo-kattaus-arkistojen-aarteita-kahdestatoista-museosta/ [11-07-2016]

52 Suomi syö ja juo, https://suomisyojajuo.fi [11-07-2016]

53 The Picture Collections of National Board of Antiquities, https://www.kuvakokoelmat.fi/sites/english [11-07-2016]

54 Photographs of Finnish food and drink culture from different eras, Avoindata, https://www.avoindata.fi/data/en/dataset/valokuvia-suomalaisesta-ruoka-ja-juomakulttuurista-eri-aikakausilta [11-07-2016]

55 Suomi syö ja juo, Flickr, https://www.flickr.com/photos/suomisyojajuo [13-07-2016]

56 Suomi syö ja juo: Facebook, https://www.facebook.com/pages/Suomi-sy%C3%B6-ja-juo/381750358594837, Twitter https://twitter.com/Suomisyojajuo, Instagram http://instagram.com/suomisyojajuo, Youtube https://www.youtube.com/channel/UCJXxekuG_NR2xk_dYvYSPwQ [13-07-2016]

4.5 Coproducing a culturally sensitive virtual museum

Digital media have created new possibilities not only for museums, but also for communities of origin (source communities or descendant communities). New technologies have given new opportunities to create, represent and disseminate cultural heritage in digital format. Ethnographic authority and an epistemological crisis of ethnographic representations have been discussed since the 1980s (Clifford & Marcus 1986) and new technologies have increased a number of controversies in relation to connecting cultural representations to source communities. This issue has arisen particularly in New Zealand, Australia and USA, where many digitisation initiatives have launched discussions on digital or virtual repatriation.

Virtual repatriation is a process of bringing digital heritage (digital documentation of heritage) back to descendant communities (Hennessy at al. 2012). An interesting illustration of this kind of initiatives is "the Virtual Museum of the Pacific", which is an experimental social media platform, developed as a part of an Australian Research Council (ARC) "Linkage Project" between the Australian Museum and the University of Wollongong (UOW). As an experimental and interactive web-based access tool, it opens up the Museum's Pacific Collection. The aim was to open these resources not only to global audiences, but also to empower source communities and give them an opportunity to interact with these collections. The aim was also to research technologies underpinning the platform (for example the semantic web and folksonomy). This experimental project created a new mechanism for access and annotating objects. Users can explore, tag objects, as well as add rich media to annotate these objects. The motivation was to improve access to the collection for different stakeholders: creator communities from Pacific Island countries and territories, the diaspora from the originating communities in Australasia, scholars and other stakeholders interested in these collections (Eklund, Lawson & Wray 2010). The Virtual Museum of the Pacific is focused not only on providing access to collection, but also on developing a platform that engages different stakeholders who can collaboratively participate in knowledge creation and sharing. In this project, new technologies are not only celebrated as "exciting" and creating "new experience", but are also researched and developed in order to facilitate certain processes, such as building strong collaboration with different communities, as well as knowledge creation and sharing.[57]

There are many interesting collaborative initiatives combining new technologies and indigenous knowledge, but among the most interesting examples are projects developed with and for Native Americans in California by Ramesh Srinivasan (Assistant Professor at UCLA in Design and Media/Information Studies): "Tribal Peace"[58], "Creating Collaborative Catalogs"[59] and "Emergent Databases, Emergent

57 Virtual Museum of the Pacific reaches critical stage, News & Media at University of Wollongong, http://media.uow.edu.au/news/UOW070521.html [26-10-2012]
58 Tribal Peace, http://www.tribalpeace.org/ [26-10-2012]
59 Digital Diversity, Creating Collaborative Catalogs, http://www.digital-diversity.org [26-10-2012]

Diversity"[60]. These initiatives are also research projects. For example, "Tribal Peace" is a community system developed within a collaborative process with the representatives of the 19 Native American Reservations of San Diego County. The Tribal Village project's objectives were to study whether establishing the satellite Internet could enable communication between the Reservations, facilitate the use of the Internet and to create a digital museum. The goals of the digital museum were to empower the Native Americans and their political movement towards sovereignty and to document their traditional practices (Srinivasan 2005, Srinivasan & Huang 2005: 13). In this research, Srinivasan examined the design of a digital media system for a community which is dispersed and does not extensively use technologies of this kind. He also proposes "a new model of technological appropriation, where Native American communities can utilize and design their own technologies to create, archive, and communicate among one another." (Srinivasan 2005: iii). This model may serve communities that have lost geographical and cultural continuity due to historical processes. "Tribal Peace" is an online system, in which registered tribal members can share different content, such as video, audio or images. System users can add material, comment on it, browse or use predefined guided tours (Srinivasan 2005: 219). The ethnographic fieldwork took two years, during which he interviewed the representatives of tribal communities, did participant observations and worked with the communities to increase the technological literacy of their members and to identify the leaders responsible for sustaining the project (Srinivasan 2005). Srinivasan used different techniques and methods to design ontology, which underpins the digital system. Srinivasan proposes a concept of "fluid ontologies", which are defined as:

> flexible knowledge structures that evolve and adapt to communities' interest based on contextual information articulated by human contributors, curators, and viewers, as well as artificial bots that are able to track interaction histories and infer relationships among knowledge pieces and preferences of viewers. (Srinivasan & Huang 2005: 1)

He argues that new technologies, as cultural artefacts, must be designed in relation to the cultural context within they function. Digital system should reflect the ontologies, perspectives and cultural context of its users. He states: "If technologies are designed in isolation from the cultures they seek to connect, people's real voices will not be heard" (Srinivasan 2011). In his projects, Srinivasan uses a variety of methods and techniques to design systems that include different perspectives, cultural concepts and practices. Moreover, these projects aim at proposing collaborative models between different stakeholders: museums, indigenous communities and research institutions. These digital museums are not defined through implemented technologies, which vary in each project. More important is recognising the larger cultural context, within new technologies function and identify ways of presenting different perspectives, as well as developing collaborative models. Digital museum facilitates documentation of cultural artefacts, communication and knowledge sharing practices. It is cooperative in its nature and takes into account different cultural perspectives and settings.

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60 Emergent Databases, Emergent Diversity, http://www.digitalinnovations.ucla.edu/2007/ccc/projects/Srinivasan.htm [26-10-2012]

In his research, Srinivasan is "arguing for a more cultural, digital, multiple value-imbued web"[61]. His presentation "Considering how digital culture enables a multiplicity of knowledges" given at the Lift conference in 2009 (Srinivasan 2009), has the subtitle: "What would a diverse, complex world brain look like?". Obviously, it refers to Well's concept of "world brain", which some researchers link to the origin of the virtual museum (Huhtamo 2002: 1, Sviličić 2010: 588). Srinivasan brings this term to the discussion on diverse cultural web, which supports different perspectives and cultural contexts through adequately designed information systems, such as digital museums. The content of a digital museum is structured around "fluid ontologies". It means that content and its structure are defined by community, whose knowledge is represented and shared through a digital system. This has consequences for museums as well. In order to use objects in museum representations, these diverse ontological structures connected to different groups that have practical and conceptual knowledge of these objects, must be taken into account (Boast, Bravo & Srinivasan 2007, Srinivasan et al. 2009).

As previously illustrated, museums are opening up their collections, but it does not obviously imply a consideration of diverse perspectives. For example, a good illustration is "the DigitaltMuseum" ("Digital Museum"), a portal presenting collections from Swedish and Norwegian museum and archive collections, which have their resources managed in Primus (Primus is a collection management system). There are separate websites for Swedish[62] and Norwegian resources[63]. "The DigitaltMuseum" is a service providing access to digitised museum collections (representation and metadata of objects). "The DigitaltMuseum" is based on the Primus collection management system, so it makes extensive use of the resources organised in the system. This project is certainly interesting and demonstrates how a museum can open up its collection. However, it is based on a collection management system that has been created according to certain requirements, which did not take into account the specificity of objects originating from the Sámi groups. The Sámi people are the indigenous groups inhabiting Norway, Sweden, Finland and Russia (Sámi region). For example in Norway, there are the Sámi museums, RiddoDuottarMuseat[64] (RiddoDuottarMuseat is an association of four museums/institutions in West Finnmark, Norway) that do not use Primus. Primus does not support the fonts that are used in the Sámi languages, and there were not enough resources to develop the system to serve the purposes of the Sámi institutions.

As many indigenous communities, the Sámi are also facing the problem of repatriating objects that traditionally belonged to them and are no longer located in their regions. Repatriation also refers to exchanging information on cultural heritage. Scandinavian museums, which were historically established to support the development of young nation-states, are facing many problems trying to reflect cultural diversity. Even though there are Sámi museums, their heritage is kept in memory

61 Cultural Knowledges and Digital Systems, Ramesh Srinivasan, http://rameshsrinivasan.org/projects/cultural-knowledges-and-digital-systems [26-10-2012]
62 Digitalt Museum, http://digitaltmuseum.se [26-10-2012]
63 Digitalt Museum, http://digitaltmuseum.no [26-10-2012]
64 RiddoDuottarMuseat, http://www.riddoduottarmuseat.no/ [26-10-2012]

institutions which are not located in the Sámi region, which makes access to them more difficult to the Sámi people (Hirvonen 2008: 23). However, digital projects can change this situation. In 2006, an international project called "Recalling Ancestral Voices" was launched with the following aims: (1) to map the history, size and location of Sámi artefacts and collections in museums and research institutions; (2) to stimulate debate about the management of the Sámi cultural heritage, and (3) to facilitate access to this material culture heritage by the Sámi in the form of a database (Harlin 2008: 3). The project also discussed the repatriation of human remains and cultural heritage to the Sámi.

The multilingual database gathered existing and reviewed information on the artefacts from different Sámi collections. In order to disseminate knowledge of the Sámi collections, the database was made accessible on the Web[65]. At this moment, the Sámi communities speak 9 different languages, and only six of them have a written version. The goal was to describe the material heritage in all these languages in order to give all the Sámi an opportunity to access these resources in their own language.

Another goal was to review existing terminology on Sámi artefacts and to create an agreed dictionary to describe their collections. This would allow for searching, comparing and studying the resources and would result in an approved access to these collections. However, this caused many difficulties (financial and technical) and finally the database supports three languages: Finnish, Norwegian and Swedish, for which it was widely criticised (Harlin 2008: 9). The project was completed in 2007 and, unfortunately, the database is no longer accessible online. It seems that in 2011 only two of the initial objectives of the projects were met. The access to the Sámi cultural heritage by the wider audience is still limited.

The examples discussed in this part show that developing digital heritage projects must take into account several different perspectives. This means that a digital project using certain technologies, must be based on requirements that consider the specificity of the material to be documented and displayed. It is not always easy to implement, even if it is one of the main objectives of the project. Primus, used in Swedish and Norwegian museums, could not be used to document objects from the Sámi groups because it did not support necessary fonts, but neither could the project initiated by the Sámi group fulfil this requirement. It is important to recognise that the groups have knowledge of these objects and are competent to document it, and they may be willing to protect it as part of their cultures.

4.6 Social media and user-generated content

While source communities in collaboration with researchers are trying to develop their own techniques and digital systems to manage their heritage and maintain knowledge management practices, museums have become more community-

65 Recalling Ancestral Voices, http://www.samimuseum.fi/heritage/english/projekti.html [26-10-2012]

oriented as well. In recent years, this trend has appeared to have grown since the advent of social media services and tools. Nowadays, users can easily contribute by creating content, tagging it, sharing, editing, rating, and so on. Information is created collaboratively. Distinctive communities may arise around for example certain ideas, concepts or practices. Museums have adopted these tools in the 2000s and entered the Museum 2.0 age (Simon 2010). The first enthusiasm with this new form of communicating has been replaced by the evaluative and reflective approach. There are different strategies to involve users to contribute to museum projects. Some projects are focused on particular tools, such as tagging, while others take a more complex approach. Museums are using a variety of social media services, such as Facebook[66], Twitter[67], Pinterest[68], Flickr[69], YouTube[70] to mention only a few. Kirsten Drotner and Kim Christian Schrøder state that:

> social media potentially impact all of the five dimensions that make up a museum according to the standard definition offered by the statutes of the International Council of Museums (ICOM 2007): acquisition, conservation, research, exhibition and communication. (Drotner & Schrøder 2013: 5)

In the review of the digital initiatives the impact is most visible in relation to research, communication and exhibition. In addition, not only museums are using social media, but also users create their own exhibitions, or "private museums" discussed in the next part of this chapter.

For example, projects using tagging, such as "Steve: The Museum Social Tagging Project"[71] and "Your Paintings Tagger"[72] contribute to museum research by understanding how objects can be described and interpreted. "Steve" is a unique collaborative project, which combines research, software development and "commitment to broadening awareness of the potential of social tagging for museums distinguish it from other social tagging initiatives"[73]. It involves a number of museum professionals and software developers. Their core activities include researching social tagging in relation to museum collections, developing open source tagging and managing tools and engaging and outreaching with other museum professionals who are interested in bringing this tool to their own institutions[74]. The main objective of "Your Paintings Tagger" "is to popularise and democratise art as well as to educate and entertain"[75]. The project is helping search online national collection consisting of around 210,000 paintings by some 38,000 artists. By adding tags users are

66 Facebook, http://facebook.com/ [08-08-2014]
67 Twitter, https://twitter.com/ [08-08-2014]
68 Pinterest, Search results for museum, http://pinterest.com/search/people/?q=museum [08-08-2014]
69 Flickr, http://www.flickr.com [08-08-2014]
70 YouTube, http://www.youtube.com [2014-08-08]
71 Steve: The Museum Social Tagging Project, http://tagger.steve.museum [08-08-2014]. The website could not be accessed in February 2016 due to safety reasons: the site was identified as unsafe and possibly containing dangerous malware.
72 Your Paintings, Tagger, http://tagger.thepcf.org.uk/ [21-08-2014]
73 Steve, FAQ, http://www.steve.museum/?page_id=22 [26-10-2012]
74 Steve.Museum, Steve: The Museum Social Tagging Project, http://www.steve.museum/ [26-10-2012]
75 Your Paintings and Tagger, Public Catalog Foundation, http://www.thepcf.org.uk/what_we_do/223 [26-08-2014]

describing digitised artworks. Launched in 2011, after a few years there were 10,946 taggers and 23,217 paintings were tagged with 5,697,112 tags. The best tagger, with the nick "Gyametra", tagged 6,473 paintings[76]. These numbers demonstrate how powerful the contribution of online audiences can be.

Tagging can be used not only to enhance research and help museums. The Brooklyn Museum combined tagging, commenting and marking as favourites in the "Posse"[77] project to communicate with its audience. The "Posse" is a community of members who can work with the museum's collection – or rather play with the collection, as some games were created for the "Posse" members. Tagging is not only an individual activity, but it also permits following other members, which means that a community dimension is added to this activity. The Brooklyn Museum succeeded in creating its own community and a kind of dialogue with its members because the museum has clearly stated in its mission how these new tools can be utilised to engage younger participants, to extent the physical visit and to provide tools for learning (Caruth & Bernstein 2007). Finally, the project managers researched and evaluated these projects (Bernestein 2008). The project is now "retired", but 230,186 tags were attributed to the collection.

In Finland, social media have been also deployed in several museums project. One of early examples of social media initiatives is "Museosolmu" ("Museum Node"), which was a social museum service designed, developed and maintained by the Tampere City Museums. The objective of the project was to stimulate the museum clients to record and share cultural material related to a variety of cultural heritage phenomena and to improve communication between museum clients and museums. Visitors are encouraged to add their digital contents to the service (images, audio and video recordings), as well as comment and propose new nodes. The service was launched in 2010, but new content has not been added since 2012, and there are less than 100 users, of which some has not contributed at all, and while others are museum professionals. Their contribution is relatively low and many of questions asked by the museums have not been answered by the visitors. This function has been used in another service – "Kysy museolta" ("Ask the museum")[78], launched by the seven Finnish museums. Visitors can ask questions that are answered by the museum professionals. Currently, there are hundreds of answered questions.

Inviting visitors to share content and memories is also a goal of a newer online service launched by the Satakunta Museum – "Kerromuseolle.fi" ("Tell the Museum") in 2013. It is a service accompanying the project on documenting and presenting the history and tradition of sport in Pori – "Pori's sports nostalgia". The museum invites users to share their memories and experiences related to sport. Users can add photos, videos or written material. This project has not attracted high numbers of registered participants either (around 21 registered users), but as contributions may also be added by unregistered visitors, the general level of contribution is higher. The Museum uses the website to encourage visitors to contribute and they can add

76 Your Paintings Tagger, http://tagger.thepcf.org.uk [26-08-2014]
77 Brooklyn Museum, Community, Posse, http://www.brooklynmuseum.org/community/posse [26-10-2012]
78 Kysy museolta, http://kysymuseolta.fi [26-08-2014]

their memories related to a particular topic. One of the already "closed" topics has 63 comments.

Finnish museums also use services and social media that do not require developing. Quite popular are museum blogs, launched to communicate with the museum audiences and to inform about particular projects, e.g.: "Vorssamuseo 3.0"[79] launched by the Forssa Museum[80], "Tulevaisuuden museo"[81] by the Kankaanpää Museum[82] and "Elävä Eteläkarjalainen Museoympäristö"[83] launched by museums in Lappeenranta[84], and a blog on the challenges of the small museum – "Pikkumuseon haasteet"[85].

Museums are also present on Facebook, but it is not so simple to evaluate museum activity there. It is difficult to evaluate how engaging these activities are and what the relationship is between the museum and its online audience. Natalia Dudareva, a communications professional working in the arts and culture sector in Denmark, combined the categories of cultural experience (Foreman-Wernet & Dervin 2011), arts attendance factors (Bakke 2009) and the four dimensions of cultural experience (Petkus 2002) to propose an approach to investigate the motivations for following museums in social media (Dudareva 2014). Results are based on 311 answered questionnaires from three museums in Copenhagen: The National Gallery of Denmark, The National Museum of Denmark, and the David Collection. Dudareva formulated the five types of relationships: "Enthusiast"; "Connected"; "Contributor"; "Interested" and "Informational". The larger group, "Enthusiast" is the most engaged and feels confident to share and interact. People from this group build social connections around their cultural experiences by actively sharing, linking, participating in events and posting on Facebook and are motivated to follow pages because want to learn about new topics. The "connected" group is less emotionally connected with their Facebook communities and wants to be inspired to visit a museum. Members of this group regularly visit museums. Also "contributors" want to be inspired to visit the museum they follow, but they are moderately active. What characterises them the most is the highest desire to contribute: they feel confident to participate in online discussions and share their opinions. Sometimes they learn about new topics. The motivation of the users belonging to the "Interested" group is to seek information on Facebook pages, but they are not very confident to participate and share their opinions and neither do they learn from pages. Sometimes they visit the museums that hey follow. The smallest group, "Informational", is very little involved with the museums through Facebook; they see the pages as a source of information, sometimes being inspired to visit the museum they follow, but does not visiting them on a regular basis (Dudareva 2014). The variety of the relationships shows that museums can construct different approaches towards their Facebook

79 Vorssamuseo 3.0, http://vorssammuseo.blogspot.com/ [26-08-2014]
80 Forssan Museo, http://www.forssanmuseo.fi/ [26-08-2014]
81 Tulevaisuuden museo, http://tulevaisuudenmuseo.blogspot.com/ [08-28-2014]
82 Kankaanpää Museum, http://www.kankaanpaa.fi/sivistyskeskus/html/fi/museo.html [08-28-2014]
83 Elävä Eteläkarjalainen Museoympäristö, http://elavamuseo.blogspot.com/ [08-28-2014]
84 Eteläkarjalan museot, http://www.lappeenranta.fi/Suomeksi/Palvelut/Kulttuuri/Museot [08-28-2014]
85 Pikkumuseon haasteet, http://nautelankoski.blogspot.fi/ [08-28-2014]

presence and try to establish different relationships with their audiences. Social media are democratic and user-friendly. Even the smallest institution maintained by volunteers can be able to provide an engaging experience for online visitors.

Social media projects enabled by memory institutions are also a way of facilitating knowledge creation in communities. In this way institutions are able to enable discussions on cultural objects or events. It results in creating more diverse perspectives. A good example is "lokalhistoriewiki.no"[86], which is a local history project developed in Norway. The project started in 2006 as the Norwegian Institute of Local History's initiative to connect people interested in local history and running local history projects (Stuedahl 2011). The project was implemented through wiki. At the moment, it consists of 37,788 articles, has 828,854 edits, 7,315 registered and 50 active users, and 158,454 uploaded images[87]. Both professional historians and persons interested in history voluntarily construct the content, which means that expert and lay knowledge may be utilised in one space. In her article, Stuedahl investigates "how the co-construction of knowledge is evolving in relation to the development of concepts and categories that structure the wiki space" (Stuedahl 2011: 9). She observed the discussions of the wiki participants in order to investigate how different concepts and categories were negotiated during these discussions. She argues that these multiple perspectives and interpretations, provided by both expert and non-expert users, create the content. The content is often based on personal memories and sometimes even contradictory narratives. This may remind us of ethnological collections, and may be perceived as an interesting case for ethnological studies in digital culture heritage (Stuedahl 2009: 12-13 in a digital version).

There are also many initiatives facilitating social media in museum practices, which are not run by museums. A wonderful example is "1001 stories of Denmark"[88], project about Danish heritage, developed by Danish Agency for Culture. It is an example of crowdsourcing and storytelling. It is a user-driven platform, allowing its users to learn about heritage sites and share knowledge of Danish heritage. The site presents stories about places in Denmark, which may be explored through an interactive map or on a timeline and are related to Danish heritage. Some of the stories are written by 180 of the most prominent experts on heritage and history, but all registered users can contribute their own stories, comments, photos and recommendations[89]. The strategy behind this project was to create a new, more interactive and involving approach to cultural heritage, making it "moveable, open, multifaceted, voluminous, democratic and modern"[90].

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86 Lokalhistoriewiki.no, http://www.lokalhistoriewiki.no [26-10-2012]

87 Om forsiden, Lokalhistoriewiki.no, http://lokalhistoriewiki.no/index.php/lokalhistoriewiki.no:Om [13-07-2016] Active users are defined as "Users who have performed an action in the last 30 days".

88 1001 stories about Denmark, http://www.kulturarv.dk/1001fortaellinger [26-10-2012]

89 1001 stories about Denmark, About 1001 & conditions of use, http://www.kulturarv.dk/1001fortaellinger/en_GB/about [26-10-2012]

90 1001 Stories about Denmark at Nodem, Mette Bom, Nov 25, 2010, Slideshare, http://www.slideshare.net/mettebom/1001-stories-about-denmark-at-nodem [26-10-2012]

4.7 Private virtual museums

Nowadays new technologies are so user-friendly that almost everyone can create their own virtual museum. It is not possible to count these private initiatives, and therefore the scope of this review cannot systematically cover them. They have established for different purposes by using different techniques and their contents differ a great deal. However, it is an important phenomenon demonstrating that people are eager to share their passions on the Web and communicate with others.

An inspiring website is the "Virtual Shoe Museum" established by graphic designer Liza Snook in 2005, with a new version launched in 2012. According to the Museum's press information from September 2011, there are some 1,500 shoes from ca. 300 artist and designers in the virtual museum. In 2010 the Museum had 300,000 visitors and around 4,000,000 page views, showing that the website has been very popular (Virtual Shoe Museum 2011). Snook explains that the idea to establish this virtual museum was simply to share a passion for shoes. She argues that usually traditional museums display only a part of their collections due to limitations of space. The way the objects are displayed is not always satisfactory, because there is not enough context information, and exposition also has its disadvantages, for example in relation to space and light. She says:

> These experiences inspired me to create a virtual shoe museum: the range of possibilities a digital environment might open up. We could include shoes in all sorts of sections, without having to compromise or duplicate. We could create multiple perspectives on any shoe, varying from 'designer', 'focus' and 'material' to 'style' and 'type' and even 'colour'. All without duplicating and every time creating a new environment in which the shoe would be presented. (Virtual Shoe Museum 2011).

Another project created by an individual person is "Museum of Family History"[91]. It is devoted to modern Jewish history, and is an individual initiative by Steven Lasky. The museum is designed for people who want to learn more about Jewish history. It consists of many smaller exhibitions and subproject devoted to different aspects of Jewish history and culture, such as "Genealogy and Family History", "Health and Immigration" and "the Synagogues of New York". There are also transcriptions and recordings of organised lectures. While the project is a one-man initiative, there is a number of people who contributed to this museum in many ways, for example by providing documents and photographs, which is also a form of crowdsourcing.

It is interesting to mention that one of the first private initiatives was "Le WebLouvre"[92], launched in 1994 by a 23-year Nicolas Pioch, at that time a student and computer science instructor at the École Nationale Supérieure des Télécommunications. This digital initiative does not have any official connection to the Louvre. In 1998 the museum was described as "one of the best known, most visited, and most often linked Web sites in cyberspace" (Dietz 1998). The project received many

91 Museum of Family History, http://www.museumoffamilyhistory.com [26-10-2012]
92 Le WebLouvre, http://www.ibiblio.org/louvre/ [19-10-2012]

international award in its first years[93]. Nicolas Pioch explains the vision behind this project in these words:

> The WebMuseum was not made as part of any official or supported project. There's not grant behind that, it is total pleasureware (tm). I decided to start working on this exhibit because I felt more artistic stuff was needed on the Internet, so the WebMuseum took over my free time (nights and week-ends...) since mid-march 1994.
>
> Some companies may be trying to get a monopolistic grab on arts and culture, developing a pay-per-view logic, shipping out CD-ROMs while trying to patent stuff which belongs to each of us: a part of our human civilization and history.
>
> This exhibit is not trying to compete in any way with books or specialized CD-ROMs. Such an Internet exhibit will neither reach the quality of paper reproduction and professional critic, nor will it be as easily available as a local CD-ROM, given the transfer time on the Internet.
>
> No support, no funding, no manpower: the WebMuseum is a collaborative work of its visitors contributing to expand and improve the WebMuseum.[94]

There is no data on virtual museums of this kind in Finland, but it may be assumed that there are initiatives like this as well. Michelle Henning argues that these projects:

> (…) grow out of tradition of the dime museums, curiosity museums and odd idiosyncratic museums, as well as out of the availability of websites as places to display personal obsessions. The virtual museum makes explicit the link between a return to curiosity and the development of new media. (Henning 2006: 154)

I cannot say whether these private museums grow out of tradition of the dime museums, curiosity museums and odd idiosyncratic museums, but obviously it does not seem to be a return to curiosity. I rather argue that in this case new media have created an opportunity to share own passions rather than obsessions. I see it rather as a contribution towards diverse World Wide Web and towards open and accessible cultural heritage, as the Pioch's project demonstrates. They have succeeded in creating ontologies around specific concepts so they contribute to a multiplicity of knowledges on the Web. These initiatives are not authoritarian, and cannot be criticised for lack of concern for the wishes or opinions of others. Without their visitors, they would not exist. Their constant development suggests that they are liked and important for many people. What I perceive as very important in these virtual museums is that their initiators have succeeded in creating their own communities and sharing their passions.

Another important aspect is that these private initiatives were developed adequately to skills and resources their owners had. The initiatives presented here demonstrate different level of technical complexity, but all of them are working digital creations. It shows that individual people are able to create and maintain them, as well as constantly improve and redevelop.

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93 Le WebLouvre, All you ever wanted to know about the WebMuseum, http://www.ibiblio.org/wm/about/ [26-10-2012]

94 WebMuseum, About the WebMuseum, Nicholas Pioch 11.10.2002, http://sunsite.icm.edu.pl/wm/about/about.html [26-10-2012]

4.8 Summary

This chapter presents a number of digital museum creations. The selection included international, widely known and discussed projects, as well as Finnish examples. Thus, the goal of the review was to show the current trends in creating and presenting cultural and digital heritage online, not to provide s systematic review in terms of spatial or temporal coverage. Some of the projects are described by their initiators and developers as virtual museums, showing how they defined it in a practical way. Other initiatives are important in relation to the definitions of the virtual museum discussed in the previous part. They show the newest trends in regard to providing online access to heritage resources.

Widely known projects, such as the Google Art Projects and the Adobe Museum of Digital Media were developed by companies in collaboration with museums. The companies were responsible for their design and implementation. The museums' input, as in case of the Google Art Project, is very often limited to providing the content. These initiatives are very ambitious and involve also artists, whose explorations may remind us of the explorations of the avant-garde artists (Huhtamo 2002). The lifespan of these projects depends on the company's strategy and resources, and therefore these initiatives may be ephemeral and not sustainable. These projects are perceived by the museum professionals as having a huge potential, for example educational, while for the companies they are an exciting experience.

Another trend in digital creation demonstrates that museums develop solutions that offer different level of immersion. There is a variety of technologies used to offer different experience in terms of immersion and combine digital and physical spheres of the museum. The popular solutions are mobile and augmented reality applications. Augmented reality is considered as providing new experiences not only for visitors, but also opportunities for the museum professionals, such as curators and educators. Many of these projects have been developed by researchers and artists, and thus there are several issues, not only strictly technological, that have been researched, for example the creation of presence and cultural presence in immersive cultural heritage environments (Kenderdine et al. 2008), knowledge transfer between different communities (Díaz 2013), and business models for the museum context (Viinikkala et al. 2013). Many augmented reality projects make extensive use of digitised collections and accompanying metadata to offer interpretative content for museum audiences.

Cultural heritage data is also important in a whole spectrum of recently developed virtual museums. Evidence, created during such processes excavation, digitisation, research or conservation is used to create new digital creations. These virtual museums are very often three-dimensional online reconstructions and models of sites of huge heritage significance. Another trend, also using cultural heritage data, is focused on the development of new technologies for harvesting, publishing and utilising open data. In Finland, several projects were launched that served as a basis for a national metadata, ontology and ontology services, as well as a linked data framework. The virtual museums created within these projects are very often services that connect resources from different institutions. Open data in the cultural

sector is one of the most important trends in recent years. Combined with advanced technologies and achievements related to artificial intelligence, these developments influence all areas of museum work.

There are several digital heritage initiatives demonstrating that digitised cultural heritage may require a different approach, depending on who they may serve. New technologies have shown the importance of connecting cultural representations to source communities. There are several new processes that accompany the creation of virtual museums that demonstrate this trend (Eklund et al. 2010). For example, the process of virtual repatriation, has been recently discussed in the museums context (Henessy et al. 2012). Many virtual museums have been created to bring digital heritage documentation back to descendant communities originating from North America, Australasia and Northern Europe. Moreover, many initiatives have demonstrated that digitisation, management of digitised resources and techniques used to provide access to these resources follow a Western model and are not adequate for managing heritage of indigenous groups (Srinivasan 2005, Srinivasan & Huang 2005, Harlin 2012). These initiatives show that new technological solutions should be designed in relation to the cultural context within which they may function.

However, museums have been focused on interaction with their communities for decades, and in recent years has been strengthen due to social media. A variety of digital projects demonstrates that all social media tools may have an impact on the museum processes that constitute a museum according to the ICOM definition (ICOM 2007): acquisition, conservation, research, exhibition and communication (Drotner & Schrøder 2013: 5). Professionally managed museums develop also their own social media services and tools, but also voluntarily run institutions are able to use available solutions to create a meaningful communication and relation with their audiences. Users are not passive receivers, but can actively contribute to cultural heritage. Social media are making cultural heritage more open and democratic.

This is also visible in the last discussed trend, which is a private virtual museum. Due to the advent of World Wide Web, it has become less complicated to create own digital products. It has resulted in an enormous number of virtual museums created by private persons. The earliest examples have been launched in the early 1990s. Even though there have not been museum institutions with their own resources behind these projects, in many cases they are very popular and succeeded in creating their own communities and reaching many visitors.

To sum up, the virtual museums are an intrinsic part of digital heritage creations. They may be developed by different stakeholders: companies, institutions and private persons. Underlying them there are different resources and objectives, and they are thus developed to function in different ways. Consequently, there are different aspects that are in the focus of museological research and they have contributed to the debate on virtual museums.

5 THE MUSEUMS SECTOR AND DIGITAL HERITAGE IN SMALL MUSEUMS IN FINLAND

5.1 Introduction

In this chapter the Finnish museum sector will be presented with the particular focus on small, local heritage museums. In the first part, the short characteristic of museum sector in Finland is presented. The main data on the museum sector, museums' collections and activities come from museum statistics maintained by the National Board of Antiquities. The collections, their documentation and digitisation in professionally and non-professionally managed institutions is presented. The description of the situation of small museums is based on the report prepared by the Local museums committee (Rakkaudesta kulttuuriperintöön 2012), appointed in 2010 by the Ministry of Education and Culture to prepare suggestions for the development of the museum sector in relation to non-professionally administered museums. In this part, also the most important Finnish initiatives in the field of digital heritage are discussed.

5.2 Characteristics of the museums sector in Finland in brief

The museum sector is diverse in terms of size, ownership mode, finance and funding, staff, collections, ITC, and so on. Since 1975 the National Board of Antiquities has been preparing museum statistics (the statistics were prepared for the years 1975, 1980, 1985, and since 1989 the statistics have been done yearly). The statistics cover all professionally managed institutions and are prepared for the need of museums, their stakeholders and the authorities. The results are provided for the use of Statistics Finland[95] and EGMUS - European Group on Museum Statistic[96], and are accessi-

95 Statistics Finland, http://www.stat.fi/ [26-10-2012]
96 EGMUS - European Group on Museum Statistic, http://www.egmus.eu/ [26-10-2012]

ble through online application[97] maintained by the National Board of Antiquities. The detailed questions concern several issues: mode of ownership, finance and funding, personnel, collections, exhibitions, publications, opening hours and visitors.

According to the statistics for 2014, there are 152 museums responsible for 327 museum branches. In relation to the type, there are 166 cultural-historical museums, 81 specialised, 59 art museums, 12 natural history and nine museums are so-called combined museums (Museotilasto 2014:5). In relation to the hierarchical organisation, there are three national museums: the National Museum of Finland, the Museum of Natural History belonging to the University of Helsinki and the Finnish National Gallery. The Finnish National Gallery is the largest art museum organisation and is divided into four units: the Ateneum Art Museum, the Museum of Contemporary Art Kiasma and the Sinebrychoff Art Museum[98]. There are also 16 national specialised museums, 22 cultural history regional museums and 16 regional art museums. (Museotilasto 2014: 49)

Nine museums (5.9%) are state-run, including also museums maintained by universities, 83 museums (54.6%) are owned by municipalities, 59 museums (38.8%) are owned by foundations and associations, and one museum is owned by the company (0.7%). (Museotilasto 2014: 6)

The funding of professionally maintained museums depends on their form of ownership and consists of statutory state aid, direct funding from foundations or associations and grants (municipal or state), and their own income (Museotilasto 2014: 7). In 2014 the museums employed 1,919 permanent full-time employees; on average there are 12.6 permanent employees in a museum, of whom 7.3 had professional training. In 2013 for the first time the museums were asked about the number of volunteers. In 2014 58 museums answered this question and according to their answers, volunteer work were 34,807 hours, which is 22.3 man-years (1,240 persons volunteered) (Museotilasto 2014: 13). In addition, there were 145 man-years of work paid by another institution than the museum (76 answers) and 73 unpaid employees (83 man-years) (Museotilasto 2014: 14).

Professionally maintained museums were open on average 191 days per year/museum unit. Majority of the main administrative units were open during the whole year (139 units - 92.1%), four were open during the summer (2.6%), six sporadically (4.0%) and two were exceptionally closed (1.3%) (Museotilasto 2014: 18). The total number of visits was 5.4 million, of which more than half were free visits (53.8%) (Museotilasto 2014: 15). The professionally run museums are responsible for a variety of museum activities related to collecting, documentation, conservation, exhibiting. Moreover, they perform administrative duties concerning the export of cultural items and the preservation of buildings and antiquities, as well as promoting museum activities and coordinating museum cooperation.

However, the Finnish museum sector is not limited to these professionally managed institutions. While in Finland the ICOM definition of museum is recognised (ICOM 2007), anyone can establish a museum. There is a huge number of small, local museums. There is a problem with the terminology related to the museum field

97 Museotilasto, http://www.museotilasto.fi [26-10-2012]

98 Organisation, About the Finnish National Gallery, Finnish National Gallery, http://www.kansallisgalleria.fi/en/tietoa-kansallisgalleriasta/organisaatio/ [20-07-2016]

in Finland. Some terms are not translatable into English, and refer to the specific context within which these institutions function. Here, I use the term "small museum" to refer to small, local history museums. Small, local history museums are very often called "paikallismuseo" in Finnish, which literally means "local museum". However, a local museum can be also a professionally managed big museum. For example, Espoo City Museum cannot be described as a small institution, because it is run on a regular basis by professional museum employees (21.8 man years), its cultural history collection consists of 250,897 objects and in 2014 was visited by 50,265 visitors (Museotilasto 2014). Consequently, instead of the term "local museum" I decided to use the terms "small museum" or "small, local history museum", because I focus on museums that are run by local volunteers and receive state subsidies. I will characterise these museums in more detail in the next part of this chapter.

In Finnish, small, local heritage museums are also named "kotiseutumuseo". The term consists of two words: "kotiseutu" and "museo". While "museo" can be literally translated into "museum", the meaning of "kotiseutu" is much more interesting in this context. In English, it means "home district"[99]. In Finland, the importance of "home" has been present in local heritage studies and the local heritage movement since the beginning of the 20th century (Riukulehto & Rinne-Koski 2014: 12). In the newest studies, an experiential theory of home was discussed (e.g. Riukulehto & Rinne-Koski 2014, Riukulehto & Rinne-Koski 2015, Riukulehto 2015). "Home" is built through personal experiences in time, and consists of key human relationships, functionality and aesthetics, the sense of independence in life management, culture, the role of nature and environment, as well as buildings and movable items (Riukulehto & Rinne-Koski 2014: 24). It is connected to people's experiences, memories and feeling, and is built through interaction with others and surroundings, and it can change during one's lifespan. In this research, I have not focused on the aspect of "home" in relation to these small, local heritage museums, but as the interviews with museums keepers showed, all these elements were present.

I also characterise these small museums as "non-professionally managed museums" as opposed to "professionally managed museums" (such Espoo City Museum). This division is very often used in the museum discourse in Finland, and it refers to the basis on which they are managed. However, this divide between these two types is questionable (Vilkuna 2012). Vilkuna argues that this unnecessary divide, which was born after the WW2, is not very correct, as in the activities of the professionally run museums have been traditionally involved volunteers, and the voluntarily run museums have been supported by the museum experts from the professionally managed institutions (Vilkuna 2012). In this research, I use "voluntarily run museums" interchangeably with "non-professionally run museums" in regard to small, local heritage museums. However, I do not refer to the professional skills of the people who are responsible for running these museums, only to the fact that they do it on a hobbyist basis and do not receive any salary for their work. I continue this "unnecessary" tradition as there is no appropriate term in the Finnish language, nor do I propose another term in English.

99 Kotiseutu, YSO - Yleinen suomalainen ontologia, https://finto.fi/yso/fi/page/p6187 [21-10-2016]

With regard to the discussion on the distinction between museums maintained professionally on a regular basis and non-professional museums the legislation should be also considered, such as The Museums Act (Museolaki 729/1992, amended 1166/1996, 644/1998, 877/2005, 1076/2015, 138/2015) and the Government Decree on Museums (Valtioneuvoston asetus museoista 1192/2005, amended 456/2013). The Museums Act defines the objectives of the museum as follows [100]:

> The purpose of the work of museums is to maintain and increase the awareness of citizens of their culture, history and environment. Museums shall carry out and promote research, education activities and information in their respective fields by storing, preserving and displaying objects and other materials pertaining to man and his environment.[101]

It also describes the conditions that a museum must meet in order to be eligible to receive state subsidies:

1) The museum is owned by the municipality or federation of municipalities or by a private community or foundation whose statutory tasks include museum activities or museum maintenance;
2) There are economic prerequisites for the operation of the museum, but the museum is not maintained for economic profit;
3) The museums' activities are guided by regulations, in which the museum's area is defined according to state decrees;
4) The museum collection is ensured to be preserved as a museum collection also after the museum's termination;

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100 Author's own translation, not authorised. Original Finnish text: 1 § Museotoiminnan tavoitteena on ylläpitää ja vahvistaa väestön ymmärrystä kulttuuristaan, historiastaan ja ympäristöstään.
Museoiden tulee edistää kulttuuri- ja luonnonperintöä koskevan tiedon saatavuutta tallentamalla ja säilyttämällä aineellista ja visuaalista kulttuuriperintöä tuleville sukupolville, harjoittamalla siihen liittyvää tutkimusta, opetusta ja tiedonvälitystä sekä näyttely- ja julkaisutoimintaa.
2 § Valtionosuuden saamisen edellytyksenä on, että:
1) museon omistaa kunta tai kuntayhtymä taikka yksityinen yhteisö tai säätiö, jonka sääntömääräisiin tehtäviin kuuluu museotoiminnan harjoittaminen tai museon ylläpitäminen;
2) museon toiminnalle on taloudelliset edellytykset, mutta että museota ei kuitenkaan ylläpidetä taloudellisen voiton tavoittelemiseksi;
3) museolla on sen toimintaa ohjaavat säännöt, joissa museon toimiala on määritelty sen mukaan kuin valtioneuvoston asetuksella säädetään;
4) museon kokoelmien säilyminen museokokoelmina on turvattu myös museon lopettaessa toimintansa;
5) museolla on toiminnasta vastaava päätoiminen museonjohtaja ja riittävä määrä museoalan koulutuksen saanutta henkilöstöä;
6) museon näyttely-, työ- ja yleisötilat sekä kokoelmien hoitoon ja säilytykseen tarkoitetut tilat ovat tarkoituksenmukaisia;
7) museon toiminta on ympärivuotista ja sen kokoelmat ovat museon käyttäjien tavoitettavissa;
8) museolla on toiminta- ja taloussuunnitelma sekä muut toimintaa ohjaavat suunnitelmat siten kuin valtioneuvoston asetuksella säädetään.
Museoalan koulutuksen saaneen henkilöstön vähimmäismäärästä ja kelpoisuusvaatimuksista säädetään valtioneuvoston asetuksella. (Museolaki 3.8.1992/729)
https://www.finlex.fi/fi/laki/ajantasa/1992/19920729

101 Translation published in Hagedorn-Saupe & Ermert 2004: 42.

5) The museum has an appointed museum director on a full-time basis and a sufficient number of museum trained staff;
6) The museum's exhibition, offices and public spaces, as well as collection care and storage facilities are appropriate;
7) The activities of the museum are year-round and its collection can be accessed by the museum users during the whole year;
8) The museum has an operational and financial plan as well as other plans guiding its activities according to the state's decree. (Museolaki 1992/729)

For practical purposes, this means that professionally maintained museums meet these conditions, while small, local heritage museums do not. According to the statistics (Museotilasto 2014), on the basis of the Museums Act, 125 of 152 museums received statutory state aid. In this context, many of the small, local heritage museums should rather be defined as exhibitions than as museums.

Until recently, there had not been much research on small, local heritage museums in Finland. Fortunately, the need to evaluate the situation of these institutions has been recognised. In 2010 the Ministry of Education and Culture appointed a Local Museums Committee, whose term ended on 31 December 2011[102]. The main objective of the committee was to outline a policy for the development of non-professionally managed museums' activities to foster local cultural heritage (Rakkaudesta kulttuuriperintöön 2012). The committee prepared its final report based on a survey conducted in 2012. Regional researchers from regional cultural history museums helped to cover the local museum field and to gather information on small, local heritage museums. The regional museums are professionally maintained institutions and provide cultural heritage information and expertise in built heritage, as well as support for the preservation and documentation of local cultural heritage. In practice, it means that the regional researchers know the local museum field and provide these institutions professional support. In order to cover the field of non-professionally managed institutions, the committee sent its questionnaire to 1,224 institutions that are run by a municipality, association, foundation, parish, state, company or a private person with the place or site in question called "a museum" or its maintaining body considering its operations explicitly as museum activities. Furthermore, the place is open to public and/or the maintaining body has a collection and /or a building, the preservation and maintenance of which is considered as one of the main objectives (Rakkaudesta kulttuuriperintöön 2012: 19).

The questionnaire covers following issues: basic information (name, address, ownership, museum type), finance and funding, personnel, opening hours, visitors, collections, security, exhibitions, the museum building, and an open question on the museum's self-assessment on activities and future plans (Rakkaudesta kulttuuriperintöön 2012: 55-62). The report analyses the situation of 726 museums responsible for 856 museum locations (Rakkaudesta kulttuuriperintöön 2012: 19).

These museums are open only during part of the year, mainly during the summer or by appointment (Rakkaudesta kulttuuriperintöön 2012: 22). In 2010 the

102 Opetus- ja kulttuuriministeriö, Paikallismuseoiden toimintaa kehitetään, http://www.minedu.fi/OPM/Tiedotteet/2010/10/paikallismuseot.html?lang=fi [26-10-2012]

number of visitors was 580,800 (446 museums answered this question), but as the museums do not have any systematic way of counting, it may be estimated that there are around one million of visitors every year (Rakkaudesta kulttuuriperintöön 2012: 23). The report states that the most visible and typical form of customer service is an exhibition presenting the museum collection. Usually, exhibitions are long-term, presenting local material culture, or the exhibition consists of an interior designed according to the time when the building was erected (Rakkaudesta kulttuuriperintöön 2012: 24).

The local museums are very active event organisers. In 2010 the museums organised 2203 events (349 museums answered). The most popular were events for volunteers, "tradition days", traditional performances and museum open days (Rakkaudesta kulttuuriperintöön 2012: 24-25). The museums are run mainly by volunteers. According to the conclusions of the reports based on the answers, volunteer work is as important as paid work - 570 employees and 5,300 volunteers were involved in the local museums' work (27,000 days of paid work and 22,000 voluntary work days, day = 7.15h/day) (Rakkaudesta kulttuuriperintöön 2012: 26). As the museums are run mainly by volunteers, the funding of these institutions is very modest and consists of funding and income obtained from different sources and activities: municipal funding, own fund-raising, state and municipal aid, foundational grants, rural development funding, financial support from regional councils and from the Centres for Economic Development, Transport and the Environment (Rakkaudesta kulttuuriperintöön 2012: 27-31).

The museums sector is funded by the state and the local authorities (c. 40%), museum activities and sponsors[103] (university museums are an exception). The digitisation projects accompanying the "National Digital Library" are funded from the state budget, as the state budget is the key instrument for allocating resources to memory institutions. A new budget line for the digitisation of cultural heritage, and for accessibility and preservation of digital cultural content has been added in 2008.

In 2011 "the National Digital Library" did an online survey on digitised material in the Finnish memory institutions. In relation to the museum sector, the survey was sent to 137 museums (national museums, regional museums, regional art museums and specialised museums), but only 36 museums answered. The total number of digitised units is 530,000,000, but it is estimated that the number is much higher (Pitkäaikaissäilytys. Digitaalisten aineistojen laajuus ja säilytysmenetelmät V1.0.).

According to the statistics of the National Boards of Antiquities statistics, professionally managed museums have 5,878,923 cultural history objects (n=127), 393,983 artworks (n=108), 19,232,960 (n=70) natural history objects, and photographic collections objects numbering 22,073,780 (n=142) (Museotilasto 2014). In non-professionally managed museums there are around 2.4 million cultural history objects, photographs, natural history objects and archival material. 666 non-professionally museums responded the survey: 601 of them has cultural history objects and 222 collection of photographs (Rakkaudesta kulttuuriperintöön 2012: 32). In the surveyed small museums, there are 1187766 cultural history objects (n=601), 8375

103 Ministry of Education and Culture, Museums and cultural heritage in the state administration, http://www.minedu.fi/OPM/Kulttuuri/Museot_ja_kulttuuriperintoe/?lang=en [26-10-2012]

artworks (n=71), 581359 photographs (n=222), 49690 archival units and other material (n=63), 168300 natural history objects (n=12). (Rakkaudesta kulttuuriperintöön 2012: 32-34).

In both types of museum, the collections are documented and catalogued in different ways. The professionally run museums succeeded in digitally cataloguing 2,085,987 history objects (n=123) and digitising 1,223,003 (n=120), digitally cataloguing 342,636 (n=101) artworks and digitising 354,487 (n=96), digitally cataloguing 1,133,772 (n=68) natural history objects 1,133,772 (n=68) and digitising 417,761 (n=66), digitally cataloguing 342,636 (n=101) photographs and digitising 354,487 (n=96) (Museotilasto 2013). It is impossible to compare the results from these professionally run museums to the results from non-professionally managed institutions. In the local museums committee survey, there were questions on the number of traditionally catalogued (in a paper based catalogue) and digitally catalogued objects. Traditionally catalogued cultural history objects numbered 744,715 (n=419), digitally 318,382 (n=202), traditionally catalogued artworks 6,010 (n=35) and digitally 1,180 (n=21), photographic collections 104,547 catalogued traditionally (n=80) and 10,2704 digitally (n=51). Almost 40% of the archival material is digitally catalogued, while traditionally around 34%. The rest of material is documented mainly digitally (around 20%), and traditionally (5.5%). 10% of natural history collections are catalogued, mainly digitally (Rakkaudesta kulttuuriperintöön 2012: 35-36).

These numbers do not cover the factual number of catalogued and digitised cultural material in Finland. It is estimated that these numbers are much higher. Moreover, the practices are very different in every museum and therefore the numbers do not indicate the quality of the catalogued and digitised material. However, these numbers, from both professionally managed and non-professionally managed museums illustrate that there is a huge amount of material that is still not even digitally catalogued and that the cataloguing practices and applications differ a great deal. The most important what these numbers illustrate is that the museums are very slowly developing their documentation and cataloguing practices: from traditional paper-based catalogues to digital catalogues and the digitisation of cultural material. In Finland, the collection is perceived as the *raison d'être* of the museums. In 2012 at the National Museological Seminar in Jyväskylä, Janne Vilkuna in his concluding address stated that he does not accept the idea of a museum without a collection (Vilkuna 2012). In addition, in recent years, due to the work of a volunteer group of museum professionals from the TAKO project[104], much more knowledge about collections has been gained. The developments show that professionally managed museums have been much more knowledgeable about their collections and tend to standardise and coordinate their efforts in relation to acquisition, documentation and management of their collections.

104 More about "TAKO" in the next part of this chapter.

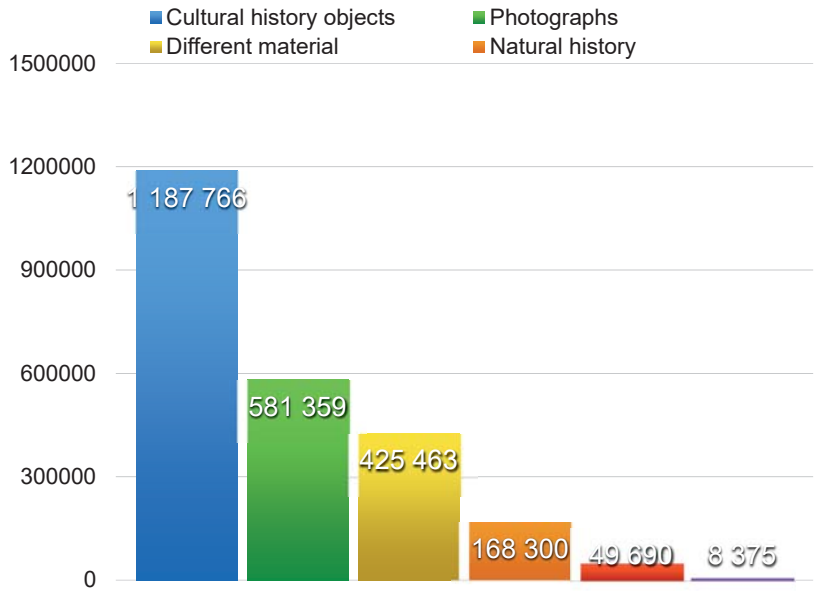

FIGURE 10 Collections of non-professionally managed museums (number of objects)

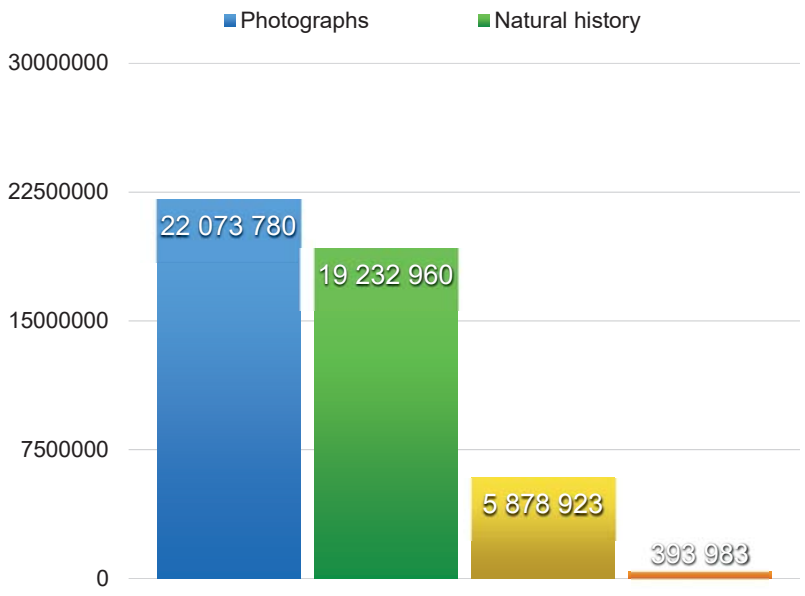

FIGURE 11 Collections of professionally managed museums (numbers of objects)

According to the report published in 2011 (Museoiden kokoelmahallintajärjestelmät 2011: 15), professionally managed museums have around 20 different collection management systems, and some 20 different applications are used in the non-professionally managed museums (n=232). Most of them are not collection management systems, but widely used applications, such as MS Word, Excel or Access. In addition, in some regions, the regional museums have developed web applications for small museums, which has brought some benefits to these users as they are easier to use (Rakkaudesta kulttuuriperintöön 2012: 36). The problem caused by different level of cataloguing practices and tools have been recognised and addressed in many countrywide initiatives, in which all types of museum can actively participate. For example, "the National Digital Library" project has succeeded in networking actors in the museum field and encouraging reflections on museum practices, as Riitta Autere comments:

> "Pilot-phase meetings and the mailing list yielded a wealth of information that went beyond one's own materials and involved a lot of peeking over the fence and asking, 'Why do you do that?'" (Riitta Autere in The National Digital Library – collaborating and interoperating 2011: 23)

and to provide "permanent and sustainable solutions" (Elina Heikka in The National Digital Library – collaborating and interoperating 2011: 18). The most complex, and hopefully sustainable, solutions were brought by "the Museum 2015" project, and covered the acquisition of the joint museum system, cataloguing development (for example cataloguing instructions: Furu 2012), the enterprise architecture and the public interface "Finna"[105], functioning as a website for digital content from Finnish museums, libraries and archives.

5.3 Small museums in the network of national initiatives

The Finnish museums sector is influenced by a number of national projects, which may be considered a practical realisation of national policies in the area of digital cultural heritage. One of the most influential projects is the Ministry of Education and Culture's "National Digital Library" project, which started in 2008. The "NDL", which is a Finnish response to the European Union's Digital Agenda for Europe's objectives on digitisation of cultural heritage, is based on "the Government Resolution on the Objectives of the National Information Society Policy" and "the Ubiquitous Information Society: Action programme 2008-2011". The project's strategic foundation is strengthened and its development outlined by the Government's report to the Finnish Parliament "A productive and innovative Finland – A digital agenda for 2011-2020" and the Ministry of Education and Culture's prospectus "A competent and creative Finland", as well as the Government's report to the Parliament concerning the future of culture and arts (The National Digital Library - collaborating and interoperating 2011: 9). In 2011, the Government Resolution on better

105 Finna, https://www.finna.fi [20-07-2016]

accessibility to and improved reuse of the digital materials of the public sector was released, which consequently demonstrates further support of the main objectives of the "NDL" project (The National Digital Library – collaborating and interoperating 2011: 9). The project is focused on the management, access and long-term preservation of electronic material of Finnish culture and science[106]. Its main focus areas are to maintain and develop a public interface for libraries, archives and libraries, to digitise cultural material, plan and develop the long-term preservation services, and to promote the interoperability of information management[107].

The "National Digital Library" project has been divided into several stages. Between 2008 and 2011, the project's basic objectives and requirements were defined. During the second stage (2012-2013) the first version of "Finna" was developed and launched. In 2014 the project incorporated more museum and higher education institutions, and the system's functionality and usability was developed. In 2015 several activities were undertaken to foster and facilitate further integration of services and interoperation within the memory institutions and to develop the "Finna" service. Furthermore, the development strategy for the years 2016-2020 was proposed (Kansallinen digitaalinen kirjasto -hanke, Loppuraportti hankekaudelta 2011-2013: 7). In 2016 further development activities have been started to include further partners, to make the cultural data accessible and to develop the service to support new users. Professionally managed museums have been part of these processes since the beginning of the "National Digital Library" project, mainly through the "Museum 2015" project.

Furthermore, at the same time museums have been actively reflecting on and developing collections documentation and management. In 2009, the professionally managed cultural history museums launched a project called "TAKO". The project is coordinated by the National Museum of Finland and the participation is voluntary. The objectives of the project are to coordinate collaboration among museums in relation to acquisitions and documentation and to improve collections management, mobility and competencies. Sharing the responsibilities for documenting between the museums is related to the main objective, the creation of the so-called "Finland Collection". According to the vision of the project, the Finland Collection is a national collection and data bank. The collection represents a well-documented and accessible cross-section of material culture in Finland and it consists of different types of objects from different museums. The idea to coordinate documentation activities originated in the 1980s, when the National Board of Antiquities appointed a study group to draw up guidelines for coordinated and joint collections documentation practices in museums, and even though the project did not proceed and result in the expected way, the guidelines influenced the documentation work of museums for years to come (Ahola 2012). Moreover, the museum professionals were also influenced by their Swedish colleagues, who launched a similar initiative called "SAMDOK" (1977-2011) (Ahola 2012). "SAMDOK" was a voluntary organisation of eight Swedish museums of cultural history: county museums, municipal museums,

106 National Digital Library, http://kdk2011.fi/en/ [26-10-2012]
107 Kansallinen digitaalinen kirjasto, Tietoa hankkeesta,http://kdk2011.fi/fi/tietoa-hankkeesta [26-10-2012]

national museums, and specialist museums[108]. The research on contemporary studies was carried out in seven working groups. The working groups served as a model for the work organisation in "TAKO" (Ahola 2012: 2).

In 2007 the "SAMDOK" network organised the international conference "Connecting Collecting" (15–16 November 2007, Nordiska Museet, Stockholm, Sweden), in response to growing international interest in the research and work of "SAMDOK". One of the outcomes of this conference was the establishment of the "Collectingnet" network with the aim of reflecting on collection development and launching an international dialogue with ICOM (Fägerborg & von Unge 2008: 7-8). Consequently, ICOM's new International Committee for Collecting COMCOL was confirmed in 2010[109]. As an international committee, COMCOL also has Finnish members. Both initiatives, "SAMDOK" and "TAKO", which at first glance seems to be national initiatives, have behind the international networks of very specialised museum professionals, whose perspectives and research practices are not limited by the walls of their own institutions.

The "NDL", digitisation and "TAKO" projects have demonstrated the importance of the development of digital collection management and have strengthened cooperation within the museums sector in relation to collections preservation, mobility, knowledge, study, accumulation and availability. Moreover, the NDL project indicated that the current architecture and infrastructure of collections in museums do not meet present and future needs (Vuola, Furu & Vakkari 2011). Consequently, a new joint project of the National Board of Antiquities, the Finnish National Gallery and the Finnish Museums Association has been launched. The "Museum 2015" project was funded by the Ministry of Education and Culture and scheduled for years 2011-2015. The main objectives of the project were to

> (1) unify museum collection management practices in order to (2) develop an enterprise architecture for collection management and an administration model for the enterprise architecture, and finally (3) to create conditions for the acquisition and implementation of a unified collection management system.[110]

The tasks were assigned to 3 working groups: (1) the enterprise architecture working group[111], (2) the cataloguing working group[112], and (3) the requirements specification working group for the joint museum collection management system[113]. The working

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108 What is SAMDOK, Nordiska Museet,http://www.nordiskamuseet.se/publication.asp?publicationid=4213 [12-03-2013]

109 International Committee for Collecting COMCOL, http://www.comcol-icom.org/ [12-03-2013]

110 National Board of Antiquities, The Museum 2015 Project,http://www.nba.fi/en/development/museum_2015 [26-10-2012]

111 National Board of Antiquities, The Museum 2015 Project, Enterprise architecture working group, http://www.nba.fi/en/development/museum_2015/enterprise_architecture_working_group [26-10-2012]

112 National Board of Antiquities, The Museum 2015 Project, Cataloguing working group, http://www.nba.fi/en/development/museum_2015/cataloguing_development [26-10-2012]

113 National Board of Antiquities, The Museum 2015 Project, http://www.nba.fi/en/development/museum_2015 [26-10-2012]

group consisted of a number of Finnish museum professionals, but their work may be followed and commented by joining the commenting groups.

The results of the enterprise architecture working group was the description of the museums' management enterprise architecture[114]. Its purpose is:

> to create an overview of the museum sector's collection management as a whole and develop practices and synergy as well as advance the diverse utilisation of information and communication technologies in collection management work.[115]

The architecture presents how different elements of the collections management of professionally managed institutions are related to each other and explains how they are connected to the other stakeholders' architectures. The presented elements are systems, agents and responsibilities, standards, processes and operating instructions, equipment, information networks, services, interfaces and technical requirements.[116] In relation to cataloguing, the working group prepared the museum cataloguing instructions, which are based on more than 500 SPECTRUM standard's instructions[117]. The instructions were prepared for the purpose of cataloguing objects, photographs, artworks, archival material and audio-visual material[118]. The main achievement of the requirements specification working group for the joint museum collections management system was a requirements specification, and on this basis the new system was obtained. In 2015 the system has been tested with several museums during the pilot stage[119]. In 2016 the pilot stage was completed and the new system MuseumPlusRIA was launched (Museo 2015 Uutiskirje 2/2015).

In the 2010s the "National Digital Library" and "Museum 2015" have been the most important projects for the museum sector that follow the national policies, laws and recommendations. Even though "Museum 2015" is the initiative that prioritises the needs of the professionally administered institutions, the results can be used by small museums as well. Collection management services are provided by the Finnish Museums Association, and the system itself is affordable and can be used by small museums as well. However, this does not mean that the system will be used to the same extent as in professionally managed institutions, as it has been said previously that professional collection management systems are too complex to be suitable for small institutions (Hongisto in Ekosaari 2008).

As shown in the previous chapters, documenting and digitising the collection is a demanding task that requires sufficient skills, tools and commitment. Having a

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114 Museoiden kokoelmahallinnan kokonaisarkkitehtuuri 1.0, (2013) Museoviraston ohjeita ja oppaita 2, Museo 2015 ja Museovirasto, Helsinki, http://www.nba.fi/fi/File/1859/museoiden-kokoelmahallinnan-kokonaisarkkitehtuuri.pdf [01-08-2014]

115 Enterprise architecture, The Museum 2015 Project, National Board of Antiquities, http://www.nba.fi/en/development/museum_2015/enterprise_architecture_working_group [01-08-2014]

116 Ibid.

117 Museum cataloguing instructions, The Museum 2015 Project, National Board of Antiquities, http://www.nba.fi/en/development/museum_2015/cataloguing_development [01-08-2014]

118 Luettelointiohjeet, http://www.luettelointiohje.fi/[01-08-2014]

119 Museum 2015 collection management system, The Museum 2015 Project, National Board of Antiquities, http://www.nba.fi/en/development/museum_2015/ [01-08-2014]

good collections management system does not automatically mean that the museum will consider collection documentation as its priority. In the next part of this chapter I present the specific cases of a number of museums in Satakunta. In this context it will be easier to place the collections documentation practices within the context of these museums.

5.4 Small local museums in Satakunta

FIGURE 12 The Vampula Museum, Vampula

The buildings of the Vampula Museum look astonishing in winter. The museum is situated by the Loimijoki River passing through the municipality, and it can also be seen from the town side.

Located in western Finland, with a population of 226537 inhabitants, Satakunta is among 19 Finnish regions the 7th most populated region (Kuntien asukasluvut aakkosjärjestyksessä, Väestötietojärjestelmä 2011) and is divided into 21 municipalities. Besides an administrative region, it has been for centuries a historically and culturally distinctive entity. Satakunta has interesting folklore and rich history. One of the Finland's most well-known Stone Age artefact, a moose's head of stone was found in

the municipality of Huittinen, and is dated to around 5200 BC[120]. In addition to the moose's head sculpture, the Stone Age is known in Huittinen from the eponymous Kiukainen Culture settlement site at Uotinmäki in Panelia. Finland's famous archaeological sites from the Bronze Age are at Rieskaronmäki in Nakkila and in Kivikylä, where the Sammallahdenmäki site has been included in the UNESCO World Heritage List since 1999. Archaeological sites and artefacts from the Iron Age are characteristic of Eura. In medieval times, a number of settlements were established, and in the 14th century, Ulvila was one of the six medieval towns of Finland. Its position was taken by Pori, founded in 1558 by Duke John, later King John III of Sweden. Nowadays, Pori is the main city in the region. Rauma, the second main city, also dates back to medieval times. The wooden centre of Rauma, with the oldest buildings dating from the 18th century, is on the UNESCO World Heritage List (1991). In addition to archaeological and historical attractions, Satakunta is also an important touristic destination with its three national parks.

FIGURE 13 The Agricultural Museum, Eurajoki

Most of the museums are located in idyllic surroundings, such as the Agricultural Museum in Eurajoki. Foreign workers from the nearby Olkiluoto Nuclear Power Plant's construction site visit the museum in their free time.

120 Huittisten hirvenpää, Huittisten museo, Huittinen, http://www.huittinen.fi/palvelut/kulttuuri_ja_vapaa-aika/huittisten_museo/huittisten_hirvenpaa_-veistos [15-02-2016]

According to a brochure prepared by the Satakunta Museum, there are 61 museums in Satakunta, while the database of the Finnish Museums Association includes 43 museums. The brochure was prepared by the regional researcher Akuliina Aartolahti, responsible for the regional museum work. Both sources cover the same professionally run institutions, but the brochure presents more small local history museums. Aartolahti knew these museums much better and she tried to keep the information on these museums up to date.

The establishment of local museums is connected to the home region movement. There are two seminal publications on the subject, published by the Finnish Literature Society and the Finnish Local Heritage Federation. The first publication covers the history of the movement between the years 1894 and 1944 (Stenfors 2007), and the second period between the years 1945 and 2000 (Turunen 2004). As Piia Stenfors defines, the term "home district" or "home region" ("kotiseutu" in Finnish) means a place, neighbourhood, locality, where someone has (childhood)home, or where is from (Stenfors 2007: 15). The home district movement may also be translated as the local heritage movement, or it may refer to a local community or society movement as well. The beginning of the movement dates from the end of the 19th century, when the first projects documenting local history were undertaken. Before long, the first societies were established. Local museum work was the most popular activity of the societies before 1944. The early societies collected not only artefacts, but also archival material and literature (Stenfors 2007: 39). Between 1945 and 1954, a second wave of establishing local associations was noted. Around 110 Finnish-speaking museum associations and local societies started to function (Turunen 2004: 19). The associations continually collected and documented local material artefacts and organised different types of competitions aiming at collecting memories and knowledge of traditions and events. This resulted in a number of publications on local history and tradition. Methods were also improved – for example the interviews were recorded (Turunen 2004: 171). The first central organisation, the Finnish Local Heritage Federation was established in 1949 and at this moment includes around 800 local associations. The federation's main aim is to promote local heritage work, locality, and cultural heritage. As the central body lobbying for local heritage work, develops and supports local heritage projects as well as promoting "recognition of the diversity of Finnish culture and regional cultures in Finland". An example of their support is an online manual on local heritage research and publishing, for example a publication on principles of local heritage research entitled "Kotiseutututkimuksen ABC - jokamiehen käsikirja"[121].

The museums that are presented in this chapter have different histories. The representation does not aim at a historical overview. Instead, it is a portrayal of some of the people who are behind these museums, short presentation of their museums and the problems related to the museum work.

121 Kotiseutututkimuksen ABC - jokamiehen käsikirja, https://kotiseutuliitto-yhdistysavain-fi.directo.fi [30-03-2015]

FIGURE 14 The Säkylä Museum, Säkylä

The Säkylä Museum, located by Lake Pyhäjärvi, is sometimes a setting for wedding photographs.

The museums that I visited are situated in small villages and municipalities, surrounded by beautiful forests and fields. Some of them cannot be reached by public transport, but in winter even one's own car does not guarantee success, as the local roads may be covered with a thick layer of snow. These municipalities are typically inhabited by a few thousand people, from which the persons responsible for the local museums are recruited. In some places, there are only a few hundred inhabitants. The local people know each other, and even if someone is not directly involved in the museum work, but has some traditional skills or knowledge, they are invited to the museum or to events to demonstrate for example how to spin wool into yarn. The persons I talked to have gained, during their long involvement in the museum work and home region movement, a strong knowledge on the local community and its history, its members and their skills. Their networks spread over the region. Almost all the museums, I present here, are run by local associations. The only exception is the Säkylä Museum, which is owned by the municipality. In this situation, when the museum is not run by the association, the way it is organised is quite different from the association-run institutions.

Established in 1962, the Säkylä Museum is by Lake Pyhäjärvi, the largest lake in South-West Finland, renowned for its clean waters and biological richness. I talked about the museum with Mirja Vuorinen, the local Library and Cultural Officer who is responsible for the museum and administrative tasks, and with Raimo Kotsalo, who as a local guide is involved in practical museum work. We met in the library in Säkylä, and then Raimo Kotsalo presented the museum to me.

FIGURE 15 The Säkylä Museum, Säkylä

Every year pupils from the local school visit the Säkylä Museum, where they hear many interesting stories from Raimo Kotsalo. They can also touch objects and learn about life "before Donald Duck".

The history of the museum is presented on the municipality's website, and I was referred to this source when I asked about its history. The history is a description of the museum and the museum buildings. Instead of talking about the museum's history, Mirja Vuorinen explained how she manages her duties related to the Museum. She is responsible for the administrative tasks, and the final decisions are made by her principals. I knew that their museum has participated in several bigger events, which gather many local museums from the region, such as the Rauma Region's Museum Weekend. I asked how this kind of events are organised. She explained that the way the events and museum network is organised has been known for years. During the organisational meetings, the museum activists and officers discuss new

ideas and develop new concepts. She referred to problems related to changes in local government. In Finland, at the time of visits, local government was being restructured. Some of the municipalities were consolidated and the officers' positions were reduced. This also had consequences for local museums as the network of people was changing or decreasing. Previously, one municipality administrated several villages, and each of them could have a local museum. After the consolidation, there are many more museums in bigger municipalities, but during regional meetings not every place has its own representative to support their own local museum. As the positions have changed, it may be difficult to find a contact person.

The problems related to the restructuring of the local government were recognised and discussed in all the museums the I visited. For example, Ulla Antola from Lappi pointed out that access to information has become worse. Finding new points of access required activity, involvement and large social network. Ulla Antola, as a very active volunteer in many local heritage associations, succeeded in managing in a new situation, but not all of the museum representatives followed these rapid changes.

My discussion with Mirja Vuorinen and Raimo Kotsalo was interesting because Mirja Vuorinen, as the officer, has a very practical and administrative approach. This perspective was counterbalanced by the opinions of Raimo Kotsalo, whose comments provided a broad historical and cultural overview of the issues related to museum work:

> Raimo Kotsalo: We, small local museums in Säkylä, did not exist, when that huge fraud happened, the university student corporation's expedition. All the old and fine things, valuable from the cultural historical and local heritage perspectives, were taken to Helsinki, and they are stored in Tikkurila. And no one sees them.
>
> Magdalena Laine-Zamojska: Yes, and to the National Museum of Finland…
>
> R. K.: Yes, this is how it happened. We call it "the robbery tour". We also have a few objects that the previous regional museum researchers lusted after… that would be handy to get them to Pori. Only "over my dead body", the term can be used… What has been bothering our museum work is that the National Museum has collected all the goodies and the regional museum has been trying to do the same at the regional level. This is not right. After all, the basic idea, the goal of the museum work here, in the countryside, should be that our own children, school kids, see that we had lived before Donald Duck appeared.[122] (Interview Säkylä 2011)

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122 Own translation. Original quote:
RK: Meitä pieniä maaseutumuseoita, meitähän ei silloin ollut, Sakylässä olemassa museota, kun se suuri huijaus tapahtui, se osakunnan maakuntaretki.Jolla kaikki hieno vanha tavara, siis historiallisesti ja kotiseutuhistoriallisesti arvokas vietiin Helsinkiin ja nyt se on Tikurillassa varastoituna. Ja kukaan ei näe

M. L-Z: niin, ja kansallismuseoon meni…

RK: Joo, me kutsumme sitä rosvoretkeksi. Ja meilläkin on muutamia esineita, joita maakuntamuseon edelliset maakuntatutkijat himoitsi, että olisi näppärä saada Poriin ja tämä vain ruumini yli termin käyttöön. Meidän museotoimitaahan on kiusannut se, että Kansallismuseo on koonut herkut päältä, maakuntamuseo pyrki maakunnallisesti samaan. Ei tämmönen ole oikein. Ja kun kuitenkin tarkoituksena museotoiminnan, se perus idea täällä

What is interesting that not only Raimo Kotsalo pointed out that many of the interesting objects were taken to the collections of the regional museums and the National Museum of Finland. The collection of the National Museum has been formed for more than 200 years. Since 1874 the ethnographic objects were collected by the regional corporations of university students as part of their activities of conserving regional corporations' collections became a part of the State Historical Museum's collection, and later, the National Museum's collection (Härö 2010: 134-135). After 1905 the corporations started to research and publish on the subject (Heinonen 2010: 156). After 1908 the home region research and museum work were closely connected to each other and many of local heritage museums were established (Heinonen 2010: 157).

The regional corporations were influenced by the work of Artur Hazelius, a Swedish teacher, folklorist and collector of traditional culture. In 1873 he opened the Scandinavian Ethnographic Collection to the public and in 1891 he established the Skansen open-air museum in Stockholm. Skansen served as a model for the Seurasaari open-air museum, located on an island in Helsinki and founded in 1909. Since then it has inspired and influenced local heritage associations and their museums.

Beside these movements, the collection documentation in local museums has also been influenced by regional museums. For decades, the regional museums have been actively involved in the local museums' collection research and work. In the early 1960s there were several initiatives related to documenting the collections of local museums. The collections were photographed, documented and stored in the regional museums ("central archives"). The Finnish Museums Association succeeded in receiving funding from the Ministry of Education to proceed with work on these central archives. The goal was to have the collections documented by the 1980s (Vilkuna 1998: 140-141). The local representatives of the museums were trained and supported to document their collections. Since the 1960s the Satakunta Museum has been actively involved in this project and regional collaboration with the small museums is still focused on the collection work (Satakunnan museo 2009).

The collection issue arose also in Panelia, where I met Jaakko Heiska, Juhani Vihervuori and Mikko Tolvi. The archaeological Kiukainen Culture was located in the area, but the contemporary village (around 1,600 inhabitants) is known for its very strong community spirit. The church (1909), dairy (1908) and the ice sports hall (1999) were built by the local community. The village is also known also for its local museum, situated in the dairy building, but mostly for the Panelia Mill, built in 1850. It consists of four mills, standing side by side. Its construction is unique at the European level and attracts many international visitors as well. During the summer, Jaakko Heiska operates the mill and freshly milled flour can be bought directly from there. This is a source of income for the museum. The museum is run by the Panelia Association, established in 1956. Juhani Vihervuori, as the secretary of the association, sent me the history of the Association, which he had prepared. The Association was established to arouse the interest of the local population in local heritage, to

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maalla, pitäisi olla se, että meidän omat mukulat, siis lapset, koululaiset näkisivät, että eletiinpä ennenkin ennen Aku Ankan ilmestymista.

work in the home region to promote local folklore and to find, present and support the conservation of the environment of Panelia and the general care for the home region (Vihervuori n.d.). They are still important to the local community in Panelia. The same reasons are behind the establishment of other Finnish local museums as well.

FIGURE 16 The Panelia Museum, Panelia

The Panelia Association is responsible for the Panelia Museum and watermill. Jaakko Heiska presented both sites. During the summer, he runs the mill every Sunday. The collection consists of the objects collected by his uncle Väinö Heiska, who was also one of the founders of the Museum. Nowadays, as in another museum, the collection grows due to donations from the community. In storage at the museum we could see the first mobile phones, computers and vacuum cleaners used in Panelia.

When I asked what they thought about the future of the museum, Juhani Vihervuori answered that he thinks the museum should specialise in presenting the issues that are characteristic and specific to this place, and which may be recognised as interesting by outsiders as well. However, the problem related to promoting this place is that several archaeological objects from the Stone and Bronze ages were recognised by the Satakunta Museum and the National Museum of Finland as important and taken to their collections. They can lend the objects, but this is difficult due to safety requirements and insurance issues. As we had an opportunity to meet al.l together, our conversation had features of a brainstorming session and they discussed among themselves the potential solutions. In this case, they proposed that instead of the original artefacts, the copies or replicas would be used in their local exhibitions. The

same topics arose when we discussed the ViMuseo system. In addition, Mikko Tolvi said that although the objects have been taken to other collections, the excavation site is there:

> Mikko Tolvi: And then, of course, if some sword was found here and kept in the National Museum, we still have the place where it was found.
>
> Juhani Vihervuori: Yes…
>
> M.T.: And they cannot take it from here. We can demonstrate that it was here. What is missing in the museums in Helsinki is that this site cannot be displayed there.
>
> Jaakko Heiska: And there they only talk about Aloksenranta.
>
> J.H.: We are living at the beginning of the 21st century, and we can imagine such relevant issues that we should receive some sort of copy to display. It is an essential part of this place. Two swords from Panelia are on the ground floor of the National Museum.[123] (Interview Panelia 2011)

Another important issue that has arisen also in Panelia, were the problems related to the restructuring of local government. We discussed the online presence of the Museum. After the consolidation of the municipalities, some of the online resources with information about their museum disappeared as the municipality's website was closed. Also, further development of the museum may be quite problematic. Mikko Tolvi pointed out that the museum is lacking a leader. They all care for the museum, but no one is taking the main responsibility for the whole museum work. The museum has not been developed for two years in any way; they are only maintaining the status quo.

Each place I visited is a unique configuration of people involved in museum work. I met only some of the network's representatives, but behind each museum there are a number of people more or less directly involved in the museum work. For example, in Vampula, where I met Tapani Kotaja, the museum is managed by the related association, with a board of 6 members. In addition, there is a secretary and a treasurer. Tapani Kotaja said that there were around 10 –20 persons actively involved in the museum work, because also the board members' spouses helped. In 2009 Vampula was consolidated with the municipality of Huittinen (10,636 inhabitants). Before that, Vampula was a municipality with a registered number of inhabitants of also around 1,600, as in Panelia, but the museums in both places have been differently managed. The association is very active in organising museum activities, such as demonstrations of handicrafts by local craftsmen, traditional professions and

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123 Author's translation. Original quote:
MT: Ja sit tietysti voihan ne jos joku miekka on löydetty täältä mikä on nyt sat..tual Kansallismuseossa ni ohan meillä se paikka mistä se on löydetty.
JV: Niin.
MT: Sitä ne ei saa täältä vietyä et. Sitähän me voidaan esitellä et täsä se oli. Museoista sit taas puuttuu Helsingistä se et siäl ei voi niinko näyttää sitä paikkaa.
JH: Siellä vaan puhutaan Aloksenrannast.
JV: Mut tämmöstä kakstuhatlukua eletään ni kuvittelis että tota, tämmöset ollelliset asiat, niin et meidän kuuluis saada jonkin näköinen kopio tänne näytille. Se on oleellinen osa paikkakuntaa, siellä on kaksi panelialaista miekkaa siällä tota Kansalismuseon alakerrassa.

other traditional skills. The main visitor groups consisted of local people, summer visitors and schoolchildren. One of the most popular summer events attracted around 180 visitors, even though the day was rainy. Interestingly, the event was not a traditional museum event, but an agility show for llamas and alpacas.

FIGURE 17 The Vampula Museum, Vampula

Tapani Kotaja showing his grandmother's wedding crown.

The association is community-oriented and the activities they organise support the welfare needs of the community members, as in Panelia. The association in Vampula does not organise any museum events in collaboration with other museums. Instead, they are focused on their own community. When we visited the museum, Tapani Kotaja showed me the objects that belonged to his family and the documents from the local dairy co-operative. There were several surnames, and he said that the same families have been living in the area for a few hundred years. The museum was established in 1936 and one of the first visible achievements of the home region and museum association was the design and realisation of the traditional folk costume of Vampula (1937). The purpose of the association was to acquire material for the museum collection and to promote the home district movement. Despite being very active, the association does not have regular members and does not collect any membership fees. The information on the museum is on the website of the city of Huittinen, to which Vampula belongs.

Museum work is organised completely differently in Vasarainen, where the Muina Homestead Museum is located. Vasarainen is inhabited by around 700 persons, and belongs to the city of Rauma. The museum is managed by the Muina home region association ("Kotiseutuyhdistys Muina"), which has almost 300 members. The association is very closely attached to the museum work and has participated in many larger projects aiming at promoting and protecting local heritage. The association has its own website, with hundreds of images presenting the museum buildings, but more importantly, the events and demonstrations of handicrafts. I met the association's chairman Leena Kekäle, who also showed me the museum. The museum is well networked. Leena Kekäle knows other museum representatives from the area, and when I called her to make an appointment we decided to meet at the same time with Ulla Antola from the museum in Lappi TI.

FIGURE 18 The Muina Homestead Museum, Vasarainen

In many museums there are several types of wooden constructions, such as different kinds of mills. Their maintenance requires appropriate know-how.

The community in Vasarainen is so active that when they have volunteer days, the volunteers are so eager to participate that they show up ahead of time. The associations is divided into several subcommittees responsible for different tasks. They regularly organise seasonal events. In 2004 the association was funded by the Ravakka Rural Development Association, a local action group, to run a local memory project ("Muinaiset muistiin Muinassa"). The project was organised because the representatives of the youngest generations do not have their own

experience of previous working methods, nor do they know the history of the museum and the buildings. Within the project the representatives of the elderly generation were interviewed and the museum archive researched. As a result, a brochure on the museum and its history was published (Muina 2004).

While all the museums that I visited have their specific atmosphere and are beautifully located, the Muina Homestead Museum is situated in an idyllic rural location. The whole museum consists of several building serving different purposes. The windmill situated on a small hill decorates the landscape and even became an element of the museum's logo. When we visited the place, the area was covered with snow, and it looked very magical. Leena Kekäle was introduced the museum. In the summer, the local people meet in the museum, engage in handicrafts, restore the building or organise events for wider audiences, while children play on the stage, which is located next to the main building.

FIGURE 19 The Muina Homestead Museum, Vasarainen

Leena Kekäle at the Muina Homestead Museum. The museum serves as a community centre for local inhabitants.

In each museum there are attempts to link the younger generations with the museum and the local community. One way to do so is to present the museum to schoolchildren and organise some practical demonstration. For example, in Säkylä, all the local school kids visit the museum. However, as Tapani Kotaja explained, there are some difficulties with organizing school events, because the teachers would like to visit the museum during the time before the summer school holidays. When the grades are already given, they try to organise more activities outside the school.

The museum representatives are volunteers and as some of them are farmers, their spring schedule is very dependent on the weather and they are quite busy then. In Vampula there is only one school a lower comprehensive school (ages 7–12 age), but all the children visit the museum, also children in the day care. During these visits, they participate in demonstrations of heritage and learn how local life looked like many decades ago.

FIGURE 20 The Museum in Lappi Tl, Rauma

Ulla Antola presenting her favourite object. The glass bulb was used as a reflector - an equivalent to present-day spotlights. During our visit I also had the chance to meet her grandson.

Another way to link the younger generations with the museum and the local community is to invite schoolchildren to take part in museum work. They are given responsibility, for example, for guiding or supervising, as in Lappi. There are many reasons behind introducing younger generations to the local museum work, but I think the personal ones are very strong. The museum is about the local history of the place and the community. The museum in Lappi TI was presented Ulla Antola, who came with her grandson. During our earlier meeting, when we also met Leena Kekäle, we also talked also about their grandchildren. We met in December, and Ulla Antola told about a family event:

Ulla Antola: Recently I have had a very nostalgic weekend; it was not necessarily very pleasant. On All Saints' Day we always have an evening ceremony for these who passed away during the year. My brother died half a year ago. My sisters, the brother's children

> and the widow, we all gathered together; first in the church in Lappi, then of course we lit the candles on the cemetery, and we did all these things that are connected to it. After that we came here, to my home, my house with my brothers grandchildren, four kids. I am a bit different as a grandma. In our grandmother's place there is nothing new. Only these that mum and dad played with forty years ago, or even older things.
>
> It is very funny to see how the kids totally enjoy it!…when they are playing all these old toys. In my opinion, the best is that here is nothing new. My brother's daughter, she, for example, has recently bought a new house, and before they move in, everything is painted white. Even though they are not a very old couple, they do not take anything from their old home. In the new place everything is new. Emma says that 'I want to come in to Ulla's house again!'
>
> M. L-Z.: How old is she?
>
> U. A.: She is four years old. I think it is very good that they are so much into playing. My son will turn forty in January and my daughter is a few years younger and I have their old toys… When I became a grandma, I took them back from the attic. I have not bought anything new to play with in here. This is a slightly different grandma's place, here they [grandchildren] can play with the things that they do not have at home.[124] (Interview Lappi and Muina 2011)

The people that I met were very personally involved in the museum work. Our discussions were highly informal and we also talked about our families and everyday life. This generational aspect was very relevant in all the museums. The museums serve as a vehicle for preserving the history of the community, but also of the families, who have been living there for several generations. The older generations keep in their memories knowledge about the past and want to transmit it to the younger generations. There is concern about the future of the knowledge and the memories that the older generations possess. When I visited the Köyliö Croft

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124 Author's translation. Original quote:

> UA: Mul on ittel ny just tota tosi nostalginen viikonloppu ei ollu välttämät kauheen mukavat merkit meillähän on pyhäinpäivän se iltatilaisuus aina näille vuoden aikana kuolleille ja mult on veli menehtynyt puolivuotta sitten ja mun sisaret ja se veljen lapset ja hänen leskensä ni oltiin sit kaikki yhdessä ensin tos Lapin kirkossa ja tota tietyst sytytettiin kynttilöit hautausmaal ja muuta tämmöst mikä siihen kuuluu mut sit mentiin tänne mun asuntooni kotiini talooni ja tota siäl oli mukana mukana sit näitä veljen lapsenlapsia neljä kappaletta ja mähän olen vähän sellanen toisenlainen mummu et meiän mummolas ei ol mitään uutta meil on vaan niit mil isä ja äiti on leikkiny neljäkymment vuoat sitten sitten taik viäl vanhempaa tavaraa se ol tosi hauska nähr ku muksut on aivan riemuissas.
>
> Touhus siin vanhoil vanhoil leluil ja mun miälest parast se kun tän veljenpojan tyttö on semne et sillä ei ole mitään uutta mitään mitään vanhaa et kaikki on uutta ja hän on nyt esimerkiks he ostaneet talon niin ennen ku he muuttaa ni kaikki maalataan valkoseks vaik ei hekään kovinkaan vanha pari oo niin mitään vanhan asunnon huonekaluja viedä vaan kaikki pannan sinne uutta ni he lähtee pois ni Emma sanoo et mää tahdon tulla Ullan talon toisenkin kerran sisälle.
>
> MLZ: Minkä ikäinen hän on?
>
> UA: Neljä vuotias.
>
> Must on tosi hyvä he he tosiaan kyl he ihan antaumuksel leikkii leikkii
>
> Tota mun on poikani täyttää tammikuussa neljäkymmentä ja tyttöni on pari vuotta nuorempi ja heidän vanhoja lelujaan mä oon … tultuani itse mummuks ni olen hakenut vintiltä säilöstä taas takkaisin ja emmää oo ostanut niil lapsil mitään uutta mummulaan

Museum, I introduced myself to Paula Härkälä and said that beside the museum my interests are related to the people who run the local museums, because I think that these museums cannot exist without them, she agreed and explained that she has been the chairman of the Köyliö Croft Museum Association's board, and has been guiding in the museum, but nowadays no one wants to replace her. She said that her daughter, who lives nearby is "half-forcibly managing" the museums, but as a working person cannot do it during working hours. Paula Härkälä was concerned about who can manage the museum and guide visitors, when she has no energy to do it (Paula Härkälä, 18-01-2012, Köyliö Croft Museum, Tuiskula).

FIGURE 21 The Köyliö Croft Museum, Tuiskula

Paula Härkälä shows a split tally stick to explain the etymology of the Finnish idiom "päivä pulkassa" ("call it a day").

Paula Härkälä laughed a bit when she said that her daughter has been involved in the museum work "half-forcibly", but also Hannu Rinne from the Cheesemaking Museum in Nakkila said with a laugh that he is involved in the museum work because was "forced" by his colleagues (Hannu Rinne, 17-01-2012, Cheesemaking Museum, Nakkila). It is understandable that all of them are voluntarily involved and do it because they want to, but there are also strong personal and social networks, within which they function and which they respect. The second issue that is visible in Paula Härkälä's statements is the problem of the generational shift. For a few decades, people have been constantly moving from villages and small municipalities to cities. The number of schools has decreased, which means that the long-term

relation between local museums and schools is also becoming more and more complicated.

Moreover, they know that the feature of their museums is uncertain, also due to the administrative changes and decrease in funding. In Hinnerjoki, Matti Perävainio referred to these problems in his answer regarding the future of their museum:

> Magdalena Laine-Zamojska: What could be the future of the museum?
>
> Matti Perävainio: That is a rather interesting question. It is said that if this municipal reform is coming, large municipalities will be established. If there are many small museums in the large municipality, it is sure that some will be closed. I am a bit afraid. That is why I think that you make your museum as modern as you can so you will be able to influence matters. It also ensures that you have got a better chance to survive.
>
> M.L-Z.: Because it is like professionally managed.
>
> M.P: Exactly.
>
> M.L-Z. Why should it be closed, if so much work has been already done?
>
> Lea Heikkilä: Yes.
>
> M.P.: Exactly. This is how I think and calculate. I am quite sure that this is going to happen. And if you collect some objects little by little, and you keep quiet about it, it will go badly. There are a few small examples of that. Here, of course, these buildings belong to the municipality. According to the governmental decision, the municipality is obligated to allow the museum to use them. Of course, there may be also discussion about sharing the costs and so on. Money is always a problem in these museums.[125] (Interview Hinnerjoki 2011)

Established in 1956, the Local Museum in Hinnerjoki is a good example how the local community tries to develop their museum and in this way to ensure its future. This tendency has been present in this museum for several decades. The new exhibition was designed in the 1980s during the enlargement of the museum. It is divided into thematic groups displayed in separate sections. There are for example a com-

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125 Author's translation. Original quote: MZ: ja mikä voi olla museon tulevaisuus?
MP: se on aika mielenkiintoine kysymys. 56:56 sanotaan nyt et jos tulee nyt esimes tää kuntauudistus, niin kun tällä puhutaan, ja tulee suurkuntia ja suurkunnan alueella on esimerkiksi hyvin paljon paikallismuseoita jotka sitten on ja aivan varmasti menee joku kiinni. Kyllä mä pahaa pelkään. Mut sen takia katson että just sä teet museostasi niin nykyaikaista kun sä pystyt ja voit siihen vaikuttaa. Se takaa myöskin sen, että sulla on paremmat mahdollisuudet selvitä.
MZ: koska se on niin kuin ammattimaisesti hoidettu.
MP: nimenomaan.
MZ: miksi laitetaan se kiinni, jos on niin paljon töitä tehty jo.
LH: joo
MP: niin, nimenomaan. Näin mä lasken ja ajattelen. Olen aivan varma, että näin tulee tapahtumaan. Että jos tuolla keräilet pikku hiljaa esineitä jossakin vaan, ja olet hiljaa siellä, niin heikosti käy jos. Siit on pikkasen esimerkkejä tuolla jo kun, ainut tässäkin on tietyst se et nää on kunnan rakennuksia, suurin osa mut sit siellä valtioneuvostonpäätökses sanotaan että kunta on velvollinen antamaan ne museokäyttöön. Ainut sit on et sit voi tulla tietyst keskustelu kustannusjaosta ja niin päin pois. Raha on aina näissä tämmösissä museoissahan on aina se ongelma.

partment presenting a tailor's workshop, school classroom and toys, village shop, a collection or coffee cups or a compartment where medical artefacts are displayed. The new exhibition was created because every year the museum is visited by hundreds of schoolchildren who do not know the purpose of the traditional artefacts, and so the display based on the thematic division is educationally more effective (Kreula 1998: 90).

FIGURE 22 The Local Museum in Hinnerjoki.

Matti Perävainio in the Local Museum in Hinnerjoki. The museum is one of few that digitise their objects.

The museum is preparing its own publications, for example on the local dialect ("Yht miält ko Hinnerjoe miähe" 1991) or on the history of the museum (Heikkilä 1998, Heino 1998, Kreula 1998, Perävainio 1998). The museum attracts also trainees, and one of them wrote an article about the museum, which also increases its visibility. Their biggest museum events, A Hinnerjoki Festival, which draws a few hundred visitors every year, have been videoed for over 20 years. About three years ago, the museum began to digitise its collection. In addition, because of a state-granted salary subsidy, they were able to employ a young person to help in this process.

The museum is so well managed and develops so quickly that is has been taken under the supervision of the Finnish Museum of Agriculture Sarka. Sarka is a national specialised museum. It serves the special needs of smaller, local museums, which have an agricultural collection, by giving advice and support. Sarka has succeeded in creating a network of agricultural museums called "Museoraitti", which

gathers around 30 small agricultural museums. There are several modes of collaboration within the network, such as co-marketing, training, exhibitions exchange. Sarka offers also the Renki cataloguing application based on the Memoron system (Mansoft oy). Matti Perävainio comes in his spare time to the museum with his laptop to digitally catalogue the collection. A location has been prepared in the exhibition space where he photographs the objects digitally. His plan is to add to the system around 1,000 objects per year.

Sarka annually selects one museum, collection, or other agricultural historic location as a summer remote destination. During the summer the chosen destination serves as Sarka's associate in collaboration and its remote exhibition. In 2012, as the chosen remote destination was the Agricultural Museum in Eurajoki, run by its active association with some 300 members. The association has its own website and has published several brochures and articles on local heritage. Pertti Lehtimäki guided me through the museum, and presented the agricultural collection. As a person with practical experience in this field, Pertti Lehtimäki was able to explain all the details and to share his own knowledge, which made this visit very interesting, even though I am not very familiar with the subject of agricultural machinery.

FIGURE 23 The Agricultural Museum in Eurajoki, Eurajoki

Pertti Lehtimäki presenting a vast collection of agricultural machines and tools.

The Agricultural Museum belongs to the museum complex. Located near the church, beside the Agricultural Museum, the complex consists of several museums: the local history museum, the School Museum, the Cellar Museum, the so-called Munakari

Boys' Room with a fisherman's home interior and the Fire Equipment Museum. The association also manages the only Pharmacy Museum in the Satakunta region, located in the centre of Eurajoki. Involved in founding the Pharmacy Museum was Ulla Antola (museum in Lappi Tl), who as a health-care professional was familiar with the subject, and as a local heritage activist was enthusiastic about the project.

This illustrates that the network of people who are behind these museums spreads across the region. The network consists of both museum professionals and museum activists. The museum professionals from the professionally run museums, such as Sarka, provide the necessary support, but the museum representatives and volunteers, such as Matti Perävainio, Ulla Antola and Pertti Lehtimäki have knowledge of the local community and traditions, as well as the skills necessary to maintain the small museums. The network is based on both formal and administrative relations and informal connections. For example, in Luvia, the Luvia Museum was presented by Heidi Helkiö-Mäkelä, who is a museum professional from the Satakunta Museum, and as a volunteer is involved in the Luvia Seor association and museum work. She has been involved professionally in several heritage projects and museum work for several years. It is obvious that this professional background has an impact on this local museum. On the other hand, the experience she gained from the voluntary work influences her professional work as well.

FIGURE 24 The Luvia Museum, Luvia

Heidi Helkiö-Mäkelä showing the Luvia Museum's catalogue. Paper-based catalogues are still the most popular form of cataloguing in the small local heritage museums.

All the museum representatives know their own museums very well. The people who present these museums share their professional experience, passion and personal interests alike. All these elements are visible in their stories, which are a mixture of expertise and personal involvement and enthusiasm. When we visited the Museum in Lappi Tl with the photographer, I asked Ulla Antola what her favourite object is. She showed a glass bulb, which was used as a spot lamp – filled with water it works as a lens, which focuses light on a chosen point. She identified the artefacts that are unique to Lappi and demonstrates local skills and ingenuity. In another museum, the guide pointed out that despite the fact that the life of previous generations was hard and dependent on nature, they still decorated their everyday objects and tools carefully and precisely. This led to a discussion on aesthetic values. Similarly, the shoemaker's workshop made us discuss environmental issues. The people who are currently responsible for these museums are extremely familiar with the artefacts they present and can use them to reflect on contemporary values. Every visit is a unique, reflective and interactive event. The experience these museums may offer different audiences is one of their special features. The people who are involved in the museum work are very reflective and have a unique approach to their museums. The diversity which is characteristic of the Finnish phenomenon of small museums should be taken into account in any in any related digital heritage projects.

FIGURE 25 The Luvia Museum, Luvia

The objects also tell also about the life of the local community in recent decades. The objects, devices and tools of their kind in the community, such as vacuum cleaners, mobile phones and other electronic devices, are very often considered by its members as important and worth preserving, so they bring them to their local museum. In the picture: An old television set from the Luvia Museum.

5.5 Summary

The Finnish museum sector is very diverse. According to the statistics prepared by the National Board of Antiquities for 2014, there are 152 museums responsible for 327 places. The total number of visits was 5.4 million. The funding consists of several sources of income: statutory state aid, direct funding from foundations or associations and grants (municipal or state), as well as the museums' own incomes. In 2014 the professionally administered museums had 1,919 permanent full-time employees, more than half of whom had professional museum-related training. These museums also have a variety of responsibilities, such as promoting museum activities and coordinating museum cooperation.

However, the Finnish museum sector does not consist only of professionally managed institutions. As in Finland everyone can establish a museum, there is a huge amount of voluntarily run museums. In the last year much more data on these museums has been collected. According to the latest report on the subject (Rakkaudesta kulttuuriperintöön 2012), there are also 1,224 museums that are run by a municipality, association, foundation, parish, state, company or a private person. The situation of 726 museums (responsible for 856 museums places) managed by municipalities, foundations or associations was thoroughly researched by the Local Museums Committee. The museums are managed mainly by the volunteers and have very modest resources. It is estimated that every year these museums are visited by around one million visitors.

Both museum types function differently and have very different resources. This is also visible in relation to their collections and the way they are documented and managed. In the professionally managed institutions, there were more than 5.8 million cultural history objects in 2014 (5.6 million in 2010), and the non-professional museum had some 2.4 million objects. The professionally managed collections were better documented: some parts are digitised and the majority is digitally documented, while in the non-professionally managed institutions the collections were mainly documented by using traditional, paper-based catalogues. Furthermore, the way the collections were managed differed a great deal. The professionally administered museums used around 20 collection management systems. The small museums used much simpler tools, such as text MS Word, Excel and Access, because the professional applications are too expensive and technologically complicated.

The main Finnish initiatives on digitisation, improving access to cultural heritage and collection management have been launched in the 2000s. The most important are: (1) the "NDL" project, which has started in 2008 and operates under the Ministry of Education and Culture; (2) "TAKO" coordinated by the National Museum of Finland, and (3) "Museum 2015" which is a joint project of the National Board of Antiquities, the Finnish National Gallery and the Finnish Museums Association. The "NDL" is focused on the management, access and long-term preservation of

electronic material of Finnish culture and science. "TAKO" is aimed at the coordination of collaboration among museums in relation to acquisitions, documentation and improving collection management, mobility and competencies. The newest project, "Museum 2015" is focused mainly on "the unification of collection management practices, enterprise architecture for collection management and the collection management system". The new system was planned to be launched in 2016 (Museo 2015 Uutiskirje 2/2015).

The main digitisation projects target professionally run institutions. The small museums are mainly supported by the regional museums. They try to assist small museums in their development, are familiar with their problems and challenges, and advocate on their behalf. However, the improvement of collection management practices is also supported by the National Board of Antiquities in the form of grants that are allocated annually to small local heritage museums.

In the second part of this chapter I introduced the representatives from the small local heritage museums in Satakunta. The representation serves rather as a portrayal, not a historical overview of their development. These people who agreed to be portrayed described their work and shared with me their concerns about their museums. Their stories included uncertainty about the future of their museums. The museums are run collectively, but in some places there are not enough people to manage all the tasks. They were also concerned about future funding. However, beside their concerns, they shared their passion and enthusiasm about local history. They stressed that the collections of their museums are important to local communities because the objects are connected to their history and experiences. The objects stored in their collections are important to the people who live there, as they tell the stories of their families, relatives and friends from the region. Moreover, they play an important role in the educational process of younger generations. The museums are a place where local communities have an opportunity to interact and spend time. In most places, the documentation of collections is not the most important museum activity, but it is only part of the whole museum experience.

Finally, it is important to mention that these museums offer a different kind of experience especially since the people who run them are very personally involved and are eager to know their visitors. That is why I showed that some of the topics we discussed, were not directly connected to museum work concerning collections. Due to this personal involvement of the museum's keeper and knowledge of their local communities, these museums offer a different and unique experience.

6 ANALYSIS OF MUSEUM PORTALS AND SERVICES PROVIDING ACCESS TO DIGITISED COLLECTIONS

6.1 Introduction

In this chapter I present the results of the analysis of museum portals and services providing access to digitised collections. Although this research is on small, Finnish museums from one region, they are placed within the broader context. In this chapter I will show examples from other countries. Among the analysed portals there is also the most important Finnish service: "Finna"[126], which provides access to digital content from Finnish institutions. In the next chapter, I will use another methodology, to focus in more detail on the Finnish examples. By changing the perspective, the small museums and their specificity are placed both within different contexts: Finnish and international. By deploying different methods, the small museums are seen from different angles.

European museums have been digitising their collections for years. The current trends and the European policy, e.g. PSI directive (Directive 2013/37/EU), encourage wide availability to and re-use of public sector information, which has its consequences for museums as well. Museums share knowledge of their collections in many ways. In the digital era, among the most important tools are online services and portals. In this part I present the data collected during the analysis of 22 museum portals. It will be further discussed in order to answer the research question: What are the qualities of online services and portals providing access to digitised museum resources?

The main objective of the analysis is to analyse the functionality of the selected online services and portals providing access to digitised museum collections. The goals of the analysis were:

- to identify the content of the services and portals;
- to identify the target groups;

126 Finna, https://www.finna.fi [21-07-2016]

- to identify a range of data in the catalogues;
- to identify the functionality in relation to digitised collections;
- to identify content personalisation systems;
- to identify additional applications and solutions (such as QR codes and geolocalisation);
- to evaluate the overall functionality of the services.

6.2 Methodology

The issues that have been investigated in relation to digital heritage services have been reviewed by Ferhat Şen in his research paper on "Islamic Manuscript Collections on the Web: An Evaluation of the User Interfaces" and include searching and navigation, design and presentation of information, user interaction, customisation and authentication or usability studies (Şen 2012: 107). Even though in this research some of these issues have been also investigated, for example in relation to object and display modes, the focus is not on user interface and design. In their investigation on the evolution of disciplines and subjects connected to website design, researchers Cristòfol Rovira and Mari-Carmen Marcos (2013) observed that their number is very high and are both theoretical and practical. Thus, the terms used in this research may not be used by all disciplines and subjects that deal with website design. The focus of this research is on the characteristics of museum portals and services and the objective was to make the text readable for museum professionals and academics. Moreover, there are numerous publications on issues that are in the scope of this analysis, for example digital exhibitions (for example Patel et al. 2005, Roberto 2010, Stogner 2009, Wang et al. 2009, Khoon & Ramaiah 2010,). An interesting contribution to this subject is Kalle Kallio's master's thesis "Museoiden verkkonäyttelyt historian oppimateriaaleina"[127] (2005). In his thesis, he investigated 121 Finnish online exhibitions to answer the question of how they can be used as educational materials (Kallio 2005). In this survey these issues were not studied in-depth, because one of the main objectives was to provide an overview of the museum portals and functionalities of the services.

The online sources were reviewed in order to select a number of museum portals and services. The main source was "Euromusnet – the exhibition portal for Europe"[128]. It is a public access portal providing information on exhibitions and online resources of the European museum. It was co-financed by the European Commission in the framework of the eTEN programme, and its supported by "NEMO the Network of European Museum Organisations". The website presents online resources from museums, gathered as a list with a short description and a link. At the time of analysis, there were 93 resources classified as "collections"[129]. Furthermore, the newest projects are very often presented and discussed at the conferences, e.g. Museums

127 In English: "Museums' online exhibitions as history learning materials" (author's translation)
128 Euromusnet, http://www.euromuse.net/ en/home/ [08-06-2014]
129 Euromuse, http://www.euromuse.net/en/resources/list_resources/?art1=all [08-06-2014]

and the Web[130], Museum Next[131] , or NODEM[132]. The preliminary list of resources consisted of more than 100 links. Some of the resources were created by a one institution to inform about a particular subject or exhibition, e.g. "Treasury of the World: Jewelled Arts of India in the Age of the Mughals"[133]. This site, prepared by the Louvre, is a kind of presentation accompanying the exhibition. These kinds of resources were excluded as their main goal is to promote the event or project, not to provide a wide access to digitised resources, even though if digitised resources are used as a content. The table below lists the resources that were selected for further analysis.

TABLE 2 Basic information about the selected services (2014)

Service	Institution	Number of objects	Number of institutions	Country
Agence photographique de la Réunion des Musées Nationaux / Photo Agency	Réunion des musées nationaux et du Grand Palais des Champs–Elysées	600,000	Hundreds	France
Alfred Flechtheim. Art dealer of the Avantgarde	Bayerische Staatsgemäldesammlungen / The Bavarian State Picture Collections	300	15	Germany
Digital National Museum in Warsaw	Muzeum Narodowe w Warszawie / National Museum in Warsaw	14,760	The National Museum in Warsaw and several branches	Poland
Digitalt Museum	KulturIT	1,402,147	150	Norway, Sweden
eSbírky	Národní muzeum / The National Museum	35,334	Around 30	Czech Republic
Europeana	Europeana	30,006,395	2,300	EU
Finna, Museum Finna	Kansallinen digitaalinen kirjasto / National Digital Library	605,866	Pilot stage: several. Finally: hundreds	Finland
Google Art Project	Google	63,654	Hundreds from 40 countries	International / USA
Het Geheugen van Nederland / The Memory of the Netherlands	Koninklijke Bibliotheek / The National Library of the Netherlands	883,928	100 institutions	Holland

(continues)

130 Museums and the Web, http://www.museumsandtheweb.com [08-06-2014]
131 Museum Next, http://www.museumnext.org [08-06-2014]
132 NODEM, http://www.nodem.org [08-06-2014]
133 Treasury of the World: Jewelled Arts of India in the Age of the Mughals, Louvre, http://mini-site.louvre.fr/moghols/index_en.html [08-06-2014]

Joconde – Portail des collections des musées de France / The national collection database Joconde	Ministère de la Culture / Ministry of Culture	496,000	350 museums	France
Kunstindex Danmark / Art Index Denmark	Stolts- og Kulturstyrelsen / Danish Agency for Culture and Palaces	Year 2004: 200,000	State-owned and state-subsidised museums	Denmark
LIMIS Lietuvos integrali muziejų informacinė sistema / Lithuanian Integral Museum Information System	The Lithuanian Art Museum	400,549	71 museums	Lithuania
Nationalmuseum: Samlingara Online / The National Museum: Collections online	The National Museum	127,000	The National Museum	Sweden
NYPL Digital Collections Beta	The New York Public Library	800,838	The New York Public Library	USA
NZMuseums	National Services Te Paerangi	17,817	405	New Zealand
Rijksmuseum Rijksstudio	Rijksmuseum Amsterdam	275,000	Rijksmuseum	Holland
SI Collections Search Center	Smithsonian Institution	8,600,000	SI: hundreds of memory and research institutions	USA
Staatliche Kunstsammlungen Dresden – Online Collection	Staatsbetrieb Staatlichen Kunstsammlungen Dresden /State Enterprise – State Art Collections in Dresden	1,200,000	Over a dosen	Germany
Tate Collection Online	Tate	70,000	Tate	UK
The National Gallery Collection Online	The National Gallery	2,300	The National Gallery	UK
V&A Collections	The Victoria and Albert Museum	1,132,791	V&A	UK
Virtual Collection of Masterpieces (VCM)	Asia–Europe Museum Network	2,309	More thank 120 museums	Europe, Asia

In order to collect the data, the following steps were undertaken in regard to the selected resources:

- entering the main page;
- in case of non-English sites, switching the language to English. If the site did not have an English version, enabling Google Translator;
- identifying how the collection can be accessed (the path);
- collecting basic information on the project and its stated audiences;
- identifying main functionalities;
- accessing an object;
- analysis of the object description;
- analysis of functions connected to the object;
- identifying content personalisation features;
- downloading information on an object (metadata) and its image (digital representation);
- checking the resolution and size of the image;
- identifying additional features;
- identifying terms of use (copyright in content and use of content).

Collected data was analysed in order to identify the qualities of the services and portals providing online access to digitised museum collections. The used method has its limitations. The data were collected from a perspective of the end user. It means that only the data that was visible for this user was collected and analysed. In other analysis (for example Dorner & Curtis 2003), the providers were contacted and they answered a set of questions that was further analysed quantitatively. In addition, in this analysis only one object was accessed. Usually the end user can see only the information that was provided for a particular object. Some of the objects may be documented in a more specific way. It means that the end user can see a different set of categories while browsing several objects. The results do not show how complex metadata on collections is implemented in a particular service.

Another limitation is that the collected data on a number of museums, objects or collections may be not actual. Depending on the implemented solutions, systems may provide this information in several ways. Some of the systems display automatically a number of digitised and available resources, while others require that this information will be provided by the system administrator or project manager. In addition, the number of accessible objects is constantly changing, as there are ongoing digitisation processes behind these projects. The services are also at a different stages of development and more institutions and collections are constantly added to the analysed services and portals. In relation to the service audiences, the results are based on the information stated by the service or portal authors. There is no data on whether the administrators or managing institutions collect data information on service users and what method is used to analyse it. The limitations of the collected data will be presented in connection with the results.

6.3 Results

6.3.1 Date of launch

Only some of the services provide the date of launching the system. The oldest projects are "Joconde" (1975) and "Kunstindex Danmark" (1985). The majority of the services have been launched in the last 10-15 years. A few projects, such as "Rijksmuseum" and "LIMIS". are the most recent initiatives.

6.3.2 Access to collections

The ways that the collections can be accessed are the following:

- online catalogue on the institution's website (e.g. "Cyfrowe Muzeum Narodowe w Warszawie", "V&A Collections", "The National Gallery Collection Online", "Tate Collection Online", "Rijksmuseum Rijksstudio", "NYPL Digital Collections");
- online catalogue or portal that provides access to collections from many institutions, usually of the same type. They are very often prepared as a result of a collaborative project with a specific focus (e.g. "Alfred Flechtheim. Art dealer of the Avantgarde", "Virtual Collection of Masterpieces");
- national portals and aggregators that provide access to collections and metadata from the whole memory institutions sector (e.g. "Joconde – Portail des collections des musées de France / The national collection database Joconde", "eSbírky", "DigitaltMuseum", "LIMIS", "Agence photographique de la Réunion des Musées Nationaux / Photo Agency", "Het Geheugen van Nederland / The Memory of the Netherlands", "Kunstindex Danmark", "Finna", "SI Search Collections Center");
- international portals, services and aggregators of material from the whole GLAM sector (e.g. "Europeana", "Google Art Project");
- through API (e.g. "Europeana API", "Rijskmuseum API")
- Some of the institutions are working on API, e.g. the Smithsonian Institution is testing it at this moment and organizing hackathons during which web and software developers are invited to create concept prototypes for the new solutions.

6.3.3 Users and target groups

Information about the services' users were collected from descriptions from the analysed services and portals. They are not based on the data on actual research and it cannot be verified whether they reflect the actual visitors to these services. These are only the statements of the project managers or owners, and so we do not know whether they are based on any real data or whether they are planned target groups. Generally, the analysed websites had no information on user statistics and user analysis. On the basis of the available publications we may assume that some of the

projects collect and analyse data on usage (e.g. CIBER Research 2013: *Europeana 2012–2013: usage and performance update*), but there are neither statistics nor data that would demonstrate usage of European collections available online.

Almost a third of the project provides no information on whom the project is designed for. The information on the users is usually published on a page that provides basic information about the project, such as "About the project" or "Frequently asked questions". The projects describe their users as: viewers, ordinary users and experts, general public, general audience and individuals. One portal is devoted to experts ("Kunstindex Danmark"). The most widely used description is "general audience or public" or "the widest possible audience". A few of them provide a detailed description of their target groups and divide users according to their search needs. For example, the "Virtual Collection of Masterpieces" defines its audience and target audience in this way:

> Audience
>
> The primary intended uses of the VCM are educational and informational. Evaluation of the uses, strengths and weaknesses of the VCM will be used to prioritise follow-up steps in its development. This will help to point out useful strategies for reaching out to yet other groups of potential users.
>
> Target audiences
>
> - Students and learners of all ages
> - Teachers, instructors and facilitators
> - The general public, including groups without previous attachment to museums and their collections.[134]

LIMIS, in turn, divides its users into these groups:

> 1. Information for external users that is public and open-access;
>
> 2. Extensive information for registered users (researchers, etc.), i.e. more detailed metadata and digital images of higher quality;
>
> 3. Even more extensive information for specialists in museums and state institutions.[135]

6.3.4 Method of providing access to objects and collections

An important part of the analysis was to identify the ways the services provide access to digitised objects. The way the objects are displayed is connected to the object-access method. The oldest projects, such as "Joconde", which are online catalogues, use the main page to inform about the content of the catalo-

134 About, VCM, http://masterpieces.asemus.museum/info/about.nhn [08-06-2014]
135 About the Portal, LIMIS, http://www.limis.lt/apie-portala [08-06-2014]

FIGURE 26 Screenshot of the main page, “Joconde”.

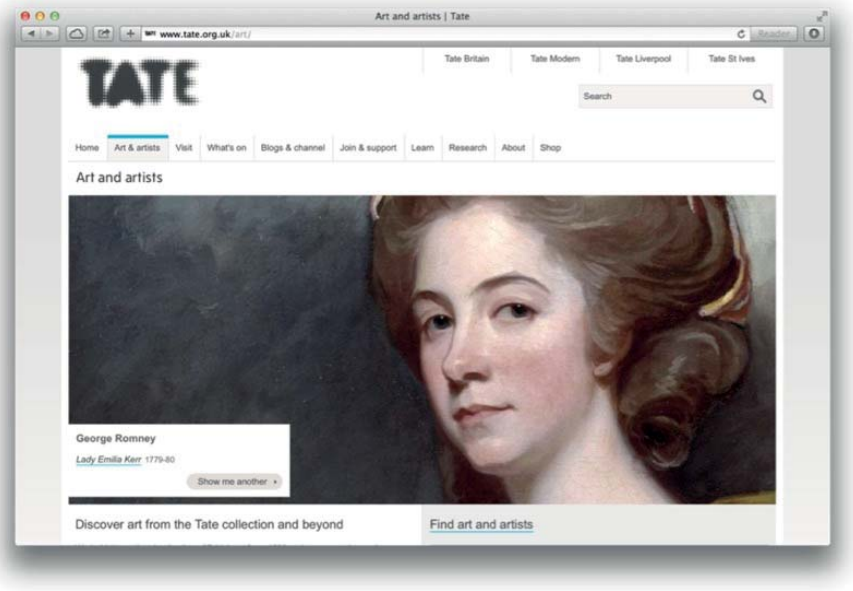

FIGURE 27 Screenshot of the main page, “Joconde”.

gue, number of resources, etc. There are a few representations of the digitised objects, but they have the role of a visual element, which makes the main page more attractive visually. Other websites show the most prominent objects from the collection.

The newest projects, such as V&A Collections, present much more representations. Usually there are around 30 representations. They are selected on a different basis. For example, "DigitaltMuseum" displays representations of objects that have been recently commented on. Some of the websites display the representation of the most visited or searched objects (e.g. "SI Collections Search Center"). The role of these representations is to engage the visitor and provide a way to immediately browse the collection. They also indicate that the visitor is an active user of the service and can influence it.

Besides the object representations that are used to encourage users to browse the collection, the collections may be accessed through search engines. Search engines and filtering options are immediately available and stress the function of the services.

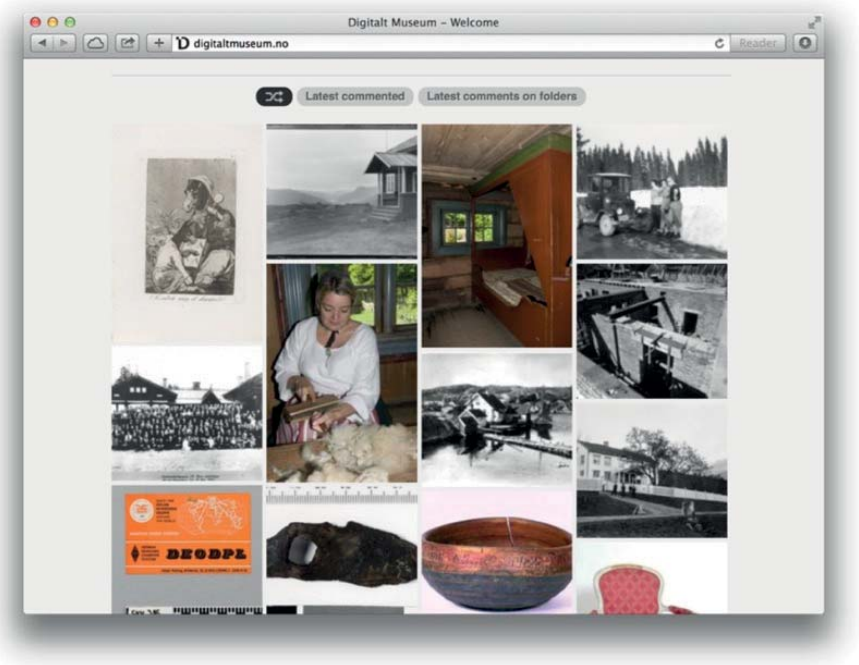

FIGURE 28 Screenshot of the objects on the main page of "DigitaltMuseum".

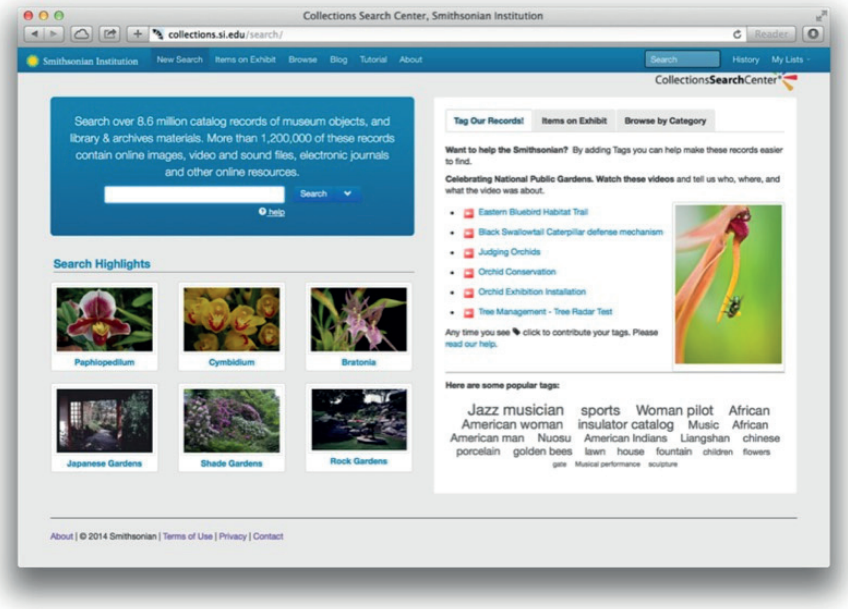

FIGURE 29 Screenshot of the main page of the “SI Collections Search Center”.

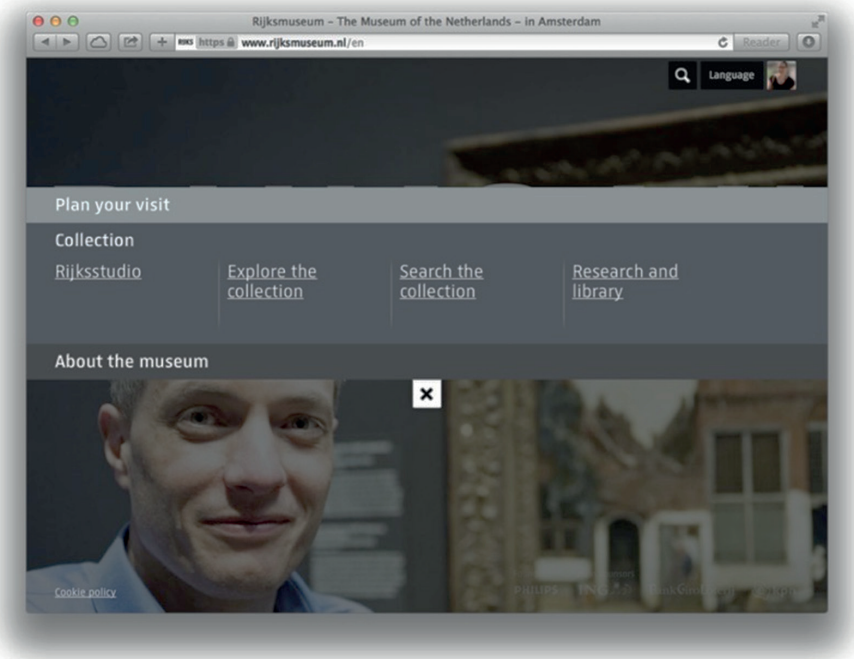

FIGURE 30 Screenshot of the main page of “Rijksmuseum”.

Another method of accessing the collection is used by Rijksmuseum. The museum not only offers the possibility to search and explore the collection, but also gives information about research, the library and a new product called the "Rijksstudio". The screenshot illustrates how these different elements are displayed. The main page of the museum offers only three categories: "Plan your visit", "Collection" and "About the Museum", and thus the function of the collection is stressed. "Rijksstudio" is also an example of a new product created around the collection and will be discussed below.

6.3.5 Object description

Metadata describing objects was collected from 22 selected objects. The used method does not allow for collecting all categories that may be used to describe an object in a particular system, as generally "empty values" are not displayed on the front side of the systems. The collected categories were not mapped, but divided into groups. In addition, the selected objects do not represent any specific type of collection and therefore they do not cover all types of objects that are be documented within the analysed projects.

There are some classes of metadata that are used by all services. The first of them are categories used to describe a title: "Title", "Name" or "Designation". There may also be additional categories such as: "Alternative title" ("eSbírky") and "Other title" ("LIMIS").

All services use a category to assign a date to an object: "Date period", "Date", "Date made", "Dates"/"Origin", "Dating", "Date of creation", "Datowanie zabytku" ("Dating of the cultural heritage object"), "Created", "Creation date", "Production date".

Besides these two groups, there are also categories used to describe the type of an object: "Type", "Format", "Object", "Field"/"type", "Type of work", "Genre", "Exhibit type", "Category", "Type of resources", "Object type", "Objecttype" [sic], and "Object". In services that provide access to a collection of one type, this category was not used.

The next group of categories used in all services are terms identifying an object: "Inventory Number", "Identyfikator"/"Numer inwentarza" ("Identifier"/"Inventory number"), "Identifier", "Inventory ID", "Object number", "Catalogue reference", "Reference", and "Museum number".

Most of the services provide a category describing the object: "Description", "Object description", "About the object", "Summary" or "Physical description".

Very commonly used is also a category informing about a person that is related to an object and its creation: "Author", "Author", "Artist", "Artist"/"Maker", "Creator", "Creator name", "Name" ("Artist's name"), "Maker" and "Producer(s)".

In the majority of services also a dimension of an object is given: "Dimension", "Dimensions", "Dimensions value", "Height", "Length", "Measurements", "Net size", "Physical format" and "Wymiary zabytku" ("Cultural heritage object's dimensions").

In almost every services a category describing a technique or technology and a material is also used. Sometimes technique and material are treated as one unit of

information, sometimes as two: "Manufacturing technique", "Material", "Materials"/"Technique", "Medium", "Medium and support", "Technology", "Technic"/"Material and Technique".

Very popular is also a group of terms used to describe the subject or topic: "Category", "Classification term", "Field", "Format"/"Subject", "Genre", "Keywords", "Subject" and "Association Keywords", "Subject" and "Topic".

Many services provide the information on copyrights and licenses: "Copyrights", "Copyright notice", "Copyright licence" and "Rights".

Terms describing the date of acquisition are also often used: "Acquisition", "Date acquisition" and "Year of acquisition".

In many services there are also additional categories, such as:

- references and bibliography;
- name of collection, its part or department that owns the collection or objects;
- name of museum or institution to which an object belongs to;
- name of an image author;
- provenience;
- visitor tag(s) and comments;
- auto-generated tags;
- information about online availability;
- localisation on exposition;
- place of conservation;
- editor;
- scientific and technical information: theme;
- authenticity;
- image ID;
- inscriptions and marks;
- former owners, legal status;
- museum director at the time of acquisition.

6.3.6 Object functions

The analysed portals offer a very similar set of functions assigned to the object. The list presented below illustrates all available functions, which are not necessarily available in all services:

- zooming in and out a digital representation (an image);
- rotating an image;
- downloading a file with a description of an object or a description with its digital representation;
- printing a file with a description of an object or a description with its digital representation;
- saving to a user's own folder (This issue is discussed more in the section on personalisation);
- tagging (Only in a few some services, e.g. "Smithsonian Institution – Collections Search Center", "Europeana", "Tate Collection Online");

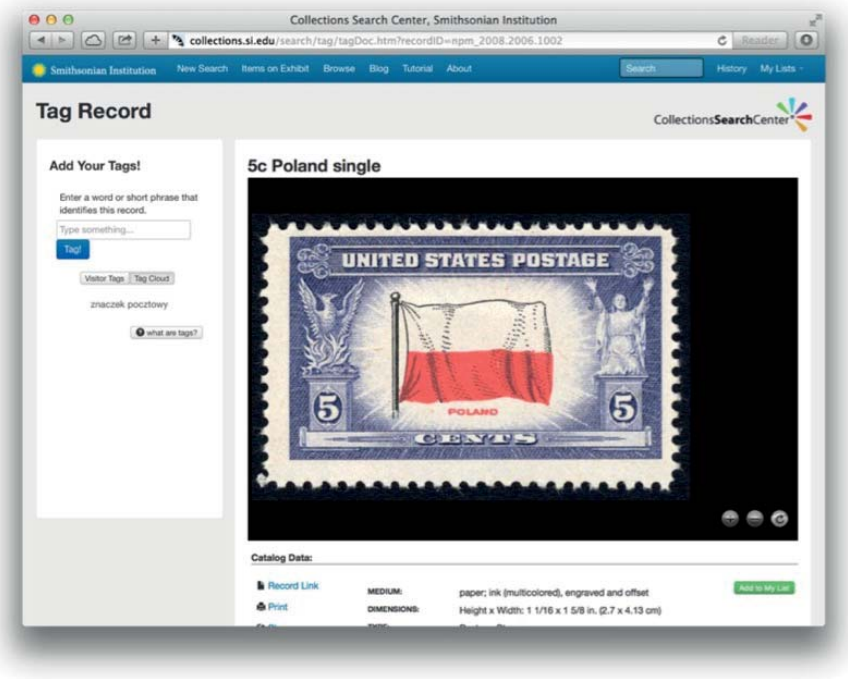

FIGURE 31 An example of tagging, screenshot, "The Smithsonian Institution – Collections Search Center".

- adding a comment to an object;
- adding objects to "Favourites";
- providing feedback on an object or informing about a mistake;
- sending a postcard with an object's representation ("eSbírky" – the function did not work during the analysis);
- forwarding a question to the organisation's experts;
- feedback concerning collections;
- ordering a high-resolution representation of an object;
- social metadata (sharing through social media, email);
- cropping - saving a selection of an artwork ("Rijksstudio");
- ordering a product based on or related to an object;
- citing information on an object on Wikipedia;
- translating an object description.

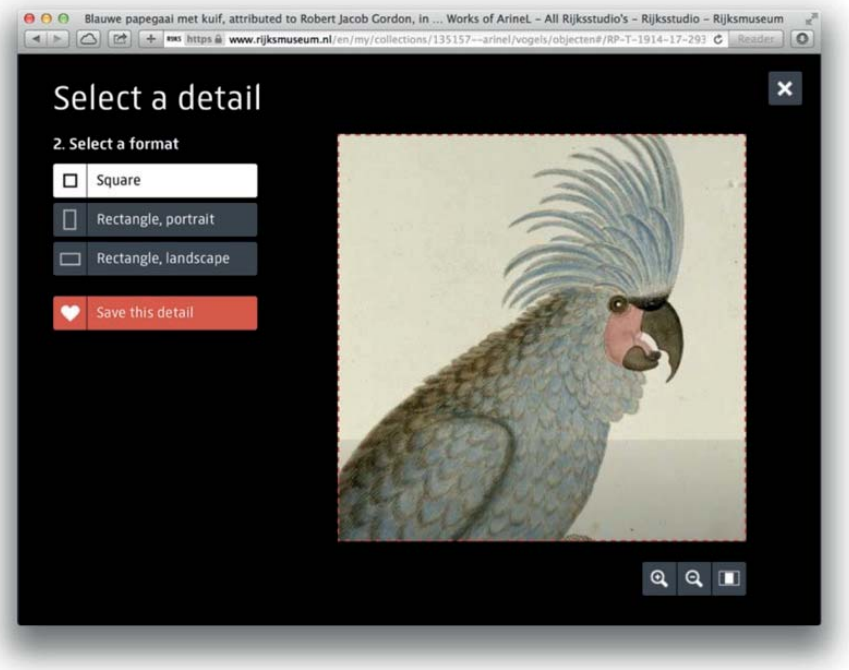

FIGURE 32 An example of selecting and saving a selection of an image, screenshot, "Rijksstudio".

6.3.7 Object representation: format & resolution

Twenty-two objects were selected in order to check the format and resolution of their digital representation. The data is presented in the table below. The same service can publish images of different size, but due to the limitation of the used method, it was possible to obtain data based only on the selected objects that were downloaded. This means that the image that is displayed can be larger. The exception is "Rijksmuseum", which gives the average size of available images. In addition, in some cases (e.g. the "Google Art Project"), the images cannot be downloaded from the service, but one of the museums that participated in this project made the images created within the project available on its own museum website. Due to the implemented technology, the image cannot be easily downloaded in some projects.

Generally, the size and resolutions of images that can be downloaded are relatively low so that they can be used in a limited way. The "Rijksmuseum" offers much bigger images and notes that the high-resolution tiff files can be ordered if they are not available in the service.

TABLE 3 Format, size & resolution of images

Service	Image format	Size and resolution
Agence photographique de la Réunion des Musées Nationaux / Photo Agency	jpeg	758 px X 486 px 96 pixels/inch
Alfred Flechtheim. Art dealer of the Avantgarde	jpeg	600 px X 854 px 180 pixels/inch
Digital National Museum in Warsaw	jpeg	534 px X 800 px 72 pixels/inch
DigitaltMuseum	jpeg	800 px X 387 px 300 pixels/inch
eSbírky	png	440 px X 781 px 72 pixels/inch
Europeana	jpeg	800 px X 594 px 72 pixels/inch
Finna, Museum Finna	jpeg	556 px X 600 px 72 pixels/inch
Google Art Project	jpeg	5873 px X 7175 px 300 pixels/inch
Het Geheugen van Nederland / The Memory of the Netherlands	jpeg	1500 px X 2141 px 200 pixels/inch
Joconde – Portail des collections des musées de France / The national collection database Joconde	jpeg	800 px X 533 px 72 pixels/inch
Kunstindex Danmark / Art Index Denmark	jpeg	219 px X 320 px 72 pixels/inch
LIMIS Lietuvos integrali muziejų informacinė sistema / Lithuanian Integral Museum Information System	jpeg	800 px X 461 px 72 pixels/inch
Nationalmuseum: Samlingara Online / The National Museum: Collections online	jpeg	910 px X 830 px 72 pixels/inch
NYPL Digital Collections Beta	jpeg	604 px X 760 px 72 pixels/inch
NZMuseums	jpeg	800 px X 790 px 240 pixels/inch
Rijksmuseum Rijksstudio	jpeg / tiff free high-res TIFF files with colour reference for professional use	4062 px X 2894 px 72 pixels/inch, 4500 x 4500 px on average
SI Collections Search Center	jpeg	500 px X 328 px 72 pixels/inch
Staatliche Kunstsammlungen Dresden – Online Collection	jepg	947 px X 600 px 96 pixels/inch
Tate Collection Online	jpeg	1536 px X 1343 px 72 pixels/inch
The National Gallery Collection Online	jpeg	532 px X 371 px 72 pixels/inch
V&A Collections	jpeg	768 px X 512 px 300 pixels/inch
Virtual Collection of Masterpieces (VCM)	jpeg	869 px X 1024 px 300 pixels/inch

6.3.8 Object and display modes

The object display consists of an object representation, metadata and additional functions. A highly characteristic function of all services is that the object has three different display modes: the card, the basic view and the detailed view. The way it is presented is related to the place of use and its function. These three modes correlate with each other. The first display mode, an object card, consists of a digital representation of an object and some metadata (one or a few items), for example the title of an object and date. The metadata may be displayed as part of the card, or may appear when the cursor passes over it. The object card is used on the main page and in the search results.

The role of the card is to attract the user, to give the first impression of the collection and to encourage accessing the collection. Clicking on the card takes the user to the second display mode of the object: the basic view. It contains an object representation, more metadata than the card and basic functions, such as saving, downloading or sharing. There can also be information on other, related objects or objects that may interest the user.

In some services, the basic view is final, but in some there is also a detailed view. It may provide more information than the basic view and additional features. Additional information, for example, such as localisation on a map, may be displayed in a separate tab (e.g. see screenshot V&A Collections – there are three tabs: "Summary", "More information", and "Map").

Almost all the services are built in the same way and provide a similar experience for their users. A user visiting the service without a specific goal typically follows this path: entering the main page with the object cards, looking at the objects or moving a cursor to get more information on an object. When she clicks on an object, she goes to a new page with the detailed view. Usually, she can get more information on the object by scrolling down or clicking on the additional tabs. She can go back, search, filter or explore further. She may also work with the collection: rotate the image, download it, tag it, share on social media services, or save in her own collection.

The only service that does not represent this approach is Rijksmuseum's "Rijksstudio". It offers different type of experience and model of interaction with its users. As opposed to the rest of the services, Rijksmuseum stresses the visual aspect of the objects by providing a high-quality representation and offers additional functions. Shown below are 3 screenshots presenting the display modes of objects: the card, the basic view and the detailed view. The first screenshots present the view that the user sees after clicking on the object card. It is a basic view of the object, but the main focus is on the high-quality representation. A title and author/creator of the object is in the lower left corner of the image. The additional functions, such as cropping or downloading are placed over the images. Previous and next objects can be reached by clicking on the arrows placed on the left and right side of the image. After clicking on the icon "i" or scrolling down, more information on the object is displayed. Also in this view, the metadata does not play the main role. There is more information on the object and functions. Moreover, there are also thumbnails referring to

collections with this work created by other users. The full metadata can be reached after clicking on the ”more details” link or by scrolling down.

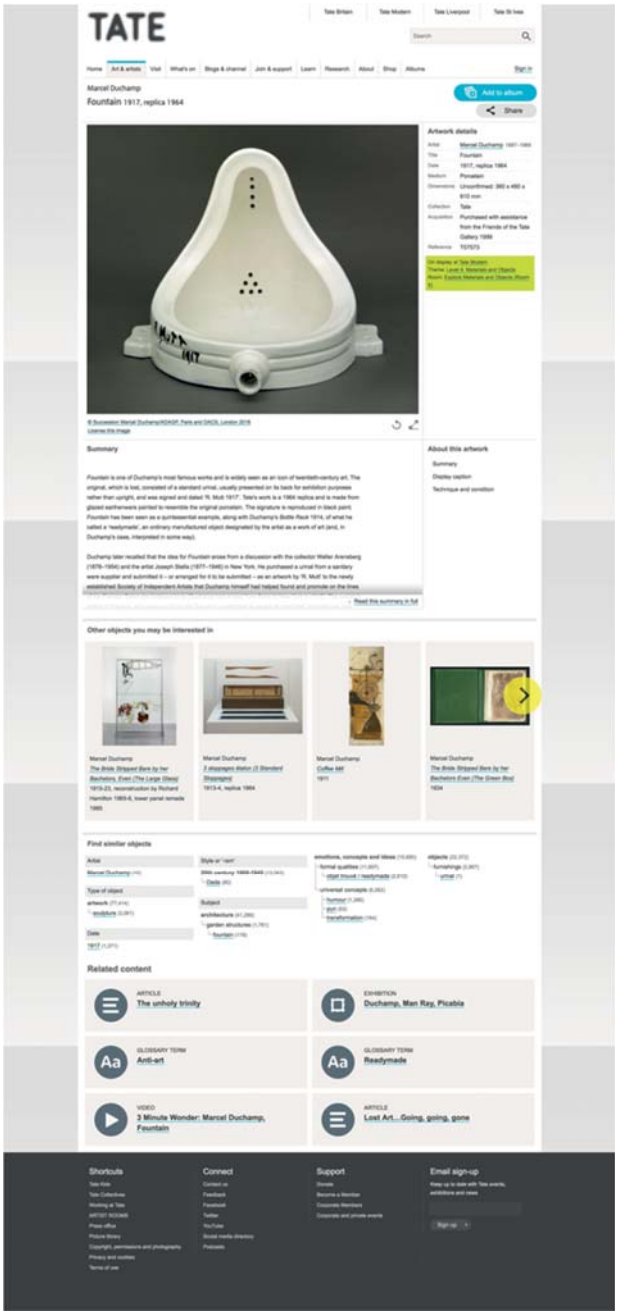

FIGURE 33 An example of the basic view in “TATE”.

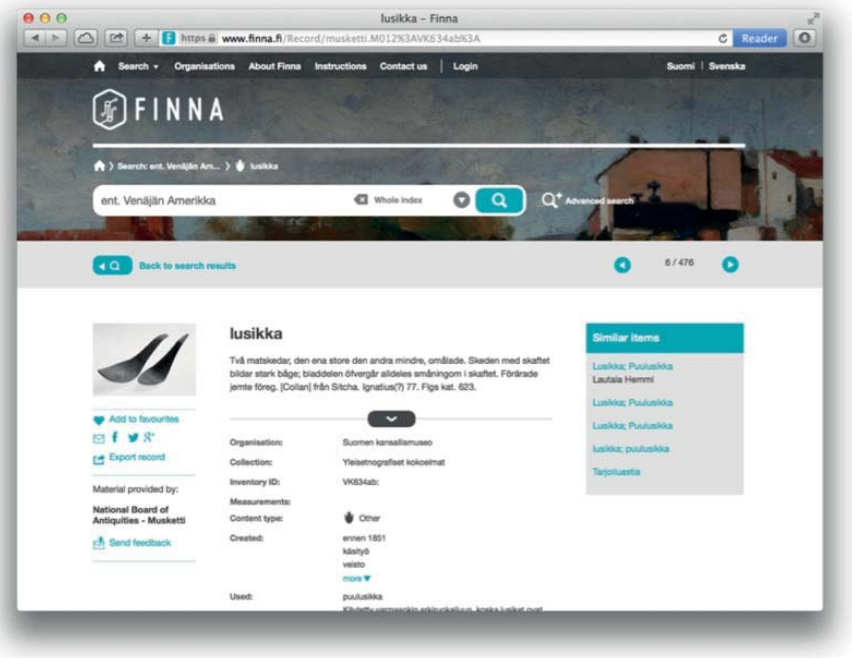

FIGURE 34 An example of the basic view, screenshot of “FINNA”.

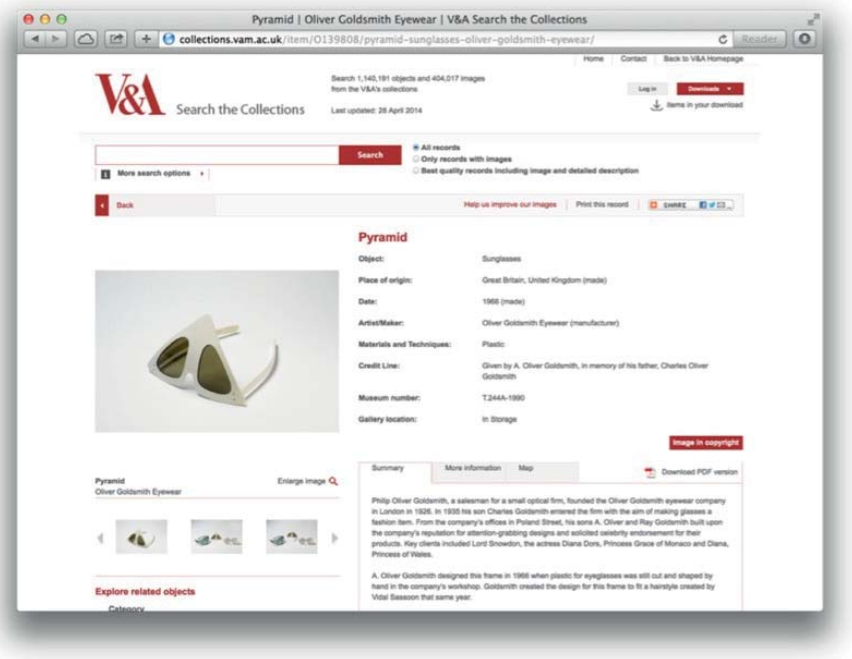

FIGURE 35 An example of the basic view, screenshot of “V&A Collections”.

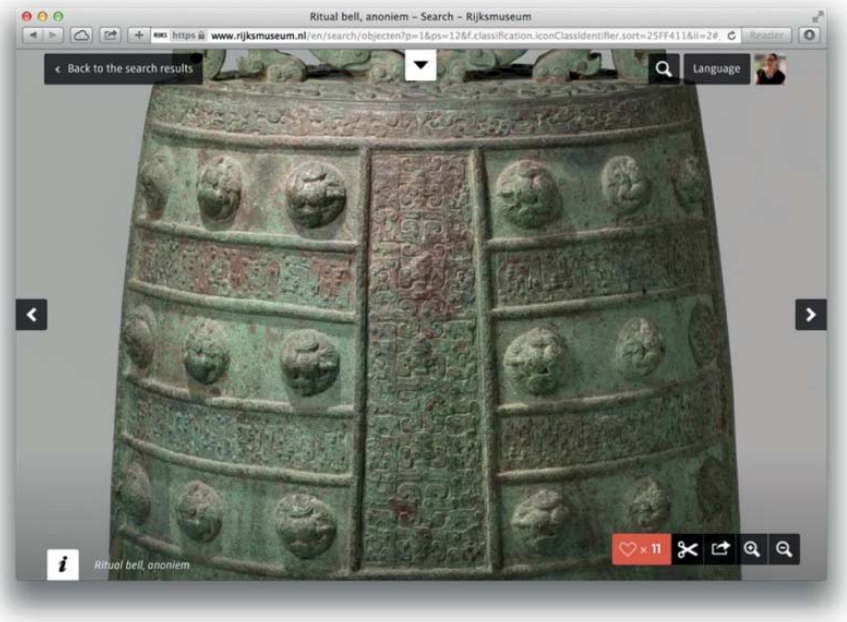

FIGURE 36 First view of a page in Rijksmuseum.

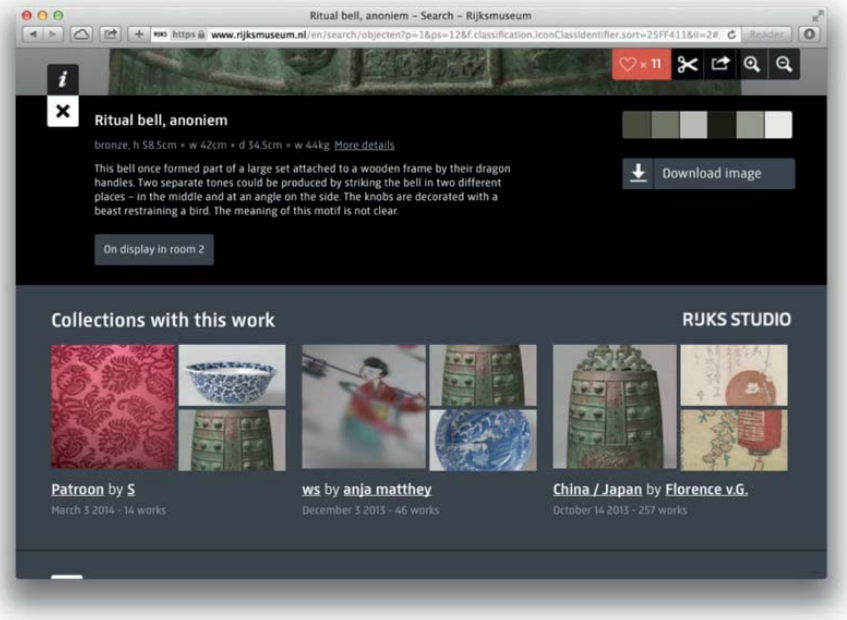

FIGURE 37 Second view of the page in Figure 36, screenshot, Rijksmuseum.

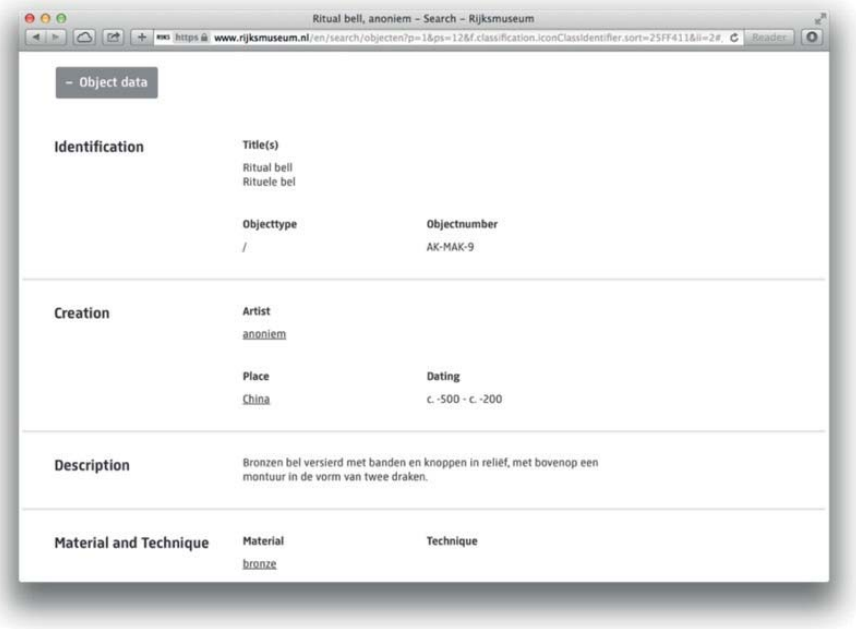

FIGURE 38 Third part of the page in Figures 36 and 37, screenshot, Rijksmuseum.

6.3.9 Online exhibitions and tours

Some of the projects offer visitors online tours and exhibitions. There is very rarely information about the author or curator of the exhibition. The typical form for online exhibitions and their structure and narration is given by the Swedish example: "The National Museum: Collections online" and the exhibition "Selfies – Now and Then"[136]. The exhibition consists of an introductory text and a selection of objects. Its structure is very simple. The objects are displayed in the same way as the objects within the research results, which is illustrated by the screenshots presented below. This type of an exhibition is very typical for services and portals providing access to collection from one institution.

Another type of exhibition is available on the sites that provide access to collections from many institutions. As an example may serve the exhibition "Hjemmets teknologi"[137] in "DigitaltMuseum" prepared by "Norsk Folkemuseum" in Oslo. These exhibitions also consist of selected objects and an introductory text, but it is created by a particular museum. Interestingly, this exhibition does not state the author or curator of the content either, while another exhibition from the same muse-

136 "Nationalmuseum: Samlingara Online", The National Museum: Collections online and the exhibition "Selfies – Now and Then", http://emp-web-22.zetcom.ch/eMuseumPlus?service=ExternalInterface&module=exhibition&objectId=3304&viewType=detailView [08-06-2014]

137 Hjemmets teknologi, "DigitaltMuseum", http://digitaltmuseum.no/info/owners/NF/exhibition/FF1CE43F-E590-4E6D-BBE7-858AF972DFEB [08-06-2014]

um, “Samiske bilder”, is signed by the conservator Leif Pareli. The name is located within the main body of the text, and is thus not an obligatory value that has to be provided by the person that makes the exhibition.

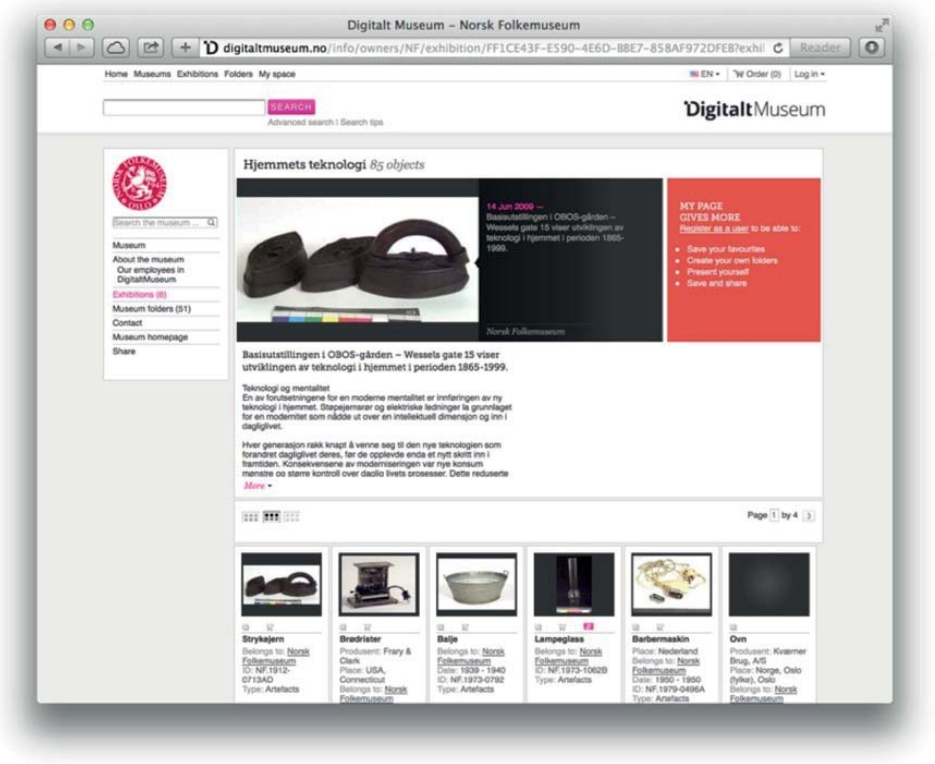

FIGURE 39 “Hjemmets teknologi”, “DigitaltMuseum” screenshot.

“DigitaltMuseum” is also an interesting project for another reason. It demonstrates how technical issues may determine the way in which new content is created. Beside exhibitions, objects may be also collected in folders in “DigitaltMuseum”. The folders are displayed in the same way as objects. Each folder has its own digital representation and basic information. The screenshot below demonstrates one of folders that belongs to Heidi Uleberg from “Norsk Folkemuseum”. A user accessing the folder sees information identifying the author of the folder in the box to the left of the window. It is not clear why the folders provide more information about authorship than the exhibitions. However, the reason may be that it is determined by the system’s function, for example each logged museum user may store objects in their own folders, while adding and publishing exhibitions is a different feature.

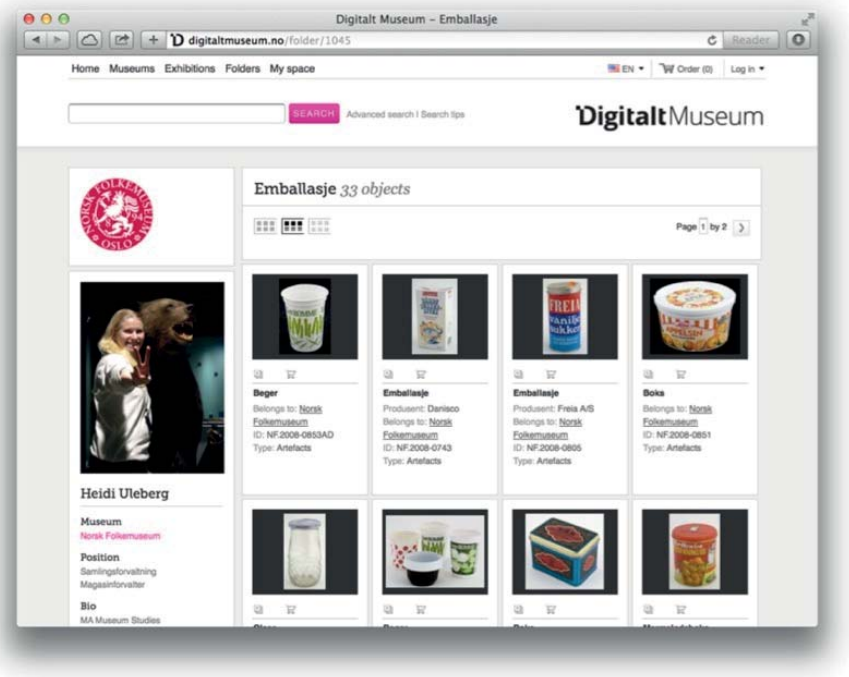

FIGURE 39 Heidi Uleberg's folder in "DigitaltMuseum".

The last example of an online exhibition is "Europeana 1914-1918"[138] created by Europeana and Oxford University. It is the result of a collaborative project involving several European memory and research institutions. On the website the users may browse the collection according to type of object, subject or localisation ("Fronts"). What is most important, the project provides an online story collection interface for users who want to share their stories related to the First World War. It is an example of an exhibition that is based on user generated content (UGC), as one of the main objectives of this project is to collect material that relates to this event or people involved and affected by it. Stories from the public are documented, digitised and published online. The material may be reused by others. The exhibition is only a part of the whole project. It involves several objectives and actions, and it is based on UGC.

The subject of the exhibitions differs a great deal, as shown by the examples given here. Some of the exhibitions follow current trends, for example Selfies – Now and Then, which discusses the phenomenon of "selfies", self-images taken by using the camera of a mobile phone, in relation to identity by drawing on the pictures from the museum's collection. The scope of the exhibition may be much broader, such as the First World War. The structure and narration of the exhibition are very simple, consisting of an introductory text and a selection of objects. The visitor is very rarely informed of who is the author of the exhibition or tour. The number of exhibitions

138 Europeana 1914-1918, http://europeana1914-1918.eu [08-06-2014]

published within a particular project is relatively low. In this context the most noteworthy one is the "Europeana 1914-1918" project which is not only an online exhibition, but also a project aiming at documenting cultural heritage and facilitates user contribution.

The purpose of the analysis of online exhibitions was to identify whether projects include online exhibitions and to acquire a general overview of their content and structure. Thus, the exhibitions were not researched in depth and therefore the results provided here are very limited.

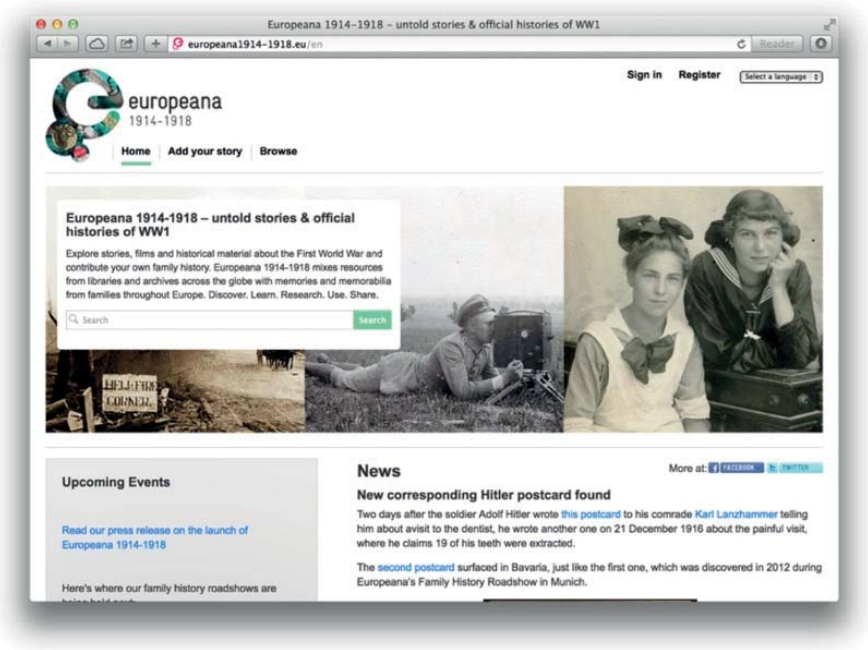

FIGURE 40 "Europeana 1914–1918"

6.3.10 Copyrights and terms of use

The purpose of this part is to give a general overview of how the user is informed about the use of the material provided by the services, and not to discuss the intellectual property rights.

The selected systems represent different approach to the use of collection, which is realised by the available licenses, system construction and its functions. Moreover, some of the services offer different terms for the object's representation and its metadata. For example, "Finna" states in its terms and conditions that the material is divided into three categories, with different terms and conditions applying to each of them:

> Metadata: The metadata presented in conjunction with search results can be freely used by all.

> Digital material: In the case of digital material, Finna provides a link to the website of the organisation which controls the material in question. Statutory or contractual rights and restrictions may apply to material available through such websites. Any rights and restrictions are specified on the websites.
>
> Images: Finna displays images of a number of museum pieces, works of art, photographs and book covers. Such preview images may be subject to use restrictions similar to those applicable to material on the websites of participating organisations.[139]

Besides these categories, some of the services define the rights to the technology used to provide access to collections. An example is "Het Geheugen van Nederland/The Memory of the Netherlands"*:*

> All rights to the database, the format, the meta-data and the digital reproductions and text are held by the Koninklijke Bibliotheek and/or the institution serving as owner or proprietor of the object on which the digital reproduction is based.[140]

"Agence photographique de la Réunion des Musées Nationaux" is even more specific and makes a distinction between the reproduction and representation.

The institutions that provide access to material from many sources state very clearly to what they have rights. The user should contact the institution that owns the content and check the rights that apply to the use of the particular material.

Terms of use are also differently prepared. Some of the websites provide a very brief text, while others outline several potential cases and terms that apply to them. In addition, the explanation is simplified. For example, "SI Collections Search Center" explains it in "Frequently Asked Questions and Answers":

> May I put Smithsonian Content on my personal website, blog or my Facebook® (or other social networking) page?
>
> Yes, so long as you:
>
> Identify the author and source of the Content;
>
> Do not remove any copyright, trademark, or other notices that are placed in or near the Content you use;
>
> Do not use the Content to promote, advertise, or sell your own products or services or for any other commercial or unauthorised purpose; and
>
> Comply with any other terms or restrictions that may be applicable to the Content.[141]

Only a few of the services (for example "Europeana", "Rijksmuseum", "DigitaltMuseum" and "Virtual Collections of Masterpieces") use widely known Creative Commons licenses. While Europeana and DigitaltMuseum use several licences, VCM provide the content under a Creative Commons "Some Rights Reserved" Licence (CC BY-NC-SA). In some services, there may be also a statement that some of

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139 Privacy & Terms, Finna, https://museot.finna.fi/Content/terms_conditions [08-06-2014]

140 Copyright, Het Geheugen van Nederland, http://www.geheugenvannederland.nl/?/en/paginas/over_het_geheugen/copyright [08-06-2014]

141 Terms of Use, Smithsonian, http://www.si.edu/termsofuse [08-06-2014]

the material may be in the public domain and the user is responsible for checking terms of use for every object and its representation. Almost every service informs its users that they should cite and, if possible, link to the source of the content.

Generally, the services are quite strict about the use of the content. The content may be downloaded and used free of charge for non-commercial purposes. The V&A Collection provides very detailed explanation of non-commercial use:

> 2. Non-commercial use of Content
>
> The following "non-commercial" uses are the only uses permitted by these Terms of Use:
>
> For personal use: this means the one-time use of Content by one person for non-commercial research and private study.
>
> For educational use: this means the one-time use of Content by a student at an Educational Establishment (defined below) for use in course-related academic materials, for the purpose of securing a degree or other academic qualification.
>
> For print-based academic publications: this means the one-time use of Content (i.e. for one edition only) for a printed publication by an academic publisher with a print-run of up to and including 4,000 copies.
>
> For academic e-publications: this means the use of Content (but using Low Resolution Images (defined below) only) for academic e-books and e-journals. Permission is granted for up to 5 years from the first day of publication.
>
> For use by charities and other non-profit organisations: Reproduction of Content in print or electronic formats for circulation to members or "friends", with a print-run of up to and including 4,000 copies or for up to 5 years for online use.[142]

The services state quite often that researchers may use content in their publications and that personal use is also allowed.

If not stated otherwise, commercial use requires permission from the owner or the proprietor of the material. Contact details or, for example, an online contact form is provided. In some cases, fees are already given on the website, while very often the price will be estimated when the potential use is stated and the technical parameters provided (for the content that needs to be digitised). The person willing to use the content in a commercial way is very often asked to provide information on the project concerned, which should include following details such as:

- Title
- The nature of the project
- Date
- Number of copies
- Name and contact details of publisher
- Distribution area

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142 Terms of use, Victoria and Albert Collection, http://www.vam.ac.uk/content/articles/t/terms-and-conditions/ [08-06-2014]

In the context of the selected services, an exceptional approach is represented by "Rijksmuseum". More than 111,000 high-quality images are available under the Creative Commons BY 3.0 license, which allows users to make commercial use of the work as well. The system is also designed to facilitate use of the collection. "Rijksstudio" is a product that promotes the creativity of its users and encourages them to use the collection. Rijskmuseum also facilitates the commercial use of its collection by collaborating with the creative industry and commercial partners.

6.3.11 Searches

Searching is one of the most important functions of the analysed websites. The function is available on the main page in the form of a search box. In addition, all the services offer advanced search options with additional criteria. A set of criteria is connected to a range of metadata categories used to describe an object. Different models of searching are used. For example, "Joconde" and "DigitaltMuseum" offer search boxes with predefined categories. LIMIS offers many more search boxes and categories that are divided into several tabs to search for different types of material ("exhibits", "archive valuables" and "library valuables", "audio/video valuables" and "photo valuables") and additional tabs that allow for more precise searches. In addition to these options, LIMIS provides three additional tabs: "Personalities", "Keywords" and "Literature, Sources".

A slightly different solution is employed in the "SI – Collections Search Center". In this case the user can explore the collection and at the same time see searching and filtering features. The "V&A Collections" also has more advanced search options visible on the main page. Very interesting solutions are used in "Finna". The user may add additional search fields and groups, and also use a map for geographic searches.

6.3.12 Personalisation

The majority of services have features that can be used to personalise their content or the way the data is displayed. On a few websites, the data may be displayed as a grid, list or slideshow. In almost one third of the websites users may log in and save the objects to create the own collections. Saving objects may be used to help the user manage downloads ("V&A Collections") and orders ("Agence photographique de la Réunion des Musées Nationaux"). In "DigitaltMuseum" logged-in users have their own profiles, and can create own folders and collect objects, store favourites, order objects and leave comments without having to provide personal information each time[143].

143 Login, Digitalt Museum, http://digitaltmuseum.no/login [08-06-2016]

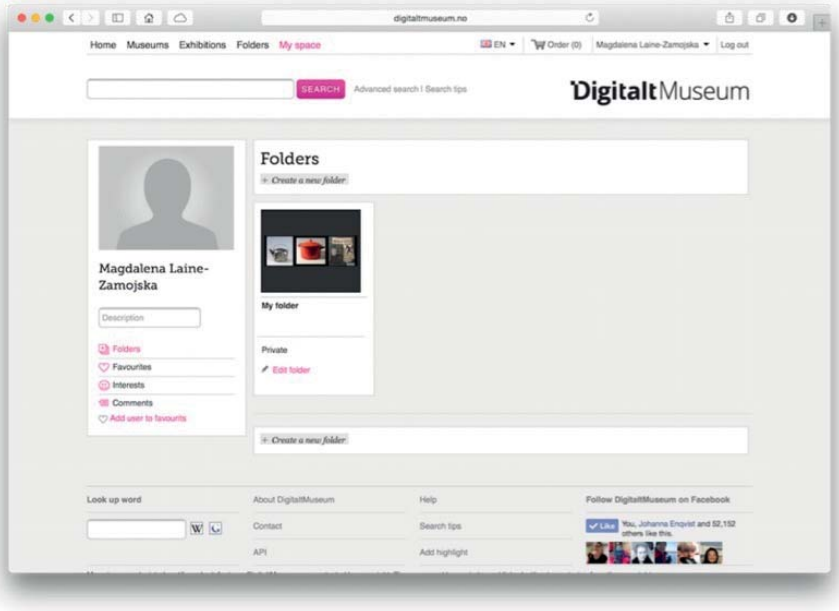

FIGURE 41 Folder in a user's account in "DigitaltMuseum".

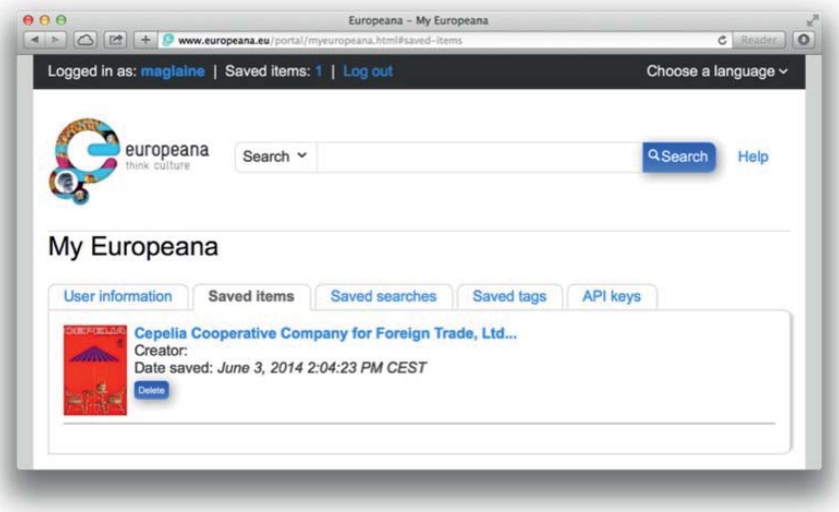

FIGURE 42 Saved images in a user's account in "Europeana".

In services that have library material and functions, such as "NYPL Digital Collections" logged-in users may check the history of their borrowings, get recommendations and rate publications. "Finna" will also offer library functions. By logging into "Europeana", users can manage their downloads, saved searches, tags and API keys. "SI – Collections Search Center" users can also save objects and make their own lists.

Rijksmuseum offers the most advanced features. "Rijksstudio" can be considered as a service created around the collection with the aim of offering its users a new kind of experience by providing several features and products.

Logged-in users are not only given features making their work with the collection easier; they are also encouraged to use the collection creatively and make new products based on it. Users can work with representations and for example crop them to save some details and save objects or details as new sets. However, the most important function is that the users can make own creations and upload them into the service, and observe the activities of other users. Some of the creations are digital, while others are physical objects inspired by the collection. Rijksmuseum organises also competitions to encourage its user to make new creations and share them. The screenshot presents an eyeshadow tin box based on colour swatches from one portrait.

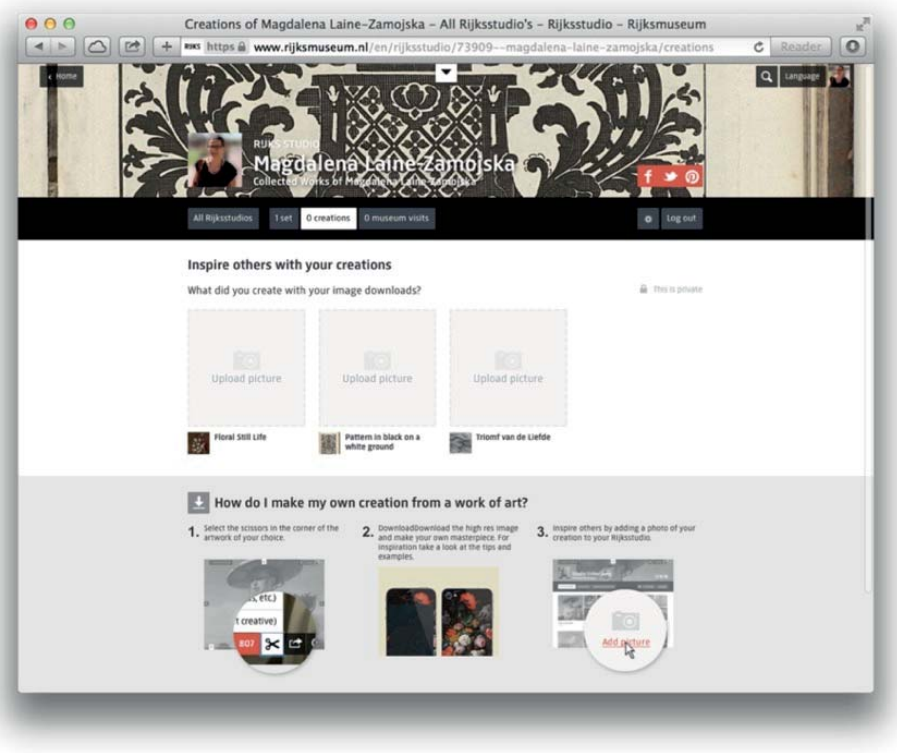

FIGURE 43 "Creations" in a user's account, "Rijksstudio", Rijksmuseum.

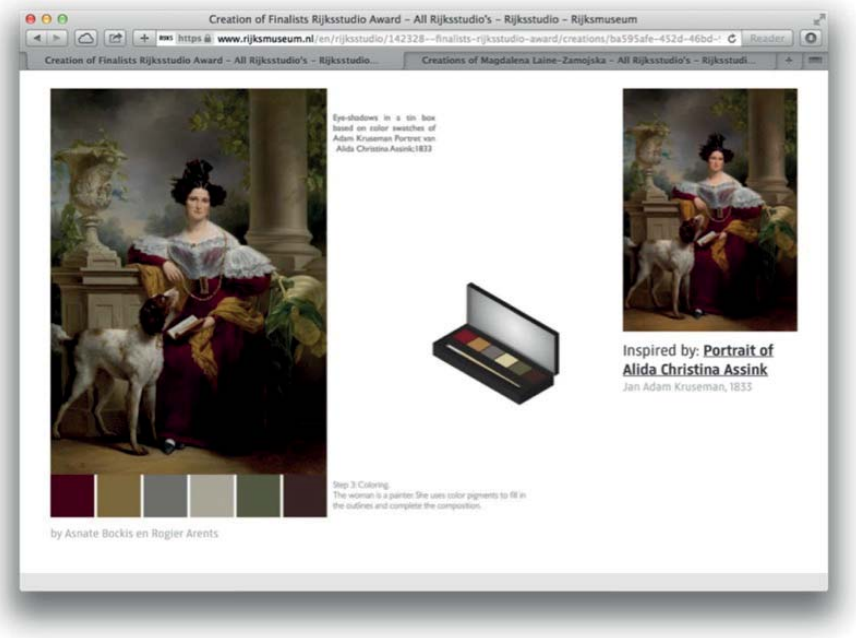

FIGURE 44 One of the creations submitted to the competition, "Rijksstudio Award", Rijksmuseum.

6.3.13 Additional features

Analysed projects offer similar additional services:

- ordering an image;
- obtaining a licence to use an image;
- sharing information on a museum owning an object ("LIMIS");
- the museum search engine (Fig. 45);
- reserving a visit to a museum (Fig 46);
- redirecting to a shop with objects inspired by the collection.

A slightly different approach is represented by. The museum has been collaborating with "Etsy"[144] which is an e-commerce website for designers and producers of handmade or vintage items. A number of vendors have made products inspired by the Rijksmuseum collection[145] The screenshot below presents some of the products made within the campaign (Fig. 47).

144 Etsy, https://www.etsy.com/, [08-06-2016]
145 Rijksmuseum and Etsy, Rijksmuseum, https://www.rijksmuseum.nl/en/whats-on/news/rijksstudio-and-etsy [08-06-2016]

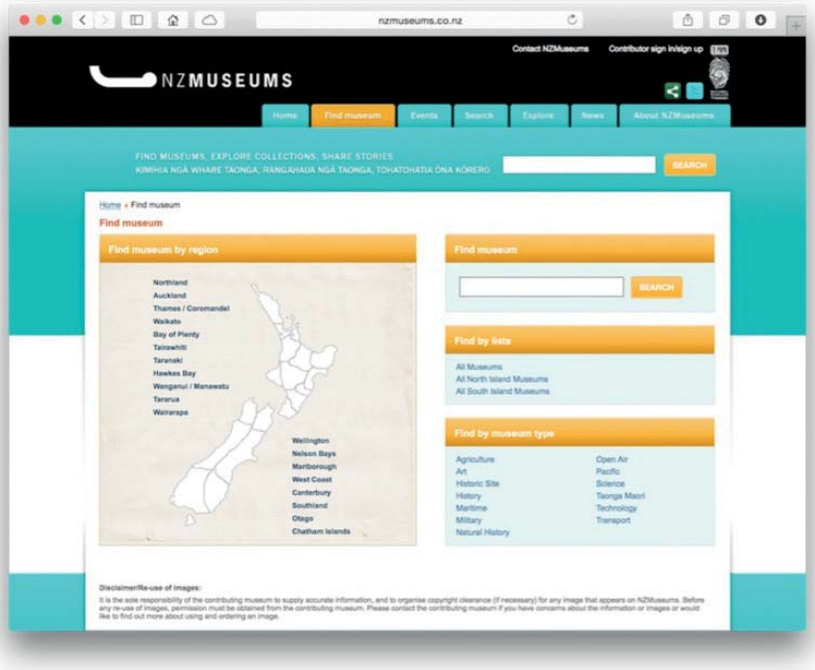

FIGURE 45 Museum search engine, “NZMuseums”.

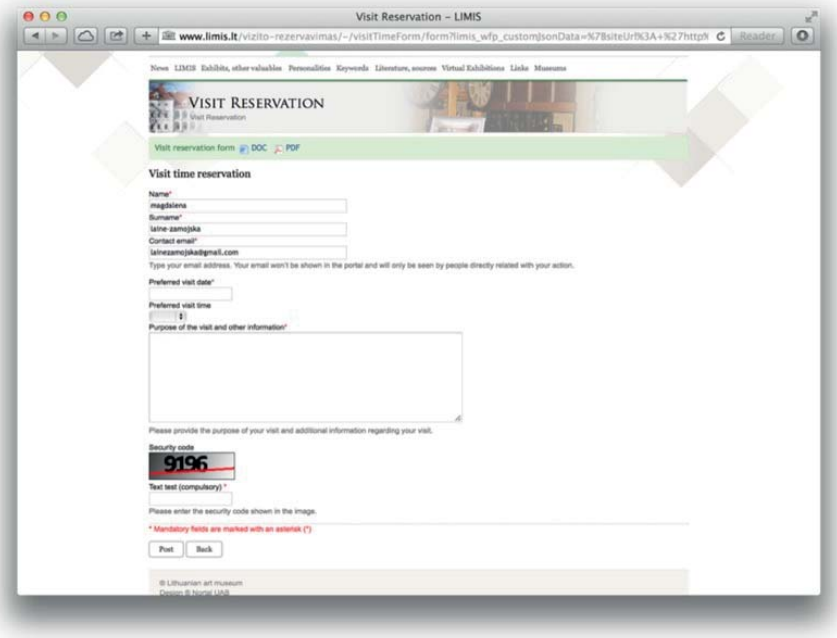

FIGURE 46 Visiting time reservation, “LIMIS”.

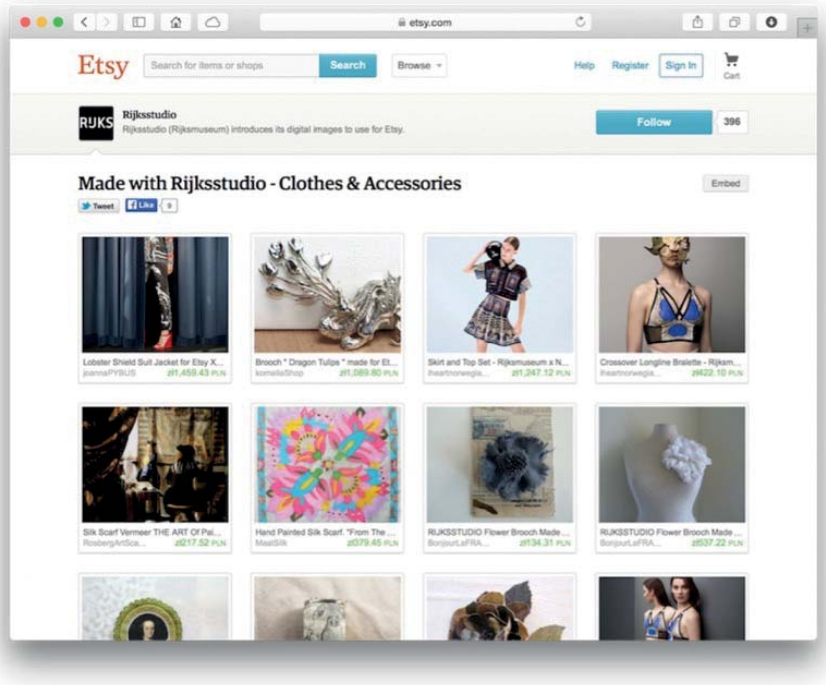

FIGURE 47 "Made with Rijksstudio", the "Etsy" online shop.

6.4 Summary & conclusions

In this research 22 museum portals and services that provide access to digitised museum collections were selected and analysed in relation to their functionality. The goals of the analysis were to provide an overview of functions and qualities characteristic of museum portals and services. The main limitation of the method is that data was collected from the perspective of the end user and only one object from each of the services was analysed. The issues investigated include: content, target groups, collections (object metadata and representation, exhibitions and tours), functionality, personalisation and additional applications.

The results show that there is a separate genre of portals, which is a museum portal. The oldest services reflect the way the objects are managed in the electronic collection management systems. Newer services are focused on object representations, while the latest services encourage users' creativity and use of resources.

The services are mainly in the official language of the service provider's country. In addition, the service's interface may be available in English as well, but the object description is not translated. Some of them offer automatic translation services.

The object descriptions differ a great deal. In some services the object has only a few items of metadata, while in others their number may be much higher. The way the object is displayed is very similar in almost all the services: there is a basic view,

an extended view and a full view. Each of these modes offers different level of information and each of them is used at a different stage of interaction with the visitor exploring the collection. The object's functions are very similar in each service and are limited to a few functions, such as zooming, saving, sharing, and so on.

In many services the objects are used in thematic exhibitions or tours. Their structure is very limited and it may suggest that their potential is unused. However, as one service demonstrated, they seem to be connected to the functionality of the system used by the museum and are connected to the system's users, and may thus reflect a new way of managing resources by museum professionals and communicating with the audiences

The ways in which the resources may be used are very different. Some of the services have very strict policy and the user cannot download or re-use the resources, while others encourage their audiences to re-use metadata and representations. In some services the works can be licensed and there are fees. Some of the services use widely recognised Creative Commons' licenses. The way the rights are explained is also different: in some services it is explained in a simpler way (in the form of "FAQ"), while in others the text may be very detailed focusing on strictly legal issues without providing easy-to -follow examples.

One of the main features is searching. Each of the services has basic and advanced search options. The offered search criteria are based on the objects' metadata. Different search tools are provided, for example in the newest services the user can use a map to search for objects from given locations.

About one third of the analysed services use some form of personalisation, for example search keywords and results can be saved in the user's account so that logged-in users can work with the objects (manage downloads, work with the representations).

As the results show, further research would be needed to provide more specific data from providers, and to investigate design issues and the characteristics, behaviour and expectations of target groups. Moreover, it would be important to survey the way the collections are open (open works and open licenses - The Open Definition[146]) and re-usable.

146 Open Definition, http://opendefinition.org/od/ [28-01-2015]

7 CLASSIFICATION OF FINNISH VIRTUAL MUSEUMS

7.1 Introduction

The growth of the Internet has created the illusion that everything is on the Internet and can be easily accessed. In this chapter I present the results of the survey of Finnish virtual museums. The overarching goal of this investigation is to provide a general picture of the digital landscape of Finnish museums especially in the context of small museums. I systematically reviewed the digital creations to show the level of complexity of the museums' digital creations in relation to the level of resources available for the institutions.

The main method used in this survey is proposed within the V-Must network of excellence. At the time of this survey, the V-Must project is still in progress, but most of the outcomes are already available. The network is the most prominent European initiative on virtual museums and its outcomes are extensively adopted in this research as well. In the first part of this chapter I present the network, its objectives, surveys and obtained results. Secondly, I explain how this methodology was applied to the Finnish context and deployed in this research. Thirdly, I present the result from the survey on the Finnish VMs and compare them with the results of the V-Must surveys. Finally, the conclusions are presented. The results will be discussed in further chapters.

7.2 About the V-MUST.net project and its objectives

This project, serving as a network of excellence, was proposed because despite the fact that the concept of virtual museums is not new and there are several European research and development initiatives focusing on virtual museums theoretically and practically, this sector is still fragmented and underdeveloped (Virtual Museums Transnational Network 2009: 3). The V-MUST consortium consists of partners from 18 institutions in 13 countries:

- The National Research Council / Consiglio Nazionale delle Ricerche, Italy

- Agency for the Promotion of European Research / Agenzia Per La Promozione Della eRicerca Europea, Italy
- King's College London, Centre for Computing in the Humanities, King's Visualisation Lab, UK
- University of Sarajevo, Dept. Computer Science, Bosnia-Herzegovina
- The French Institute for Research in Computer Science and Automation / Institut National de Recherche en Informatique et Automatique (INRIA-IPARLA Joint Research Team), France
- Lund University, Department of Design Sciences, Sweden
- The Science and Technology in Archaeology Research Center / STARC, Cyprus Institute, Cyprus
- CINECA, Italy
- Foundation of the Hellenic World, Greece
- Allard Pierson Museum, University of Amsterdam, Netherlands
- Center for Documentation of Cultural and Natural Heritage, Egypt
- Comune di Roma, Sovraintendenza ai Beni Culturali, Museum of Imperial Forums / Museo dei Fori Imperiali, Italy
- Fraunhofer Institute for Computer Graphics Research IGD / Fraunhofer Institute für Graphische Datenverarbeitung, Germany
- Virtualware, Spain
- Visual Dimension, Belgium
- The Spanish Association of Virtual Archaeology / Sociedad Española de Arqueología Virtual, Spain
- Noho LTD, Ireland
- Brighton Business School, University of Brighton, UK

The consortium members involve researchers, experts and developers representing several disciplines and fields of expertise, who over a period of 10 years have been involved in the development of more than 50 virtual museums (Virtual Museums Transnational Network 2009: 5-6). Although the digital creations developed by these institutions and their partners have received many international awards, the authors identify several factors slowing the progress of research within the VM domain: lack of comparison and integration of research results, insufficient testing with real users with regard to their needs, characteristics and psychology, lack of evaluation criteria and insufficient diversity in the expertise of the teams (Virtual Museums Transnational Network 2009: 6). They list four main areas that should be identified to overcome these problems:

> Services and facilities for VM (repositories, simulation, rendering and visualisation, computing);
>
> New methodologies and digital workflows, since they are usually developed inside each research sector separately, without a shared cross-domain methodology, taking into account: digital preservation, maintenance and usability of VM;
>
> Tools for presentation and interaction as well as new transmedia authoring components;

> Stakeholders that have to be involved in VM design and deployment (researchers expert in ICT, social-cognitive studies; museum staff and curators; final-users: visitors, tourists, students; professionals in the field of communication, marketing and art). (Virtual Museums Transnational Network 2009: 7)

The overarching goal of the project is to build "a shared new paradigm for the creation and deployment of Virtual Museums, much more integrated within European and national policies, and eventually to the creation of new professional activities and positions (e.g. digital curators)." (Virtual Museums Transnational Network 2009: 10). The main objectives are achieved within eight work packages, and a set of quality procedures is established to ensure the quality of all scientific deliverables (Definition of quality control procedure V.1.1. 2011: 6). Objectives that are important in relation to the methodology and theory developed within the V-MUST.net project, as well as relevant to this research, are to:

> Improve the creation, access, management, sustainability and digital preservation of appropriate virtual and digital contents, with the overall goal of making easier the creation, delivering, sharing and preservation of VM, identifying data and knowledge preservation strategies
>
> Create an interdisciplinary research network that will act as a bridge between the technological, cognitive and humanities domains; Create a common language and a common basic knowledge shared by all research domains involved
>
> Advance the state-of-the-art (overcome the epistemic limits of established approaches; bring in new ideas and conduct exploratory research around them)
>
> Identify needs, requirements and problems that need new researches to find solutions
>
> Identify evaluation criteria to state successful cases
>
> Exchange and re-use of VR set-ups. (Virtual Museums Transnational Network 2009: 9-10)

7.3 V-MUST methodology and terminology

The methodology proposed by the V-MUST project is the first complex methodology for the digital creations of museum, and is therefore presented here in detail. It may be used to analyse all kinds of implementations that make use of technology that focus on heritage.

One part of the V-MUST.net project was focused on proposing a terminology framework for the virtual museum domain (Sartini & Vigliarolo 2011). The process of constructing the framework was initiated during peer review and discussions, involving experts representing different fields: archaeology, social sciences, design, communication and ICT (Sartini & Vigliarolo 2011:7). The proposed concept was illustrated with practical realisations that were used for agreeing on the definition. The basic guidelines instructing how the definitions should be constructed were prepared and adopted.

It is important to note that the team has used the web-based system (open Content Management System, based on Drupal) to work collaboratively within this pro-

ject. It serves as a community site, where terms can be defined, linked to each other and discussed147. On the one hand, the environment facilitated discussions between the consortium members, and on the other hand the site gives access to these discussions and online examples illustrating the definitions. It promotes new research modes and ways of publishing research results. Along with the traditional publications, the glossary, examples and discussions are also accessible online. However, when I reviewed the projects in September 2016, the site was no longer accessible.

The project's initial glossary was constructed by collecting ad hoc terminology from the domain of virtual museums. Furthermore, several main categories and their definitions were proposed. The eight main categories consist of types, sub-types and related general terms. The structure and terminology should be considered as a draft to be worked on and modified within the project timespan, but as the authors state "it is nevertheless necessary to rely on a solid and unambiguous basis (even if temporary) to start any wide-spreading scientific discussion" (Farouk & Pescarin 2013: 10). The general categories, types and sub-types are organised into the hierarchical structure presented below:

CATEGORIES

MAIN CATEGORY 1
- TYPE 1.1
  - SUB-TYPE 1.1.1
    - SUB-TYPE 1.1.1
    - SUB-TYPE n.
- TYPE 1.2
- TYPE 1.n.
- GENERAL TERM 1.1
- GENERAL TERM 1.n.

MAIN CATEGORY 2
- TYPE 2.1
  - SUB-TYPE 2.1.1
  - SUB-TYPE 2.1.2
  - SUB-TYPE n.
- TYPE 2.2
- TYPE 2.n.
- GENERAL TERM 2.1
- GENERAL TERM 2.n.

META-TERMS

VIRTUAL MUSEUM TYPES (Giannoulis et al. 2011: 6-7)

The main eight categories of virtual museums are:

1. Content
2. Interaction technology

147 V-MUST glossary, http://v-must-dev.cineca.it [14-08-2014]

3. Duration
4. Communication
5. Level of immersion
6. Format > distribution
7. Scope
8. Sustainability

Virtual museums are complex creations and all these categories should be considered in the analysis:

> any main category represents essential and particular aspects of virtual museums. The specific peculiarities have in fact an impact in a part or in the entire digital pipeline of creation, dissemination and preservation of a Virtual Museum. (Farouk & Pescarin 2013: 13).

7.3.1 Content

Types of virtual museums in relation to their content:

- Archaeology Virtual Museum
- Art Virtual Museum
- Ethnographic Virtual museum
- Historical Virtual Museum
- Natural History Museum
- Design Virtual Museum
- Music Virtual Museum
- Fashion Virtual Museum
- Etc. (Terminology, Definitions and Types for Virtual Museums 2013)

The proposed list of types is not complete, as the authors state:

> Since it is very difficult to set up all kind of possible museums by their content (see as an example: http://en.wikipedia.org/wiki/Category:Types_of_museum which seems still not complete, as lacking of Music Museums), a classification by content seems to be necessarily open (i.e. to which category would belong, for instance a VM such as "fashion and textile museum" or "Valentino Garavani Virtual Museum") (Farouk & Pescarin 2013: 13).

7.3.2 Interaction technology

Virtual museums are defined in relation to type of interaction between the user and the environment, including two main types:

- Interactive VMs
- Non-interactive VMs (Farouk & Pescarin 2013: 14-16).

Interactive VMs respond to the action of the user and the interaction may occur in a different form, e.g. interaction may be based on the use of devices ("device based interaction"), or based on natural behaviours of the user, such as movement and gestures ("gesture-based interaction") or speech ("speech based interaction"). Non-

interactive VMs are defined as: "Assemblage of digital media providing the user passive (including emotional, intellectual and imaginative) engagement." (Farouk & Pescarin 2013: 15).

7.3.3 Duration

Virtual museums can be categorised in relation to the timing of display. This category contains:

- Periodic VMs ("applications playable not continuously, according to specific time intervals")
- Permanent ("applications playable continuously in time")
- Temporary VMs ("applications conceived to be played for a limited time span, also according to a specific event") (Farouk & Pescarin 2013: 17)

7.3.4 Communication

Classification in relation to the type of communication between a "sender" and a "receiver". Descriptive VMs is:

> a Virtual Museum characterised by a mode of communication in which events, monuments, artifacts, artworks, customs or beliefs are defined, described and interpreted by a "Sender" who aims at informing and making aware the "Receiver". (Farouk & Pescarin 2013: 17)

Narrative VMs is:

> a Virtual Museum that uses a mode of communication in which the 'Sender' provides information about events, monuments, artifacts, artworks, customs or beliefs by arranging them in a sequence (e.g. chronological), in order to create an account of a subject by the 'Receiver's' side. (Farouk & Pescarin 2013: 17)

Dramatisation-based VMs is:

> a Virtual Museum where the "sender" delivers a message/information by reconstructing and presenting events, novel stories, actions and items in a capturing and engaging ways so as to deeply involve the "receiver". (Farouk & Pescarin 2013: 18)

7.3.5 Level of immersion

The authors use the classification of immersive systems proposed by researchers Marcello Carrozzino and Massimo Bergamasco (Terminology, Definitions and Types for Virtual Museums 2013: 18). VMs are divided accordingly to the lever of immersion: non-immersive VMs and immersive VMs (Farouk & Pescarin 2013: 18):

> Immersive VMs: the content is communicated by the means of immersive technologies, and are into two types: high-immersion VMs and low-immersion VMs
>
> Non-immersive VMs (Farouk & Pescarin 2013: 18)

7.3.6 Level of sustainability

According to the project objectives, sustainability is considered as one of the most important factor, as the authors states:

> Sustainability is one of the key aspects of the V-MUST project, since one of the negative experiences reported in the creation of Virtual Museums is the lack of policy and strategy regarding the future persistence and sustainability of applications (hardware/software solutions), but also of digital and multimedia datasets and assets that are not preserved for future re-use or exchange. (Farouk & Pescarin 2013: 19).

VMs are divided according to their level of reusability:

- fully re-usable VMs;
- partially re-usable VMs (reusable VM setup, reusable multimedia, reusable digital content, reusable metadata, reusable software, reusable VM workflow);
- non-reusable VMs. (Farouk & Pescarin 2013: 19)

7.3.7 Type of distribution

This category consists of two main types of virtual museums: distributed and non-distributed. Each of these categories consists of several sub-types:

> Distributed VMs: mobile VMs, offline distributed VMs, online VMs
>
> Non-distributed VMs: on-site installation, portable VMs (Farouk & Pescarin 2013: 23).

Distributed, mobile VM is defined as:

> a virtual museum that can be moved from location to another. It is designed to be installed and dismantled easily. It may include VM applications available for mobile devices, independently to the accessibility of the application on line and off line. (Farouk & Pescarin 2013: 23).

Offline distributed VMs or distributed VM products: "all products distributed in CD, DVD, Blue Ray or other offline supported formats" (Farouk & Pescarin 2013: 23).
Online VMs:

> The term on-line VM, that was first used by Tsichrizis and Gibbs (Tsichrizis and Gibbs 1991), describes a museum designed in the nominal world of a computer and existing in the Internet, giving the visitor the illusion of being present in an actual museum (Mateevitsi et al. 2008). Often this term is referred to digital online copies of real museums or of their collections. (Farouk & Pescarin 2013: 23-24).

7.3.8 Scope

VMs are classified by scope categories in relation to their purpose, which may be focused on the following main types: education, edutainment, entertainment or research. Each of these types contains sub-types. The purpose of VMs influences also the choice of technology, communication mode or business strategy. (Farouk & Pescarin 2013: 24).

Educational VMs:

> All VM applications that have been conceived and implemented having in mind specific instructional purposes; these applications have clear and well-defined educational objectives and are directed to as well set up and identifiable target population which possesses definite prerequisites; they are often thought to be used in formal educational settings (schools; universities, professional training…). (Farouk & Pescarin 2013: 24-25).

Edutainment VMs:

> All Virtual museums that use a gaming environment to convey specific information, trigger and foster learning. (…). To Buckingham and Scanlon (Buckingham and Scanlon 2000) "edutainment" is a hybrid genre that relies heavily on visual material, on narrative or game-like formats, and on more informal, less didactic styles of address. (…) Content with a high degree of both educational and entertainment value is known as edutainment. (Farouk & Pescarin 2013: 25).

Entertainment VMs:

> VM applications that have been conceived and developed for the user's fun and enjoyment. They nevertheless may convey significant and valuable information on cultural heritage, thus also sustaining informal learning processes. (Farouk & Pescarin 2013: 25-26)

The sub-type of this type, described as "enhancement of visitor experience": "concerns VM applications that provide additional or complementary information to a non-virtual museum". The purpose of promotional VMs is to advertise and promote issues related to cultural heritage (items, sites, etc.).

Promotional VMs:

> are designed and implemented with the primary aim of capturing and maintaining attention until the main promotional messages are passed through. Such applications may greatly vary in their approach, depending on the target population specifically addressed. (Farouk & Pescarin 2013: 25-26).

Research VMs:

> VM applications that are meant to support and enhance research. It also includes applications that, due to their innovative character, may sustain research in other related fields such as: ICT, augmented reality, artificial intelligence, virtual worlds and serious games, geography, etc. The considered applications are often prototypes and demos endowed with specific innovative functionalities and can cover specific issues. (Farouk & Pescarin 2013: 26)

7.3.9 Evaluation of VMs in the V-MUST project

In 2011 the project team carried out the first online survey. Around 90 virtual museums within and outside Europe were identified through web browsing and by using keywords related to the virtual museum domain. The examples were categorised and analysed (Ferdani 2013: 13). The virtual museums were categorised and defined by their (1) content, (2) interaction technology, (3) duration, (4) type of communication, (5) level of immersion, (6) format, (7) scope and (8) sustainability.

Within the synthesis process of the results, the researchers created five reference scenarios representing a combination of proposed categories: (1) Mobile virtual museum or Micro museum (VR/AR); (2) On-site interactive installation; (3) Web-delivered virtual museum; (4) Multimedia virtual museum, and (5) Digital archive (State of the art on Virtual Museums in Europe and outside Europe 2013: 15-21). In Deliverable 3, the proposed scenarios are following: (1) "web-based virtual museum, the unique museum"; (2) "web-based virtual museum, aggregators, portals and large scale collaborations"; (3) "virtual museums in situ (large screen in theatre)"; (4) "virtual museums in situ (small screen in the gallery)"; (5) "the mobile virtual museum" (Hazan et al. 2012: 22-26). By combining these categories, we get six scenarios: (1) mobile VMs; (2) web-delivered VMs; (3) VMs in situ (large-scale solutions); (4) VMs in situ (small scale solutions); (5) multimedia VMs; and (6) aggregators or digital archives (large-scale collaborations).

The research was planned as an ongoing investigation. The list of the virtual museums was to be updated, and consequently the categories and scenarios revised and redefined. The results from the first survey indicated four areas requiring further discussion: (1) relation between the VMs and the real museum; (2) a necessity to propose a consistent definition of VMs that is concerned with the classification; (3) the problem of identifying virtual museums, as there is no single widely used definition, and (4) further work on scenarios to facilitate further online research on VMs (Ferdani 2013: 21-22).

Consequently, in 2012 a new "expert survey" was carried out (Ferdani 2013: 24). The objectives of the survey were to update end enlarge the list of the virtual museums, provide missing information and develop the scenarios (Ferdani 2013: 25). In addition, the survey and research activities were organised in connection with "Archeovirtual 2012" in Paestrum, Italy. Archeovirtual, which is part of the Mediterranean Expo of Archaeological Tourism, is the largest exhibition of virtual heritage projects in Europe[148]. During the exhibition, the V-Must.net project organised a call for participation. The objectives of the call were to collect information on virtual museums, and to systematically organise and evaluate them. The submitted projects were analysed and information synthesised in a form containing 12 categories (8 categories of VMs, name of the museum, institution, description and link). The best projects were exhibited at Archeovirtual 2012 and this opportunity was taken to conduct an evaluation of cognitive and perceptive issues (Ferdani 2013: 25).

The results of the expert survey indicated that the communication category, defining the user experience, should be considered as a central factor in relation to VMs scenarios. The studied VMs represent following scenarios: (1) narrative online; (2) narrative on-site; (3) narrative mobile; (4) descriptive online; (5) descriptive on-site, and (6) descriptive mobile (Ferdani 2013: 25). In the next step, around 25 the most representative virtual museums have been evaluated and six representative cases illustrating each scenario selected. The virtual museums were evaluated in relation to their qualities: (1) pedagogical; (2) technical; (3) visualisation and metadata, and (4) museological quality. Each, representative example, is comprehensively described and the link provided (Ferdani 2013). These examples may serve as a refer-

148 Archeovirtual 2012, http://www.vhlab.itabc.cnr.it/archeovirtual/2012/ [13-01-2014]

ence for researchers, developers and other experts from the domain of virtual museums.

7.4 Methodology of the survey

In the previous part I presented the methodology of evaluating virtual museums and the classification developed within the V-Must.net project, as well as the first results achieved by the research team. The V-MUST classification is not final, but according to the objectives of the V-MUST.net project, it can facilitate further research and enable wider discussion of the state of virtual museums in Europe. In this part I describe how the V-MUST methodology and terminology are used in this research. The results from the V-MUST project and this research are discussed and compared in the section presenting results and discussion.

The importance of the V-Must project can hardly be overestimated in relation to research on virtual museums. At this moment it is the largest European project with objectives directly focused on museums' digital creations and their preservation. It involves the institutions that have been developing virtual museums and digital applications for several years and have expertise in a variety of aspects related to digitisation, visualisation and digital preservation.

The project consortium does not include any Finnish institutions, and among the associated members there is only one institution from Finland – the Media Lab of the School of Arts, Design and Architecture at Aalto University (Helsinki, Finland). In addition, the Media Lab developed the only two examples of virtual museums from Finland, "Re-discovering Vrouw Maria" and "Mapping Modernism" that were analysed by the V-MUST research group. Both projects were submitted to the expert survey carried out in connection with "Archeovirtual 2012". They are descriptive on-site installations and were developed in connection with museum exhibitions. "Re-discovering Vrouw Maria" accompanied the exhibition "Spoil of Riches - Stories of the Vrouw Maria and the St. Michel"[149] (25.4.2012-13.01.2013) at the Maritime Centre Vellamo in Kotka, while "Mapping Modernism" accompanied "the Modernism" exhibition (11.02.2010-03.05.2010) at the Design Museum in Helsinki. Both museums are professionally run institutions. Besides these examples, which can be categorised as on-site virtual museums, the Finnish virtual museums are not covered by the surveys carried out within the V-MUST.net project.

In this research, the survey on the Finnish virtual museums has been carried out and both the V-MUST methodology and classification have been used. However, there are certain differences in how the surveys have been conducted. In the V-MUST.net project, the researchers first identified a number of virtual museums in Europe and outside Europe. In the first survey, they browsed the Internet and used keywords from the domain of the virtual museum. In the second, "expert", survey, the examples were added during the call for participation. In this research, the objec-

149 Exhibitions archive, Matitime Museum, National Board of Antiquities, http://www.nba.fi/en/museums/maritime_museum/exhibition%20archive [14-01-2013]

tive is to investigate the landscape of Finnish virtual museums, and therefore its focus is only on VMs created by or for Finnish museums. The selection of VMs is also different. In 2008, in the beginning of this study I made a systematic review of the Finnish websites. The review influences this survey, and so I will first briefly describe the methodology and results of the first review. Next, I will describe the methodology of the latest survey.

The goals of the first review were: (1) to obtain a more general picture of the websites and webpages of Finnish museums with focus on the small local history museums; (2) to find exceptional online initiatives, and finally (3) to identify the elements needed to construct the structure of a museum website. The last objective is concerned with the research prototype and is discussed separately in the following chapters.

As a starting point for the first review carried out in 2008 I used the list of Finnish museums accessible in Museot.fi website[150]. The website is maintained by the Finnish Museums Association. The Finnish Museums Association is a central organisation for museums responsible for representing museums' interests and supporting museums development through various projects and activities[151]. The Museot.fi website is an access point to the database with information on Finnish museums as well as the exhibition calendar. The searchable database[152] allows users to browse museums according to: (1) type of the museum; (2) available services; and (3) accessibility in museums. The museums may be searched by their location, name or subject. Each museum (e.g. the Ateneum Art Museum[153]) is shortly described and a link to the museum's own website is provided. There is also more specific information, such as opening hours, ticket prices, address information and available services. I used the list with the links to the museums' websites to make a preliminary review of the websites of the Finnish museums. At that time, the list included 1,073 institutions (July 2008)[154]. If the link was not working, I search the museum's name in the Google search engine to find the museum's website or page on the city/municipality's website.

As an analytical tool to review the websites I used the categories defined by Werner Schweibenz (Schweibenz 2004: 3). Schweibenz proposes four stages in the development of the online museums: (1) the brochure museum, which is a website offering only basic information on the institution; (2) the content museum uses an object-oriented approach to present the representation of the museum's collection; (3) the learning museum offers didactically enhanced content, and (4) the virtual museum that connects resources from different institutions (Schweibenz 2004: 3). All the listed museums have some kind of online presence. The majority of the small museums' websites represent the brochure museum. The professionally run institutions' websites can be categorised as content and learning museums, and only a few as virtual museums.

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150 Museot.fi http://www.museot.fi/ [14-01-2013]
151 Suomen museoliitto, http://www.museoliitto.fi [14-01-2013]
152 Museot.fi, Search museums, http://www.museot.fi/searchmuseums [14-01-2013]
153 Museot.fi, Ateneum Art Museum, http://www.museot.fi/searchmuseums/index.php?museo_id=21094 [26-10-2012]
154 Providing information is not obligatory, and therefore the database does not necessarily give the actual number of museums.

Furthermore, I identified several characteristic features of the digital creations of museums that would require further analysis and a different method. As an analytical tool, Schweibenz's categories are very general and not precisely defined to provide the expected results. The valuable results from this systematic review indicate that: (1) the Finnish museums have digital creations; (2) according to the discussed definitions of virtual museums, some of these digital creations can be defined as such; (3) there is a visible difference in relation to complexity and quality of digital creations launched by the professionally and non-professionally run institutions.

Consequently, on the basis of the obtained results, the second, wider survey was carried out. The V-Must.net classification, as an analytical tool, was applied to digital creation launched and maintained by Finnish museums, and which are accessible online. According to the V-Must.net classification, the scope of this analysis covers online and mobile VMs that are a sub-type of the distributed VMs. The objectives of the second survey are: (1) to identify and provide an overall picture of Finnish virtual museums, especially in relation to small, local heritage museums; (2) to identify the role of small, local history museums in providing an online access to heritage in Finland, and (3) to compare the results from this survey with the V-Must.net project to place the Finnish virtual museums within the wider context.

The scope is limited mainly to online and mobile virtual museums for several reasons. As the first survey indicated, this form of distribution is widely known and used in the Finnish museums. This form of distribution facilitates wider collaboration and sharing opportunities. In relation to professionally run museums, their collections have typically been opened up by publishing catalogue records online in digital form. In the context of Finnish VMs, the main way of providing access to knowledge on collections is through online forms of distribution: museum websites, portals and information search services. Initiatives for access to heritage in other forms of distribution are fewer and reserved for professionally run museums.

In order to select a list of museums covered by this survey, I took as my starting point a listed compilation of data collected by the Finnish Museums Association (the database of the museums) and the National Board of Antiquities (museum statistics and the survey carried out by the Local Museums Committee). On the Local Museums Committee's list there are 1,154 museums (2012), while the Finnish Museums Association listed 919 museums (retrieved on October 9, 2013).

The lists prepared by these two institutions include several categories, of which the following were relevant: museum name, place and museum type. In this survey, I compiled the data from these two sources and limited the selection to museums from Satakunta and countrywide initiatives that influence the museums in Satakunta.

The first group of museums, limited to museums in the region of Satakunta, consists of 63 museums and museum places. There are 42 small local history museums, which were classified in the Local Museums Committee's survey as:

- Type of home district museum / local heritage museum (e.g. school museum, open-air museum, home museum, object museum, magazine museum)

- School museum

- Museum of medical sciences or medical care (e.g. pharmacy museum, hospital museum and sanatorium museum)
- Museum of everyday life and history of housing
- Special collection (e.g. bottle, coffee cup or postage stamp museum)
- Hobby museum (museum of sport and recreation, horse museum, museum and music instruments museum)
- Personal museum (e.g. writer's home museum, artist's home museum, home museum devoted to one person or family
- Historical museum of war, weapons or defence[155] (Rakkaudesta kulttuuriperintöön 2012: 55)

Each museum may belong to several categories. According to the typology used by the Finnish Museums Association, the museums represent cultural history museums and local museums. Alongside these non-professionally run museums, there are nine professionally maintained institutions, which are responsible for 20 museum locations. These museums represent several types of museums: special museums, art museums, regional art museums, cultural history museums, natural history museums and regional museums.

The second group of analysed museums consists of projects that have not been developed in the region of Satakunta, but are countrywide initiatives providing access to cultural heritage originating from this region, or according to their objectives and organisational scheme, they may be or will be expanded to cover also the institutions in Satakunta. These projects have been developed within the last years by different institutions and for different purposes. One of the criteria was to select the newest and most influential projects. In this sense, these projects give widest access to the cultural heritage and propose standards for the whole museum sector, and will be used to demonstrate how small museums can function within the larger context.

The proposed review form consists of categories divided into three groups: (1) basic information, (2) links, and (3) V-Must classification. The first set of categories includes: museum name, location and museum type. The second group of information includes links: the link available from Museot.fi or alternatively a link from Google. The links from Museot.fi were used as the starting point. If a provided URL was not valid, I searched for the museum name in the Google search engine. The next categories inform whether the museum has its own website, webpage or

155 Author's translation of:
- Kotiseutumuseotyyppinen museo (esim. kotiseutumuseo, ulkomuseo, talomuseo, esinemuseo, makasiinimuseo)
- Koulumuseo
- Lääketieteen tai terveydenhoitoalan museo (esim. apteekki-, sairaala- ja parantolamuseo
- Museum of history of everyday life and housing [Arjen ja asumisenhistorian museo
- Erikoiskokoelma (esim. pullo-, kahvikuppi- tai postimerkkimuseo)
- Harrastusmuseo (esim. urheilu- ja liikuntamuseo, hevosmuseo, musiikki- ja soitinmuseo)
- Henkilöhistoriallinen museo (esim. kirjailijakoti, taiteilijakoti, yhdelle henkilölle tai perheelle omistettu kotimuseo)
- Sota-, ase- tai maanpuolustushistoriallinen museo

whether it is present in some other services and websites, such as regional museum portals or Facebook. The third group includes eight V-Must categories: content, interaction technology, duration, communication, level of immersion, level of sustainability, type of distribution and scope. As presented earlier, each of these main categories includes types and subtypes, which were also taken into account in this survey. The exception is the level of distribution, because the survey is limited to online and mobile virtual museums to answer the research questions of the survey.

7.5 Results

The survey was conducted between October 2013 and March 2014. The list with the categories described in the previous part was used to identify and provide an overall picture of Finnish virtual museums. The V-Must categories were used to analyse the online presence of 52 museums from Satakunta. The majority of these institutions represent cultural history museums, three are art museums (responsible for 4 museum venues) and one is a natural history museum.

Generally speaking, the online presence of small museums is very limited, since not all the museums are present online. Searches for the museum websites did not give any results for six small local museums. All professionally run museums have their own websites with their own web addresses, but five of them have websites accessible through the website of a city or municipality, e.g. the Satakunta Museum[156], located in the city of Pori, has its pages on the city's website. The list of analysed projects consists of 66 locations. The survey has shown that among these projects there are only 7 digital creations that can be defined as virtual museums, according to the definitions proposed within the V-Must project (Farouk & Pescarin 2013). Briefly presented here are the results of the survey to show the landscape of virtual museums in Satakunta in relation to small museums, and also to reflect on the methodology.

The first group of digital creations are projects that are not virtual museums. Almost all of them are non-interactive; only one has an element, in this case a panorama, which offers a kind of interaction defined as device-based interaction: "the Virtual Street" presented by the Kankaanpää City Museum[157]. The Virtual Street presents Kankaanpää in the 1930s. The user can go thought the place and get more information on the buildings, their owners and history. The information is provided in the form of a text label and images.

156 Satakunta Museum, http://www.pori.fi/kulttuuri/satakunnanmuseo.html [14-05-2015]
157 Kankaanpää City Museum, Virtuaalinen Keskuskatu, http://www.kankaanpaa.fi/sivistyskeskus/html/fi/virtuaalikatu.html [14-05-2015]

FIGURE 48 Virtuaalinen Keskuskatu (Virtual Street) , Kankaanpää City Museum.

This example also offers a low-immersion experience, while the rest of the projects are non-immersive. All the projects represent a descriptive type of communication and are permanent. In terms of duration, all projects can be categorised as permanent. It was quite difficult to categorise the websites or webpages with regard to scope, as their content is very limited and they are not virtual museums. On some of the websites there are educational materials for teachers or long descriptions of the buildings, collections and history of the museum. In this sense, they may be defined as educational. In addition, the small local museums are described on the municipality's website, mainly in the category "Tourist attractions", "Leisure" or "Culture" – which means that their scope can be defined as promotional. Finally, the museums try to provide some additional or complementary information to a non-virtual museum, and in this sense they are thus a sub-type of entertainment projects – defined as "enhancement of visitor experience" (Farouk & Pescarin 2013: 25-26). In relation to sustainability, the projects can be defined as non-reusable. The content consists of text and images, which are subject to copyrights.

Besides the museums' own websites and pages on the municipality's sites, the museums are present on Facebook and in e.g. some portals, such as the Kukkilintu Museo, which does not have its own website, is presented on the tourist information website "Maisa Porin Seudun Matkailu Oy"[158]. The information about the Kokemäki

158 Kukkilintu museo - esineistöä Karjalasta Maisa Porin Seudun Matkailu Oy, http://www.maisa.fi/matkailijat/nae-ja-koe/kukkilintu-museo-esineistoa-karjalasta [13-01-2014]

Agricultural Museum is on the website of Kokemäki[159] and it is also presented on the "Museoraitti" site, launched in 2006[160]. "Museoraitti" is a site developed by the professionally run agricultural museum Sarka and presents a number of museums with collections.

In relation to small museums, the most prominent project in Satakunta is "Aikamatka Satakunnassa" ("A Journey through Time in Satakunta") [161], a project coordinated by the Satakunta Museum. This is a joint project of the Satakunta Museum, the Rauma museum, the Rauma Maritime Museum, the Kankaanpää City Museum, the Emil Cedercreutz Museum and the Huittinen Museum, and funded by the Regional Council of Satakunta. It is a portal presenting information on the local museums, tourist attractions and sites related to the cultural heritage. It also proposes several themes, such as "The Bronze Age in Satakunta", "Agricultural machinery" and "For families".

"Aikamatka Satakunnassa" is the most consistent source of information on the museums in the region. However, the site is not a virtual museum either. In regard to the V-Must characteristics of the virtual museum, its content can be described as a cultural history project, permanent, interactive, descriptive, non-reusable, with its scope related to the educational, entertainment and promotional purposes of the site. "Aikamatka Satakunnassa" has been created to improve the quality of available information on museums and heritage sites in Satakunta, and to increase the number of visitors. This is the clearest example of how museums enhance visitor experience through their digital creations at a regional level. In Finland, 16 out of 19 regions have their own regional museum portal. In addition, there are a few regional portals promoting museums from the regions that due to administrative changes no longer exist. Usually, regional portals have been launched and maintained by the regional museums or official tourist and member organisations. Moreover, there are three thematic portals ("Trafiikki museot ry"[162], "Sotahistorialliset erikoismuseot ja perinnekokoelmat"[163] and "Museoraitti - maatalousteemaisten museoiden esittely"[164]). They have the same goals: to inform about the museum and encourage people to visit them, but they do not focus on heritage and cannot be defined as virtual museums.

159 Kokemäen maatalousmuseo, http://www.kokemaki.fi/palvelut/vapaa-aika/kulttuuri/museot/kokemaen_maatalousmuseo/ [13-01-2014]

160 Kokemäen maatalousmuseo ja ulkomuseo, Museoraitti - maatalousteemaisten museoiden esittely, http://www.museoraitti.fi/index.asp?yv=2&av=283&kieli [13-01-2014]

161 Aikamatka Satakunnassa, http://aikamatkasatakunnassa.fi [13-01-2014]

162 Trafiikki museot ry, http://www.trafiikki.fi [13-01-2014]

163 Sotamuseo – Sotamuseo valvoo aselajimuseoiden toimintaa, Maanpuolustuskorkeakoulu, http://www.mpkk.fi/fi/sotamuseo/aselajimuseot [13-01-2014]

164 Museoraitti - maatalousteemaisten museoiden esittely, http://www.museoraitti.fi [13-01-2014]

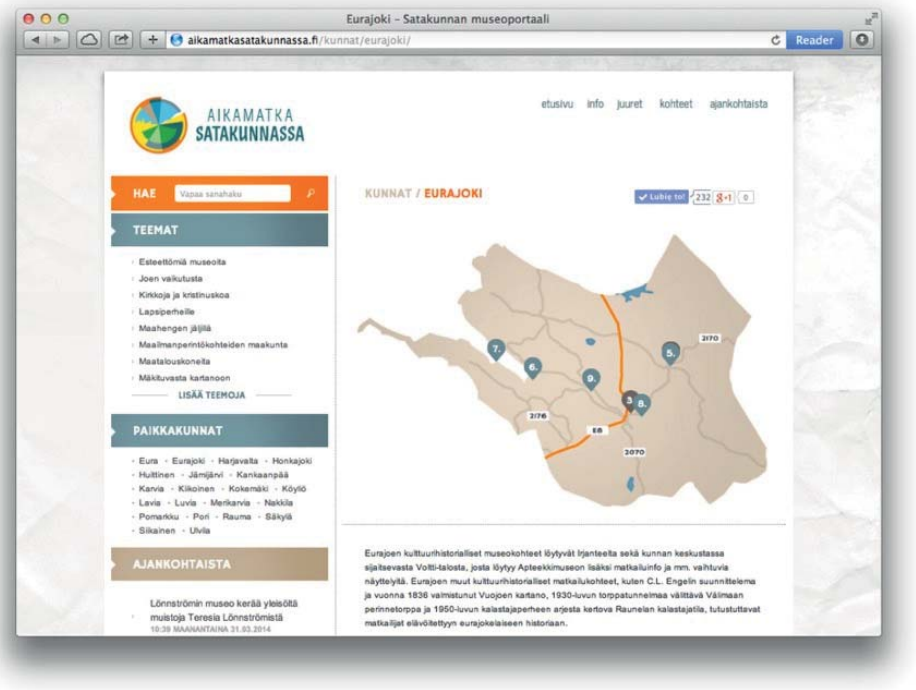

FIGURE 49 "Aikamatka Satakunnassa"

None of these online projects meets the definitions of virtual museums proposed within the V-Must project (Farouk & Pescarin 2013). The projects are accessible for the public, but they are generally not focused on tangible or intangible heritage. The main focus of the analysed project is on the institution, its activities and information relevant for a potential visitor to plan a visit to the physical museum. There are only few examples of presenting tangible and intangible heritage, such as a presentation of an object of the month provided by the Emil Cedercreutz Museum[165]. The presentation is a static page with an image and textual description, which means that it is non-interactive and non-immersive. The object of the month can be also found on the Museum's profile on Facebook[166]. The link to the webpage with the object is shared with the additional title. It displays only a part of the description of the object, but after clicking on the object, the user is taken to the Museum's webpage.

165 Kuukauden esine, maaliskuu 2014, Emil Cedercreutzin museo, Harjavalta, http://www.harjavalta.fi/palvelut/museo/kuukauden-esine/maaliskuu-2014/ [01-04-2014]

166 Emil Cedercreutzin museo, Facebook, https://www.facebook.com/emilcedercreutzinmuseo?ref=ts&fref=ts [01-04-2014]

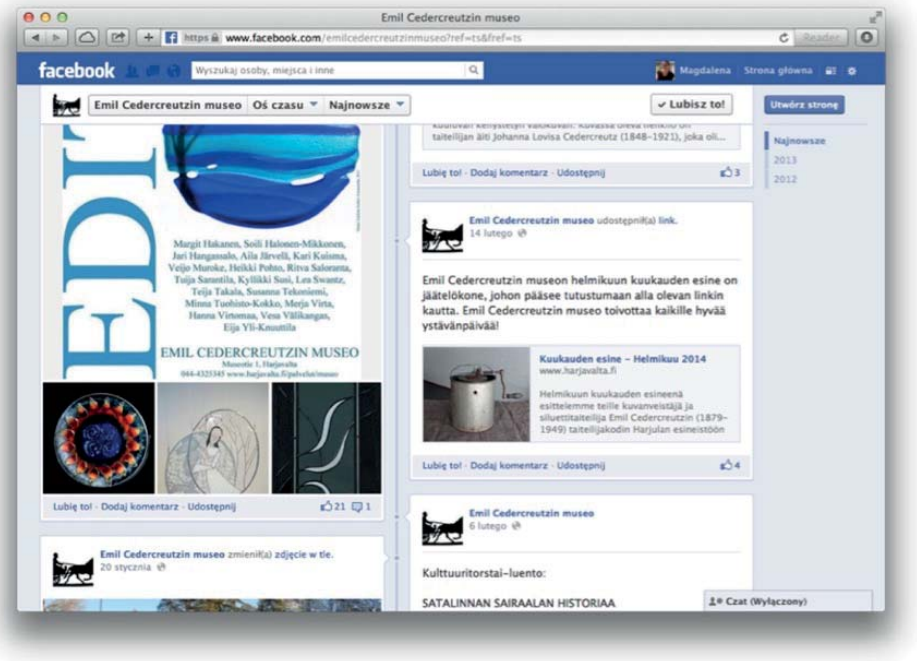

FIGURE 50 The object of the month, the Emil Cedercreutz Museum, Facebook

A second group of digital creations that according to the definitions used within the V-Must project are virtual museums, are online exhibitions prepared by the Satakunta Museum, sometimes in collaboration with other institutions and persons. The same categories can be used to analyse them, but what is most important, as opposed to the previously presented creations, these are focused on tangible or intangible heritage.

The Satakunta Museum created seven separate virtual exhibitions:

- "Hotelli Otava" ("Hotel Otava")[167]
- "Kadunnimet - Kaupungin muisti" ("Street Names – Memory of the City")[168]
- "Naisia Porissa" ("Women in Pori")[169]
- "Paperitehtaalaisen muistoja" ("Memories of the Paper Mill Workers")[170]
- "Puukaupungin tarina" ("The Story of the Wooden City")[171]

167 Hotelli Otava, Verkkonäyttelyt, Satakunnanmuseo, Porin kaupunki, http://www.pori.fi/kulttuuri/satakunnanmuseo/verkkonayttelyt/hotelliotava.html [01-04-2014]

168 Kadunnimet - Kaupungin muisti, Verkkonäyttelyt, Satakunnanmuseo, Porin kaupunki, http://www.aikamatkasatakunnassa.fi/kadunnimet/ [01-04-2014]

169 Naisia Porissa, Verkkonäyttelyt, Satakunnanmuseo, Porin kaupunki, http://www.pori.fi/kulttuuri/satakunnanmuseo/verkkonayttelyt/naisiaporissa.html [01-04-2014]

170 Paperitehtaalaisen muistoja, Verkkonäyttelyt, Satakunnanmuseo, Porin kaupunki, http://www.pori.fi/kulttuuri/satakunnanmuseo/verkkonayttelyt/paperitehtaalaisenmuistoja_3.html [01-04-2014]

- Teollisuustyön jäljillä" (“Tracing Industrial Work”)[172]
- “Varo vaaraa!” (“Watch out for Danger!”)[173]

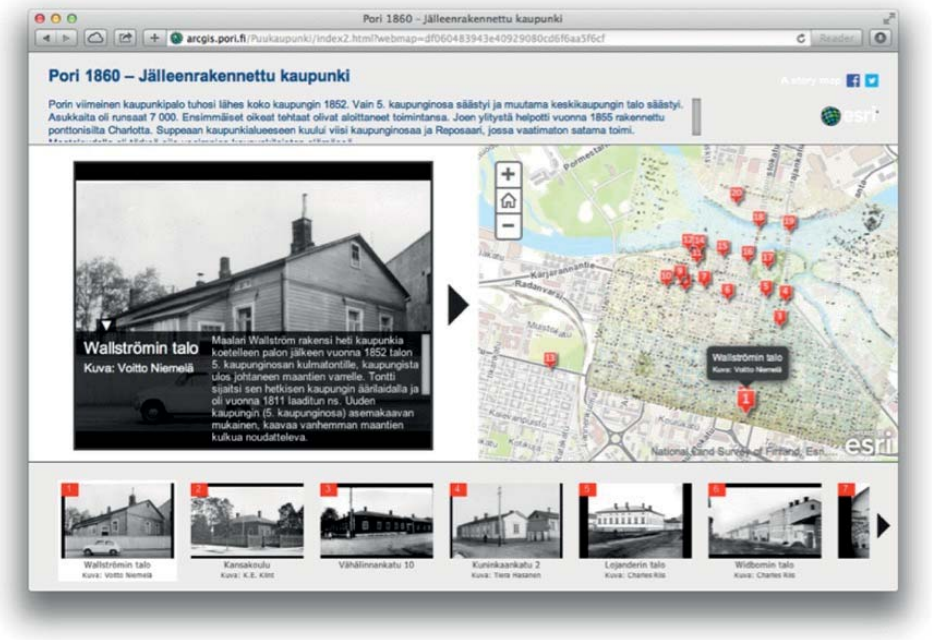

FIGURE 51 “The Story of the Wooden City”, Satakunta Museum

Six of them are historical narrative online museums; one is mobile narrative museum - “The Story of the Wooden City”, which is also the only interactive. They are partially reusable, as they are intended to serve teachers and students (the scope is educational). “Hotel Orava” was an online exhibition documenting the renovation of the building, and was therefore planned as a temporary creation, but it is still accessible as the rest of the project that can be defined as permanent.

Some of the exhibitions do not provide information when they were created, but most of them were created around 1998 and 2012. All of them are narrative online museums, non-immersive and in relation to their content they can be defined as historical. Apart from one, the mobile museum – “The Story of the Wooden City”, they are constructed as linked webpages consisting of text and images, and therefore can be described as non-interactive.

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171 Puukaupungin tarina, Verkkonäyttelyt, Satakunnanmuseo, Porin kaupunki, http://arcgis.pori.fi/Puukaupunki/index2.html?webmap=df060483943e40929080cd6f6aa5f6cf [01-04-2014]

172 Teollisuustyön jäljillä, Verkkonäyttelyt, Satakunnanmuseo, Porin kaupunki, http://www.pori.fi/kulttuuri/satakunnanmuseo/teollisuustyonjaljilla.html [01-04-2014]

173 Varo vaaraa!, Verkkonäyttelyt, Satakunnanmuseo, Porin kaupunki, http://www.pori.fi/kulttuuri/satakunnanmuseo/verkkonayttelyt/varovaaraa_2.html [01-04-2014]

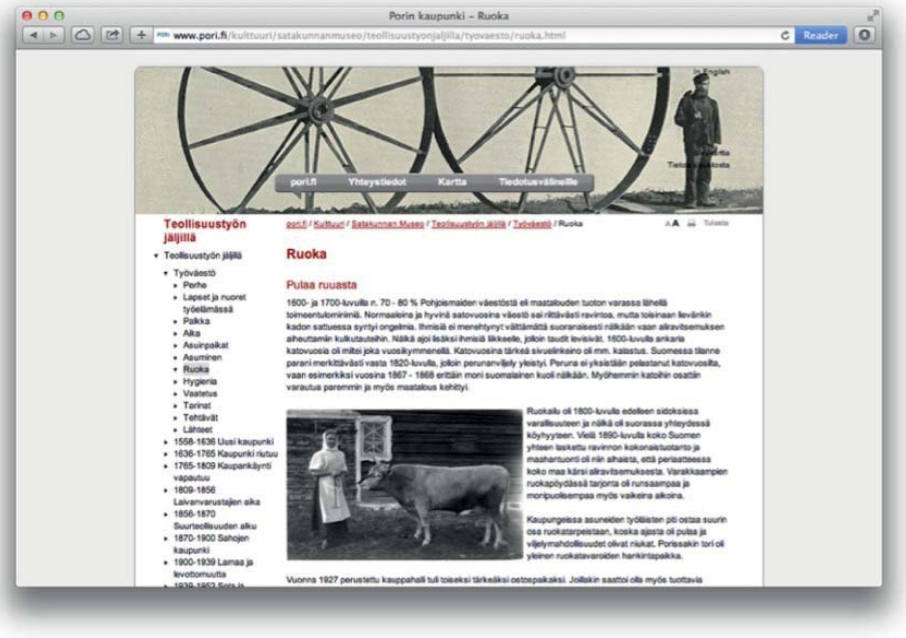

FIGURE 52 "Tracing Industrial Work", Satakunta Museum

The "Story of the Wooden City" consists of four interactive maps with images and descriptions of the wooden buildings. When accessed on the mobile device with GPS, due to implemented GIS solutions the user can check own localisation and learn about existing and historical wooden building around. The author of the idea of the Story of the Wooden City was Timo Widbom, and Anna Eteläaho from the Tampere University of Technology was responsible for the technical development. The content, which consists of images, was provided by the Satakunta Museum.

Generally, they do not provide information on their purpose, but it can be assumed that they are mainly educational. The previous example can be defined also as a research project. Another example of a project with a research scope is "Women in Pori", developed between 2011 and 2012. It was a joint project of the Satakunta Museum and the Degree Program of Cultural Production and Landscape Studies at the University of Turku with its localisation in Pori. The students participating in this project were asked to produce biographies of women living in Pori in the 19th century to contribute to the exhibition. The project supervisor and researcher, Anna Sivula, investigated how these biographies, as historical representations, were translated into a museum exhibition (Sivula 2012). The museological quality of these projects lies in the quality of the curatorial content, as their objective is educational. "Tracing Industrial Work" is designed to serve teachers and students. In this case, it is strengthened by the fact that the content can be reused and the authors encourage to do it.

FIGURE 53 The "Women in Pori" website

The previously presented examples can be defined as virtual museums, the content is very well curated and prepared, and can be easily used for educational purposes. However, their scope is very limited and it is not easy to find these projects. Two of them have research objectives, and all of them are important in regard to their educational quality. However, beside these aspects, they do not contribute much to any other areas of expertise, the museum sector or larger audiences. The projects belonging to the last group may serve as an example of projects contributing in other areas. They have not been developed in the region of Satakunta, but they cover cultural heritage related to this region or ca be available to the institutions from Satakunta.

These initiatives are wider, country wide projects, which give access to cultural content through following services: (1) "Finnish Museums Online"[174], (2) "CultureSampo"[175], which is a portal for Finnish cultural heritage based on semantic web and Web 2.0 technologies, and it is a continuation of "MuseumFinland"[176] project, and (3) through a common user interface Finna[177], which is a discovery service developed within the "National Digital Library" (NDL) project of the Ministry of Edu-

174 Finnish Museums Online, http://suomenmuseotonline.fi/en [01-04-2014]
175 The Semantic Web 2.0, Semantic Computing Research Group (SeCo), http://www.seco.tkk.fi/applications/kulttuurisampo/ [01-04-2014]
176 MuseumFinland - Finnish Museums on the Semantic Web, The Semantic Web 2.0, Semantic Computing Research Group (SeCo), http://www.seco.tkk.fi/applications/museumfinland/ [01-04-2014]
177 Finna, https://www.finna.fi [01-04-2014]

cation and culture. Collections from several institutions and organisations from Satakunta have joined "Finnish Museums Online"[178].

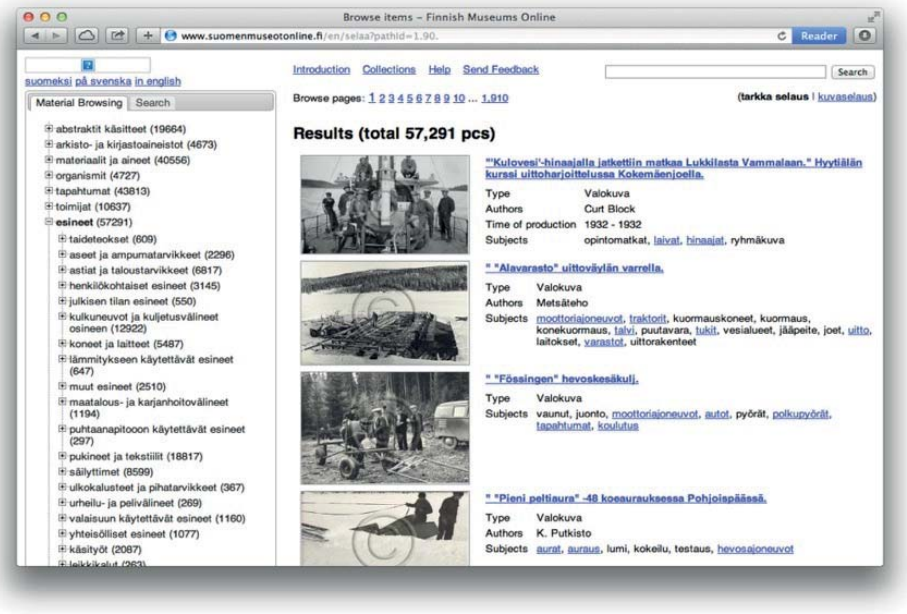

FIGURE 54 "Finnish Museums Online"

The most valuable objects from Satakunta are in the collection of the National Museum of Finland, and thus accessible online, such as a sword found in Eura in the region [179]. As the discovery service, "Finna" allows for basic and advanced search of metadata, as well as geographic search. At this moment "Finna" is in a pilot stage, so the available resources are limited, but it is a long-term project and finally we can expect much higher number of available resources. According to the plans, in "Finna" pictures can be purchased, loans renewed or materials and documents ordered through the additional services (so far, the services are implemented for the library materials). The museum content can be commented on.

According to the V-Must classification, these three services are similar, as they present content from a number of several memory institutions, and so they can be called multi-subject virtual museums and aggregators. The services are online, mobile, descriptive and permanent. Some of the content in "CultureSampo" can be described as narrative. The level of interactivity is low (device based interaction or tangible interaction in case of a mobile access) and the services are not immersive. In regard to the purpose, the "Finnish Museums Online" is aimed at increasing access

178 Suomen Museot Online – Collections, http://suomenmuseotonline.fi/en/collections [01-04-2014]

179 "miekka; linssipontinen miekka", MuseoFinna, https://museot.finna.fi/Record/musketti.M012%3AKM70%3A1 [01-04-2014]

to museum collections[180], and it is thus defined through the purpose of the museum and in regard to this, it can be assumed that it may be related to educational, entertainment or promotional functions and activities of the museum. "CultureSampo" is a "semantic portal and publication channel for Finnish cultural heritage"[181], developed mostly as a research project, and thus according to the V-Must classification mainly a research virtual museum. The project developer does not define the purpose in relation to education, edutainment or enhancement of visitor experience. Consequently, we can only assume that the museums participating in this project define the purpose in the same way. The newest project, "Finna", "is intended for all seekers of information and inspiration"[182], and accordingly its purpose is defined through that; seeking information and inspiration may be connected to research and educational objectives as well as may enhance the visitor's experience.

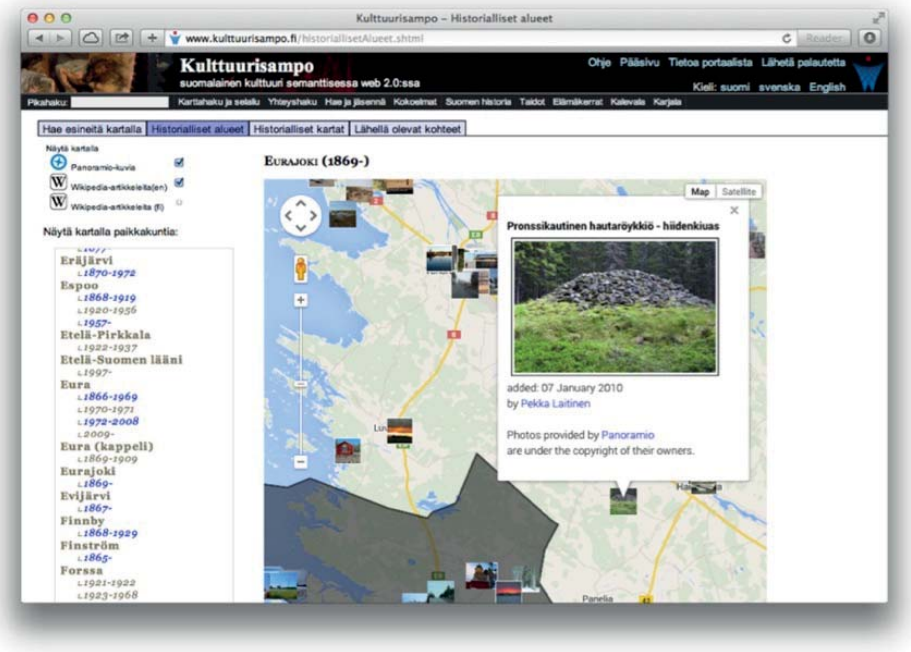

FIGURE 55 Historical map of Eurajoki, "CultureSampo"

180 Introduction, Finnish Museums Online, http://suomenmuseotonline.fi/en/introduction [01-04-2014]

181 CultureSampo - Finnish Culture on the Semantic Web 2.0, Semantic Computing Research Group (SeCo), http://www.seco.tkk.fi/applications/kulttuurisampo/ [01-04-2014]

182 What is Finna? Finna, https://museot.finna.fi/Content/about [01-04-2014]

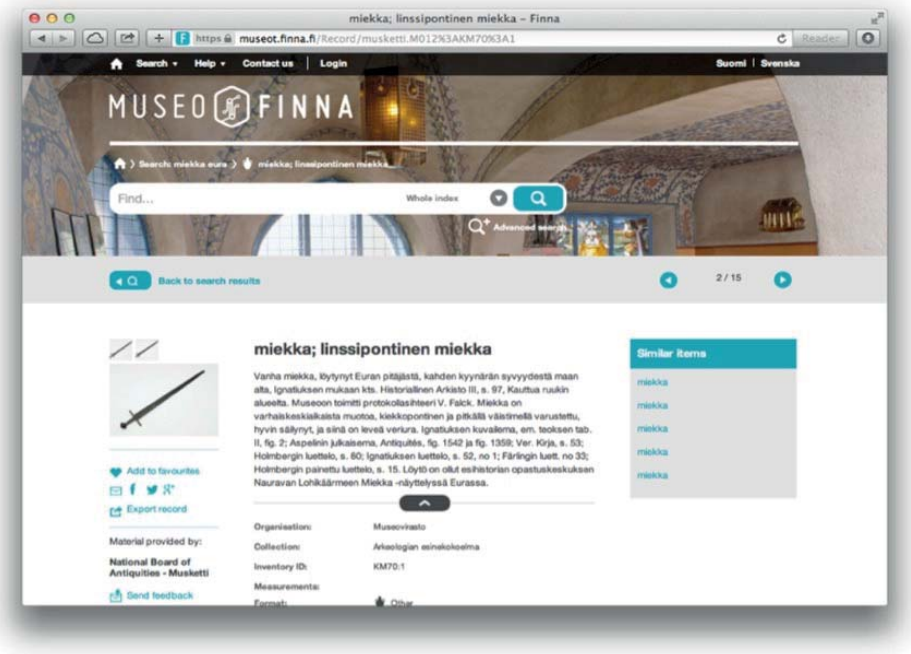

FIGURE 56 A record presenting a sword from Eura in "Museum Finna"

These virtual museums are sustainable in different ways. The publication of images from the Finnish Museums Online is prohibited without the authorisation of the museum. "CultureSampo" does not inform about the copyrights, and certain uses of digital material should be agreed with the owner of the material. "Finna" informs its users that the resource's metadata can be freely reused, and digital material and images can be reused according to the managing institution's policy. "CultureSampo" is the research project and the system consists of the FinnONTO National Semantic Web Content Infrastructure and the National Ontology Library Service ONKI based on W3C Semantic Web recommendations and best practices[183], while "Finna" is built on open-source software and programmes, which means that these three virtual museums can be partly reused.

Issues regarding the quality of metadata and new ways of documentation have also been actively approached by museums. Two online exhibitions were created within the TAKO project; "A Finnish Winter's Day" ("Suomalainen talvipäivä")[184] and "Prepared for Nature" ("Varustautuneena luontoon")[185]. The presentation is a static page with an image and textual description, which means that it is non-interactive and non-immersive. The object of the month can be also found on the

183 CultureSampo - Finnish Culture on the Semantic Web 2.0, Semantic Computing Research Group (SeCo), http://www.seco.tkk.fi/applications/kulttuurisampo/ [01-04-2014]
184 Suomalainen talvipäivä, http://tako.nba.fi/suomalainentalvipaiva/ [01-04-2014]
185 Varustautuneena luontoon, http://tako.nba.fi/varustautuneenaluontoon/fi/ [01-04-2014]

museum's profile on Facebook[186]. The link to the webpage with the object is shared with the additional title. It displays only a part of the description of the object, but after clicking on the object, the user is taken to the museum's webpage.

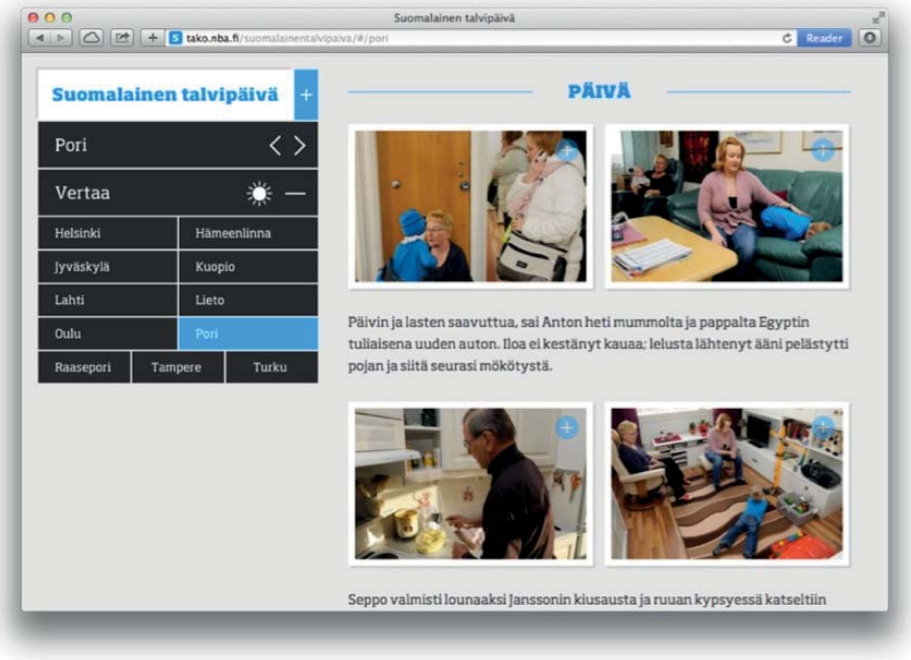

FIGURE 57 A Finnish day with Raija and Seppo from Pori, "A Finnish Winter's Day"

There is also a recently launched initiative, which is open to all Finnish museums known as "The Museum without Walls" ("Seinätön museo"),a project launched in 2013 by the Finnish Museums Association in collaboration with Momeo Oy[187]. "The Museum without Walls" consist of mobile routes created by the participating museums. The route, which is market on a map, can include, for example, images, texts, videos, and audio. The route is designed to be used on smart phones and tablets during the walk, so the user can navigate and follow the marked points to learn more about the place and associated events, monuments, persons, and so on. However, the routes are also accessible online on the Citynomadi service[188]. At this moment there are nine routes, for example "A route through the history of Helsinki". The content consists of textual descriptions and images.

186 Emil Cedercreutzin museo, Facebook, https://www.facebook.com/emilcedercreutzinmuseo?ref=ts&fref=ts [01-04-2014]

187 Seinätön museo, esite, Suomen Museoliitto, http://www.museoliitto.fi/doc/seinaton_museo-esite.pdf [01-04-2014]

188 "A walk through Helsinki's history", Citynomadi, https://citynomadi.com/route/88a8e1eb30aaa4f3f6f2414d9f49e367/en/A%20walk%20through%20Helsinki's%20history [01-04-2014]

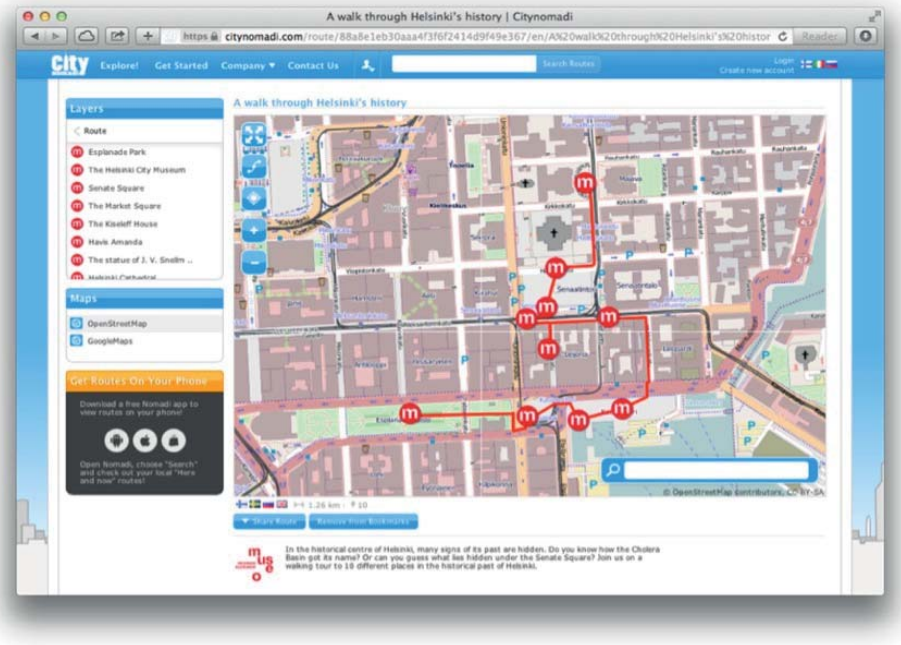

FIGURE 58 A walk through the history of Helsinki, Citynomadi

The following V-Must categories characterise this mobile narrative/descriptive virtual museum: permanent, narrative, interactive (tangible interaction on mobile applications and desktop device) and multi-subject museum. The project is partially reusable, as in the next stage the Finnish Museums Association will prepare a package for new museums to create their own routes, making the workflow reusable. The goal of the project, as defined by the Association, is to enhance the visitor experience. As in the previous cases, the other goals must be defined by the museums themselves, but content provided so far may suggest that they are educational and promotional as well.

Analysing specific categories of virtual museums does not give a general picture of the best solutions, as they are a combination of stylistic and technological solutions (Hazan et al. 2012: 26). Virtual museums require analysis according to quality criteria. In the V-Must project, criteria were proposed relating to four areas (Ferdani 2013: 27): (1) pedagogical quality; (2) technical quality; (3) visualisation and metadata quality; and (4) museological quality. The examples discussed here represent several scenarios of virtual museums and different areas of quality.

Most of the analysed digital creations are not virtual museums, but they are all closest to the scenario of the "web-based virtual museum, the unique museum" (Hazan et al. 2012: 22). It is a representation of a physical museum, presenting information on the institution and giving additional value to the museum visit. It is expected that besides the institutional VM, the museum is present in social media services (Hazan et al. 2012: 22). The museums present the most necessary information for visiting the museum. Through its website and "Aikamatka Satakunnassa" ("A

Journey through Time in Satakunta"), the Satakunta Museum makes the visitors aware of the cultural heritage of the region. The museums and heritage sites are very clearly marked on the map. Each museum or site is presented in a very aesthetic way, and the information is complete. The proposed themes increase the level of interactivity, as the visitor can find the most interesting theme and plan a visit. The objective of the project was to increase the level of accessibility of local museums and the way they are presented meets this objective. Information on some of these museums cannot be found online in any other form.

The virtual exhibitions, which may be defined as virtual museums, are curated and serve as educational resources, which is their strength. They are prepared in collaboration with the Satakunta Museum and other research institutes. Some of these projects have been developed as research initiatives and some of the aspects related to their creation were important, but in general their achievements are limited with regard to museological, visualisation and technical qualities.

On the contrary, services such as "Finnish Museums Online", "CultureSampo" and "Finna", which follow the scenario of the "web-based virtual museum, aggregators, portals and large scale collaborations" (digital archives), contribute much more (Hazan et al. 2012: 23). Examples of this type of VM scenario are the "Google Art Project" and "Europeana". "CultureSampo" is a research projects and the quality of this project lies mainly in its technical and metadata quality. It is the only Finnish project that brings the Finnish cultural heritage to the semantic web. Also the Finnish Museums Online project is important in relation to metadata quality. The focus in this project was on the quality of data on museum collections. Setting up the standards and framework for delivery of cultural content is the most important in relation to the museological qualities. Participation in this project is an opportunity to get the skills and work on the recommended level. In addition, professionals from non-participating museums can use the resources in a collection documentation process.

"Finna" is part of the Ministry of Education and Culture's National Digital Library project, and there is long-term commitment towards its development. "Finna" is the most important national initiative for all memory institutions in the Finnish context. This creates new challenges especially for museums. Cultural heritage and scientific information can be retrieved from a one place, which means that the quality and level of digitised material from these different sectors must meet certain common standards. Usually, a museum collection includes many different types of objects. Consequently, documentation, digitisation and preservation are more complicated and require different approaches and methods. Moreover, communicating knowledge of collections is an extremely difficult process, requiring constant professional and curatorial input. Apart from the challenges that each museum institution faces in its everyday work, there are problems that have arisen during collaboration between the institutions, even within a single sector. Museum documentation, practices and used systems vary a great deal. There was a need to solve these problems within one sector first, and therefore the Museum 2015 project was launched. It was designed to solve the most crucial problems of the sector and the expected results will influence museum work for the next several years. Besides the museological quality of the project, its technical quality lies in its very high sustainability, because open source software was used in the implementation. The aspect of visualisation is

also important, as the goal of the service is to provide easy access to highly different materials.

A different scenario is represented by "Museums without the walls", which can be described as a narrative mobile VM. The project is in its pilot stage, so there are only few, simple routes. The strength of this project is the close collaboration of the Finnish Museums Association, museums and the company. The museums get the tool and professional support to improve their online activities. The project was planned in a sustainable way, initially as a pilot stage in which 10 museums participated. In the second stage the museums will get a chance to create more complex routes. The project will be open to member museums. The main quality of this project is that the Finnish Museums Association has recognised the needs of the Finnish museums in relation to the current trends in museum applications and has decided to coordinate the project. In addition to the assistance, the museums get an opportunity to reflect on their own institution, learn from the other institutions and achieve the results that meet their own mission and serve their audiences. Interestingly, another narrative mobile VM, "The Story of the Wooden City", did not get as much attention. The factor differentiating these two initiatives is the level of sustainability.

7.6 Comparison of results: European and Finnish virtual museums

For several reasons, the comparison of the results from this survey and V-Must can be done only in a limited way. The selection of the cases was different, as this research has different objectives. I focused on cases launched in or related to one region in Finland, while in V-Must the researchers identified a number of cases. In addition, I focused only on projects that can be accessed online, while the selection of VMs in the V-Must project also covers other types of VMs. However, some general trends can be seen. According to results from the surveys in 2011 and 2012 (Ferdani 2013) the majority of museums in the V-Must project are descriptive online VM (39%), as well as in this survey. Mobile VMs are still very unpopular: narrative mobile VM (9%) and descriptive mobile (6%). 36% of VMs are onsite: descriptive (12%) and narrative (24%). I have no data on onsite VMs in the region of Satakunta. In this research, there was only one mobile VM identified in the region.

Interestingly, the main categories in relation to the content in the V-Must survey are: archaeology (43%), architecture (33%), art (11%), history (9%) and others (4%). In the Finnish context, the main categories are history and art. There are also important multi-subject VMs, as the most important projects give access to collections in different types of museums. The interaction of the researched museums is similar in t both cases: the VMs are mainly interactive, permanent and non-immersive (the V-Must project: interactive 92% and non-interactive 8%; permanent 93%, temporary 6% and periodic 1%; non-immersive 61%, low-immersive 20%, medium-immersive 5% and 14% high-immersive). In relation to the type of communication in the V-Must survey 62% are descriptive and 38% narrative, which responds to

general trends in the Finnish context, but not in regard to the online exhibitions, which are narrative.

The V-Must results regarding scope are as follows: educational 32%, edutainment 29%, 18% enhancement of the visitor experience, 10% research, 5% entertainment and 6% promotion, and with regard to sustainability: 59% non-reusable, 33% reusable and 8% partially reusable. The Finnish projects are also focused on educational aspects, as well as the enhancement of the visitor experience. In relation to the creations that are not virtual museums, the promotional aspect is also important. Developmental and research issues are also relevant in the Finnish projects.

Results differ with regard to sustainability. For an external reviewer, it is impossible to access all data necessary to evaluate the level of sustainability, but as stated in the projects' objectives and materials, they are mainly partially reusable. The aspect of reusability was very important in the Finnish services.

To sum up the comparison, the main differences between the Finnish and international projects can be identified in regard to two categories: content and usability. The Finnish museums are mainly cultural history museums, so it is understandable that the majority of digital creations presents historical subjects. Finally, a high level of reusability can characterise the projects launched in Finland. The main and most important initiatives for the development of the sector are partially re-usable, while internationally the majority of the projects are non-reusable.

7.7 Conclusions

The conclusions of this survey are related to the methodology developed with the V-Must project and used to analyse the VMs in one region in Finland and to the obtained results compared with the results of the two V-Must surveys carried out in 2011 and 2012.

With regard to the methodology, one of the most problematic issues is related to the typology and an identification of the VMs. The identification must be based on the definitions of the virtual museums (Farouk & Pescarin 2013), but in general, the term virtual museum is overused, and in the context of museums there is a huge variety of digital creations called "virtual museums". As the Finnish context demonstrates, there are no statistics on virtual museums. The Finnish Museums Association maintains a database with links to the museums, their contact details, opening hours, exhibitions, etc. The statistics prepared by the National Board of Antiquities do not provide data that could help to identify the Finnish VMs.

In this survey, I focused on one region (Satakunta), compiling a list of the museums and the web addresses covering their online presence, such as the information on the municipality or city's website, own website, regional portals and the Facebook account. Investigation of these digital creations was a starting point to identify the VMs launched within the region. In order to state whether a digital creation is a virtual museum, several aspects must be analysed: whether the creation is digital, focused on tangible or intangible heritage and whether it has certain purposes.

The results from the analysis demonstrate that the only virtual museums developed in the region of Satakunta, are educational online exhibitions prepared in collaborative projects. However, their impact on the wider sector, its development and the access to cultural heritage is very limited. The rest of the digital creations identified and analysed within this survey are not VMs. They only give information about the museum and its activities, but do not give access to tangible and intangible heritage. An interesting example of a VM launched within the region is the website of the Emil Cedercreutz Museum – each month the museum presents an object from its collection. Despite meeting the definition of a VM, it is a very simple way of presenting heritage. In addition, the same object is partly presented on the Museum's Facebook profile. This means that according to the V-Must definitions and classification, the Facebook profile or page could serve as a VM. The categories can be used to characterise several aspects of this creation, but any social media features are taken into account.

Furthermore, there are VMs that display heritage from the region of Satakunta or may include the regional institutions in the near future, and that could not be accessed through digital creations concerning Satakunta. The most important initiatives are not accessible through the museums' own websites. The national projects are described on the organising institutions' own websites (such as the National Board of Antiquities and the Finnish Museums Association), but it does not mean that the sites giving access to heritage from a certain region are connected or linked to the local heritage institutions.

The survey was limited to Satakunta, and the results are therefore limited. However, the results of the first review that covered all regions indicate that the situation is very similar in all regions, especially in relation to small museums. The most prominent projects have been launched in the biggest institutions located in the most important cities of their regions, where professional resources are available. The most important projects analysed in this survey have also been developed in two cities - Helsinki and Pori.

The identification of the museums that are not web-based is even much more problematic. Within the V-Must project, these projects were identified through the call for participation connected to the event. The projects were described, selected and analysed. In the Finnish context, there is no institution that collects and stores data on VMs, and thus identifying them is quite problematic. The projects can be identified on site, through research groups at the research institutions and their publications (scientific publications, project descriptions, etc.) and other information distribution channels, such as mailing lists (e.g. Museoposti in Finland).

In relation to the survey results, it is not possible to conclude whether the number of VMs in Finland is high or low. The selection covered only one region, and the most influential development projects are initiated and maintained by the institutions central to the museum sector. In general, access to tangible and intangible heritage in the institutions in Satakunta is very limited. Some of the smallest institutions are not even present online.

The results indicate that the level of available resources (human, administrative and financial) in the museum is proportional to the complexity of the online presence. A low level of complexity combined with a low level of available resources re-

sults in digital solutions that are characteristic of small, non-professionally run museums. The digital creations characterised by a low level of complexity and available resources are online brochures – the information about the museum, its type, address and contact details are published on the municipality's website or touristic portal. The resources are not located within the museum and in most cases it is the publisher, not the museum, that controls the information. The museum can provide the description or images, but cannot decide how the content is published. These solutions are not interactive and they do not require any further engagement from the museum.

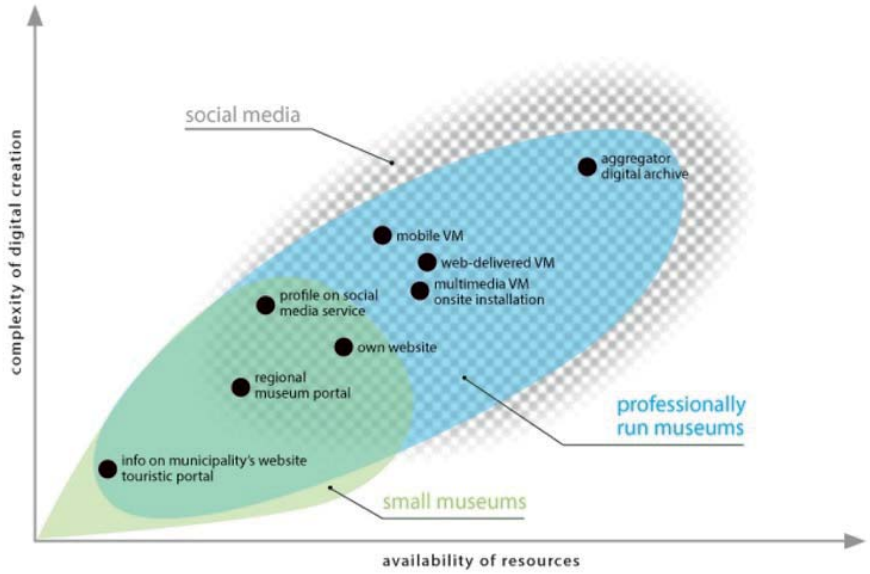

FIGURE 59 Diagram illustrating the correlation between the level of available resources and the complexity of digital creation in relation to small and professionally run museums

In the situation where the level of available resources is a bit higher, the level of digital solution is more complex. To this group belong regional portals and accounts on social media, which are used in a simple way by providing basic information on the institution and events. In regard to regional portals, the resources are located within the museum responsible for the project and external partners, such as creative industries responsible for programming and design, as in the case of "Aikamatka Satakunnassa" ("A Journey through Time in Satakunta"). Without these partners, the museum can develop a more complex digital presence by the use of social media, an example being the Emil Cedercreutz Museum. It requires different sets of skills and knowledge, but generally the museum is able to create a virtual museum only with

its existing resources. The museums use Facebook to advertise their events, but the museum collection can be integrated into these actions.

The growing level of available resources means that museums launch and maintain their own websites. In Satakunta, only some of the analysed small museums have their own websites, while each professionally run institution is maintaining at least their pages on the city's website. More complex digital creations, such VMs, require much higher financial and professional input. At this moment, these solutions are reserved only for professionally run museums. The web-delivered VMs in the case of Satakunta, are online exhibitions, but their impact is very low and they do not include small museums.

This survey suggests that the most complex digital creations, the digital archives or national aggregators, integrate the Satakunta institutions only to a limited degree. At the time of this survey, the main development project is in the pilot stage and includes only some institutions, but we can expect that in the future there will be more and more institutions involved, not only those that are professionally managed.

Finally, as the diagram demonstrates, some of the solutions are characteristic of small museums and some of professionally run institutions. The spectrum of digital creations characteristic of larger institutions is much wider. In addition, mainly the professionally run institutions can provide access to cultural and digital heritage, which means that they can develop and maintain VMs. All institution can take advantage of egalitarian social media services.

7.8 Limitations of the method

The definitions proposed within the V-Must project together with classification and scenarios can be considered as a useful framework to get an overview the landscape of VMs. However, as I pointed in the results, one of the limitations is the difficulty related to the selection of VMs. In every survey, the method of selection of VMs can be different, which implies the difficulty of comparing the obtained results.

Another issue is how the definition is related to the classification and scenarios with regard to the identification of VMs. According to the definition of the virtual museum (Farouk & Pescarin 2013), some of the qualities of VMs, such as educational scope, are the analytical categories. On the contrary, some of them are not related to the definition. As I demonstrated, I used the categories to analyse the digital creations that could not be defined as VMs because they are not focused on heritage. This means that one of the most important features of VMs cannot be directly analysed and that there are no tools to analyse the ways the museum is focused on tangible and intangible heritage. In addition, the results from this survey indicate that, in theory, the museums could launch and maintain the VMs on Facebook.

A further limitation of this method is that some of the categories are much more precise than others. For example, distribution can be easily identified, but sustainability is a much more capacious category. The VM can be reusable, partly reusable or non-reusable. It is related to different aspects, such as metadata, content or

workflow. In addition, as this category is so capacious, it is extremely difficult to analyse the product and obtain relevant data. For example, in relation to very complex projects, an external reviewer is not able to obtain all the data necessary to evaluate the level of sustainability. It may suggest that virtual museums should be defined and categorised by their own developers.

The main limitation of this method is that the categories are defined from the point of view of the developers or researchers. For example, the interactivity is defined in relation to the user experience. Non-interactive VMs are defined as: "Assemblage of digital media providing the user passive (including emotional, intellectual and imaginative) engagement." (Farouk & Pescarin 2013: 15). The method does not describe how to evaluate user engagement or experience. In addition, if the researcher carries out the analysis, it may mean that she should evaluate whether her engagement is emotionally, intellectually or imaginatively passive. During the review process, I had the same problem. For example, I could not find "CultureSampo" engaging in any of the proposed ways. I categorised it as interactive, because I assumed that the way the data is presented (e.g. data visualisation: objects displayed on the map) may provide the user active engagement. On the other hand, I can imagine that using the map may be quite problematic, as there is a huge number of objects displayed on the map, at a glance it does not look very inviting to explore, which means that it may be difficult to feel engaged with this assemblage of digital media. This means that this method is useful for the developers for understanding on which aspects they should focus and what kinds of solutions or approaches may be chosen, but it is not the best method to evaluate the user experience.

However, the project researchers have been aware of that and during Archaeovirtual 2011 they reviewed several VMs submitted to the exhibition (Pescarin et al. 2012). The evaluation procedures and methods have been discussed within the seventh working package of the V-MUST project. It means that the method is sufficient to approach the problematic of VMs and to start a general analysis of the characteristics and scenarios of VMs, but its limitations should be recognised and other methods should supplement it.

Finally, this method does not provide any information on the relation between the digital and the real museum. In the most extreme cases, when the museum is not online, we do not know anything about the reasons why the institution is not accessible on the Internet. In other cases, we do not know how the VMs are integrated into the mission of the institution, its activities or how they influence the relation between the museums and its audiences.

In the next chapter I will present the iterative process of prototyping the virtual museum for small museums to show how elements and issues should be considered with regard to the process of designing, developing and maintaining the virtual museum in the context of voluntarily managed small Finnish museums.

8 PROTOTYPING A VIRTUAL MUSEUM FOR SMALL FINNISH MUSEUMS

8.1 Introduction

This chapter presents the iterative process of prototyping the virtual museum for small Finnish museums. The approach used in this process can be to some extent characterised as ethnographic action research (EAR). There are several similarities and some differences, on which I focus in this section. The development of EAR is related to a research project in rural Sri Lanka – "Kothmale Community Radio and Internet Project" (KCRIP). The project, which was an ethnographic study of a community radio and Internet project, was launched in 2002 with the aims of developing a transferrable methodology for monitoring and evaluating community multimedia centres (Tacchi, Slater, & Lewis 2002). Within the research, the usefulness of ethnography was also explored (Slater, Tacchi & Lewis 2002). In order to develop a transferable methodology the more applied method was developed, which is based on the combination of ethnography and research, where ethnography guides the research process and action research is used to apply the findings in order to facilitate the cyclical development of a project (Tacchi, Slater & Hearn 2003):

> The EAR approach combines participatory techniques and an ethnographic approach in an action research framework to address the identified gap between research and the ability to implement its findings. Ethnography and participatory techniques are used to guide the research process and action research to link the research back into the initiative through the development and planning of new activities. (Tacchi, Foth & Hearn 2009: 35)

The more recent project "Finding a Voice: Making Technological Change Socially Effective and Culturally Empowering" (2006-2008) had the goal of understanding how creative engagement with ICT can empower positive social change.

The EAR, as an approach, is focused on "communicative ecologies", a term coined by Don Slater and Jo Tacchi (Slater & Tacchi 2003 cited in Tacchi 2004). Communicative ecologies describe actual practices of use and interaction with new media technology in the wider context. The purpose of an ethnographic approach is to understand the social relationships and processes within which a research project

is undertaken: (1) the immediate circle of participants; (2) the wider social context of the project and (3) the social structure and processes (Tacchi, Slater & Lewis 2003: 2). The key research methods of the EAR include: observation, participant observation and field notes, participatory techniques, diaries, ICT/media content analysis, short questionnaire-based surveys, in-depth interviews, feedback mechanisms and forms of "self-documentation" (Tacchi, Slater & Hearn 2003, Tacchi, Foth & Hearn 2009). New media may be used by the participants to communicate and to document the project.

The difference between the action research and other research methodologies is "in the nature of the enquiry process, which is, in effect, an attempt to take action or provoke change or improvements of some kind (e.g., to design, implement, or evaluate a new media application)" (Hearn et al. 2009: 49). In this research, the enquiry process is focused on the design of the new media application – the ViMuseo tool. The action research consists of several steps, which proceed cyclically: from the research question to an enquiry process, which is an action, and back to a consideration of the research question (Hearn et al. 2009: 49). The action is an important element, and taking action consists of planning and action, which is observed and reflected on in order to plan the next actions (Hearn et al. 2009: 51-52). Action research may be used to design or evaluate some aspect of technology or to understand how it is used within the context. In this research, it was used to prototype the tool, but I suggest that it can also be used in the implementation of the designed system.

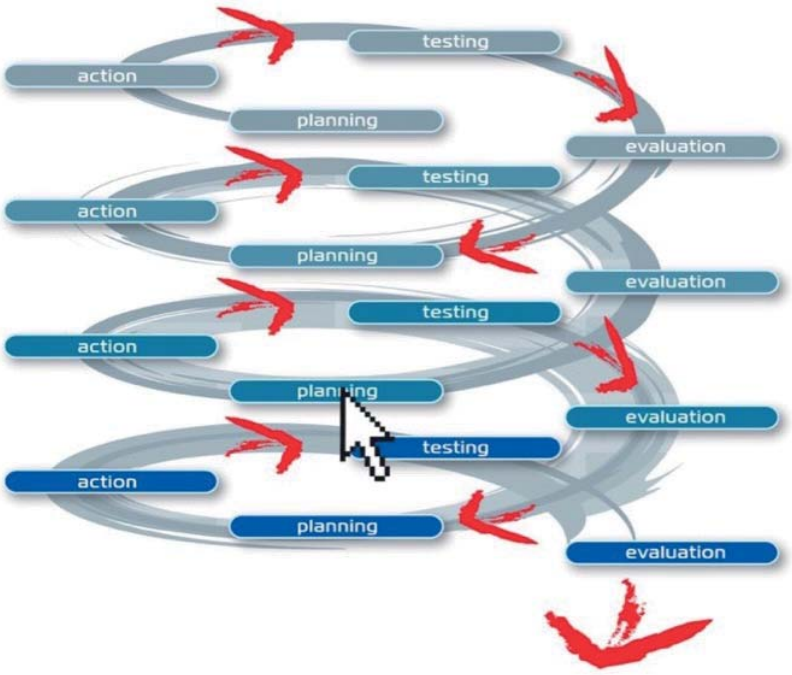

FIGURE 60 The design of the ViMuseo service presented schematically.

The characteristic activities of the action research are: planning, acting, observing and reflecting. Each of these steps involved different techniques to gather data. The ViMuseo tool was developed within several cycles of this research. The starting point was to assess the need for this research and identify the problem areas.

The main technique used to design the virtual museum was prototyping. A prototype is a representation of a design idea. In the area of design, and participatory design in particular, prototyping is a widely recognised technique (Arnowitz et al. 2006, Blomberg et al. 1996, Bodker & Grønbæk 1991, Buchenau & Suri 2000, Ehn 1989, Erickson 1995, Greenbaum & Kyng 1991, Grønbæk et al. 1997, Kensing 1987, Mogensen 1992, 1994, Snyder 2003, Trigg et al. 1991). Stephanie Houde and Charles Hill in their seminal article "What do prototypes prototype?" write about prototyping:

> Prototypes provide the means for examining design problems and evaluating solutions. Selecting the focus of a prototype is the art of identifying the most important open design questions. If the artifact is to provide new functionality for users – and thus play a new role in their lives – the most important questions may concern exactly what that role should be and what features are needed to support it. If the role is well understood, but the goal of the artifact is to present its functionality in a novel way, then prototyping must focus on how the artifact will look and feel. If the artifact's functionality is to be based on a new technique, questions of how to implement the design may be the focus of prototyping efforts. (Houde & Hill 1997: 1-2).

While prototyping is connected to the development of design and human-computer interaction discipline, Michael Guggenheim argues that the history of "prototyping" is much longer:

> Prototyping: has always existed and probably, for most of human history, has been more important than it's opposite, orderly science and planning. But the differentiation of the functional system of science and art and the strong differentiation between experts and lay people in high modernity has obscured existing forms of prototyping. (Guggenheim 2010: 51).

He argues that acknowledging prototyping as part of western society has become possible only since the late 1960s, as part of the "revolt of the audience" (Gerhards 2001, cited in Guggenheim 2010: 51). He explains:

> Prototyping is not simply understood as the development of "first forms" or "first strikes" as beta-versions of products as in industrial design, but as a more general mode of doing culture: a mode that is tentative, based on bricolage, user involvement and ongoing change and improvements of products and practices, as "open innovation", rather than on an expert in a closed lab who turns out a finished product to be used by an unknowing user. (Guggenheim 2010: 51-52).

This research combines these two approaches. The process of prototyping is also interdisciplinary (Thomson Klein 2007, 2010), involving graphic designers and programmers. On the one hand, the main prototype and the preceding versions have been created to explore several problems and demonstrate the concept. It this sense, it is related to the area of design. On the other hand, the prototyping is understood in a tentative model of doing culture. It is open to innovation and based on ongoing change and improvements of practices. Moreover, by combining these two ap-

proaches, it attempts to compromise lay knowledge with technological expertise in the museum context. In this sense, despite that only the final version is called "prototype", all the presentations created as part of this research can be considered as prototypes. The final version is called the "final prototype" in order to underline that it is the final model developed within this research process.

8.2 The iterative process of prototyping

8.2.1 The initial steps

The first activities related to prototyping were connected to the research plan and defining the research questions. The first steps can be characterised as the first research cycle. This stage included planning, acting, observing and reflecting. The main aims of this stage were to identify areas requiring further investigation in order to formulate research questions and to identify techniques used in the process of prototyping.

The very first proposition was the multimedia presentation "The Helmeted Guinea Fowl. An exemplary multimedia presentation" (2008). The presentation was used only as a part of the research plan and was not published in any other way. The aim of the development process was to identify a set of categories and elements that constitute the museum presentation in order to design a tool to create museum multimedia presentations and support digitisation practices. The model presentation would be used to design templates or an application for making presentations of this kind. The museum professional would be able to create it herself. More technically advanced elements, such as animations or 3D objects could be commissioned. Several issues were identified that required further investigation:

1) Preparation and prioritisation of the material: What criteria are important in the selection of the material? Originally digital vs. digitised material.
2) Structure of the presentation: What is the structure of the material? How are the materials structured? How are the materials designed to be accessed by different groups of users?
3) Digital content management: How is the content managed within the museum practices and connected to the existing management system? Digital asset management system versus collection management system.
4) External connections: How is the content connected and linked to other resources, e.g. the museum's website, online resources and services over the Web.
5) Navigation and design: What is the navigation model of the presentation? What are the priorities of the design? How the design is related to the content?
6) Preservation: How will the content be preserved?
7) Standards: What standards are used to ensure access, preservation and interoperability?

8) Procedures, scheme and elements of the presentation: What procedures, scheme and elements are used to construct the presentation?
9) Re-use: How are the materials stored in order to facilitate reuse?

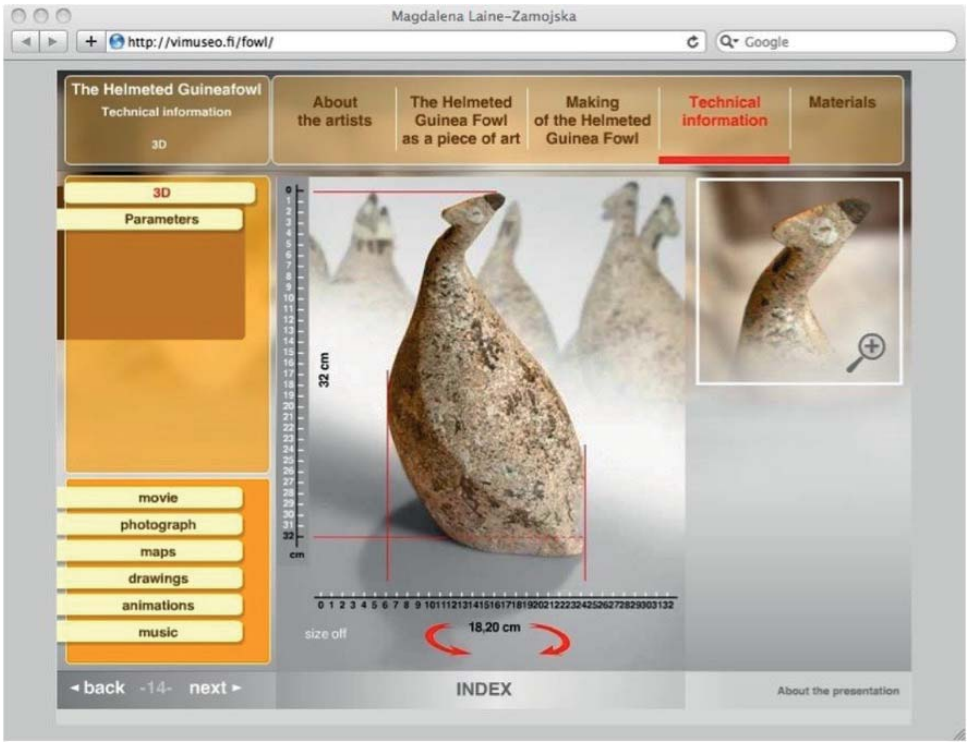

FIGURE 61 "The Helmeted Guinea Fowl". An example of a multimedia presentation

The concept of the tool was presented to and discussed with museum professionals – Museum Director Janne Vilkuna, who also served as the research supervisor, Chief Curator Pirjo Vuorinen, Curator Marja-Liisa Hyvönen and Miika Nurminen. Miika Nurminen is a system designer from IT Services, University of Jyväskylä, who has been developing the DUO collection management system for the museum since 2002. It was discussed whether this kind of tool would be useful in the museum context, how the museum functions and how DUO has been developed. The first ideas were to design this tool to fit the context of the University Museum and meet its objectives. The photograph collection and the collection management system were explored. The curator demonstrated the collection management system and explained how it functions within other practices of the museum.

I have reflected on my research diary, the discussions and development process of the multimedia and on this basis I have planned the next steps in order to answer the above questions. The investigations that followed were divided into three problem areas: the presentation, the presentation and the museum context, and the presentation and the wider cultural context.

In the next stage, the concept was redefined and evaluated in relation to the current situation of the museum sector (Chapter 5) and to the material collected during the review of the Finnish museum websites (Chapter 7). The online presence of the small museums is limited to a brochure museum. Despite this, however, their collections are relatively rich in comparison with the collections of professionally managed institutions. In addition, the small museums are not in the focus of the current collection documentation projects. Consequently, the proposed digital solution should improve their current situation on the web, so in order to be more sustainable, the digital product should be available online and connected to other activities of the museum, along with presenting the museum. In addition, to provide the most sustainable solution, the service can be designed to serve many institutions and thus offer additional value for the users who may want to find a particular institution or information about events and exhibitions.
A set of graphical propositions was created (2009) by a graphic designer to visualise the concept.

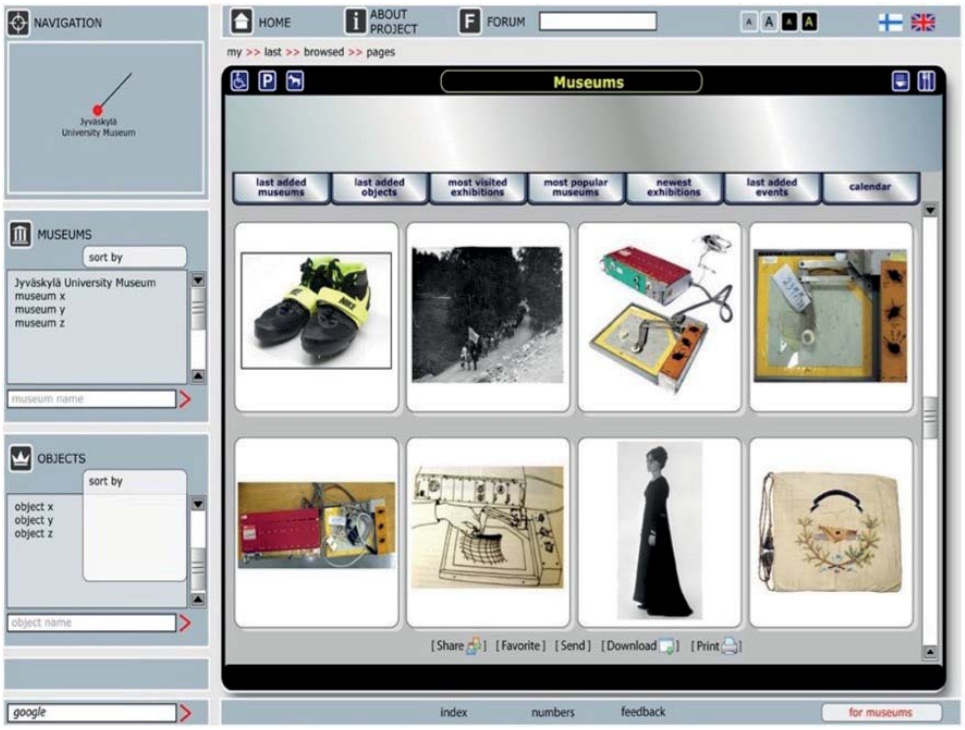

FIGURE 62 Proposition of the service's layout. The main page and the objects

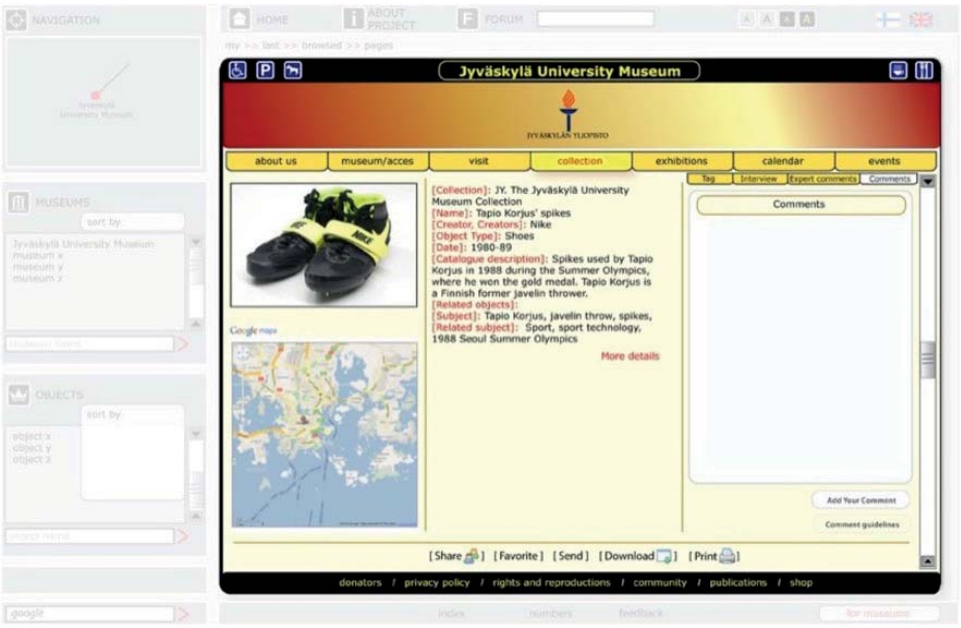

FIGURE 63 Proposition of the service's layout. The image presents the object and the "add comment" tab

Further issues regarding the online product were identified:

1) Museum website: What categories can be used to describe the museum website? What categories can be shared by all museums? What method can be used to identify these categories
2) Objects: How could the object be represented on the website? What external services could be used to describe the object? How could the object be integrated with the website? What solution could be used to describe the object in the system?
3) What functions should be added to provide access to many museums within the same service?
4) Collaboration: What techniques and tools can be used to document the collaboration between the stakeholders? How can the process be documented?

8.2.2 The first prototypes

The stage was evaluated and the preliminary set of requirements was proposed. The requirements and the layouts were used for the next stage: the development of the first prototypes (Version A and Version B, layouts and screenshots presented in the last part of this chapter). The layouts and screenshots are included at the end of this chapter. The development of the Version A was planned as an exploratory prototyping and involved new stakeholders: web developers. The system, planned as a research project and as an exploratory comparative study, has two implementations

developed in cooperation with two independent programming teams in order to identify design problems and evaluate solutions, and to select the focus of the prototype (Houde & Hill 1997: 1-2). Versions A and B were developed between December 2011 and September 2012. The methodology of cooperation within the two teams is almost the same. The same objectives, materials, and ways of reporting were presented to both teams. Despite this same methodology, the final effect and the general workflows differ a great deal. The design decisions were the same in both cases, but their implementation was different due to the different technologies that were implemented. Design should take into account technical constraints and trends. In the 2010s new approaches to design become more popular, such as responsive web, adaptive web design and mobile design. This means that designers use different techniques to create products that work well on different devices with different parameters (for example the different resolutions of monitors, mobile and desktop devices, etc.). The layouts presented in this chapter represent trends characteristic of the late 2000s and the early 2010s. The goal of presenting them in this chapter is to demonstrate that the same design decisions may be implemented differently, depending on what techniques, tools and approaches programmers may want to use.

Several issues were agreed with both teams:

1) The prototype is exploratory and all the proposed solutions will be discussed by the team members.
2) Each meeting will be documented in my research diary and in the online diary. The material will be used in my research.
3) The way of working is exploratory in nature and all issues and potential solutions should be discussed.
4) The prototype is developed for research purposes only.
5) The basic functionality of the system is specified. The system will be functional at the basic level. Several selected features will be developed in order to demonstrate the system's idea. The development is an integral part of the research, and therefore functionality is described generally and will be specified during the development process. Key functions of the system:
   - Institution: adding, editing, interactivity between museums
   - Managing users: registration of museum representatives (adding a new museum), registration of several representatives from the same museum
   - Adding and editing objects in the prescribed manner. Adding objects will be possible through a predefined template.
   - Searching with defined parameters. Filtering and sorting with defined parameters.
   - Navigation: Navigating through museums and objects according to predefined schema.
   - Administration: Administrative panel allowing for managing all the data gathered in the system.
   - Languages: The system will support many languages.
6) The graphical user interface will be designed by the designer and based on previously designed layouts. The proposition should present the visual aspect

of the system and the position of its elements. The layouts will be prepared simultaneously with the development process in order to support the functionality of the system. A set of prepared layouts: main page/recently added museums; main page/recently added events; main page/recently added objects; main page/newest exhibitions; museum; museum/about us; museum/about us/staff; (8) museum info; museum/info details; object; detailed object view; and exhibition.

7) The system will be developed by the web developers.

A wiki was used to document the process of the development and to manage the project. The wiki included the folder with the reporting forms. The reporting form served as a diary and was prepared in the form of questionnaire, which could be answered online and seen by other wiki members, in this case the project stakeholders. The questionnaire is divided into 3 parts: "Before the meeting", "After the meeting", "During work" and consists of several open questions concerning problematic issues faced during the work, encountered problems, short term goals and planned steps, unclear issues requiring further discussion and keywords. The programmers added their reports, the graphic designer reported orally and I made notes.

In order to identify the described categories, the museum website and the websites of a number of professionally managed museums were reviewed. On this basis, a set of preliminary categories sufficient to describe institution was proposed. These are divided into a few groups according to their functions:

1) Descriptive categories
   - "Info": detailed information about the institution, visiting and postal addresses, e-mail address, phone numbers, etc.
   - "Museum access": information about available services, building floor plan, building description, directions and map, car park and facility rental
   - "About us": about the museum, about the staff, the mission, open vacancies, contact information and background for the press
   - "Visit": opening hours, ticket prices, guides, information for groups, recommended tours and visit planning
2) Collections, exhibitions and projects
   - "Collections"
   - "Exhibitions": present, permanent, upcoming and exhibitions archive
   - "Projects": different projects and project archives
3) Categories related to current activities
   - "Events": different types of events, workshops, and lectures, etc.
   - "News"
   - "Calendar"
4) Categories focused on communities and people supporting the institution
   - "Donors"
   - "Community"
5) Categories related to legal issues
   - "Rights and reproductions"

   - "Privacy policy:
6) Other activities
   - "Publications"
   - "Museum shop"

Prototyping processes of Version A and B were evaluated and several conclusions were drawn. Firstly, the process of prototyping cannot be fully planned and consequently, the results are to some extent unpredictable. In both processes the same methodology was used, the same functionalities and graphical layouts presented, but Versions A and B are different. The reason is that the mode of prototyping is in fact tentative (Guggenheim 2010) and includes constant changes, suggestions and ideas that are discussed within the team. Depending on the team, each process of prototyping can have a different dynamic. For example, during the development of Version B, the web developers proposed different ways of displaying subcategories presenting the museum. In addition, another idea was explored: personalisation of the layout colours so that each museum could select a colour that corresponds to its corporate visual identity. Secondly, the process of prototyping demonstrated which areas are problematic in terms of developing the virtual museum. The main areas were identified in discussions and reports provided by the developers and graphic designer. They are the following:

1) Lack of a common language caused problems in communication within the interdisciplinary team. This was caused by a lack of experience in developing digital creations for museums. In order to overcome this problem, all members explained the terms the they used and solution that they proposed, so the rest of the team could assess them in relation to their own domain.
2) Identifying a minimum set of functions that the final prototype should have to demonstrate the concept of the prototype.
3) Identifying the most open design questions in order to select the focus of the prototype (Houde & Hill 1997: 1-2). The research goal was to introduce an artefact that plays a new role in the users' lives, but the web developers and programmers needed to solve some problems related to their domains, and therefore the focus was also how to implement the design and how to present its functionality in a novel way (Houde & Hill 1997: 1-2).
4) Prototyping that involved different stakeholders required several negotiations. For example, it was necessary to constantly focus on available resources and how they should be redistributed to achieve the final result.
5) The use of prototyping made some agreements very challenging, as it was impossible to make a prior specification of requirements.
6) Necessity to focus on user experience and to select an approach to design.

On this basis, it was possible to reflect on this stage of the research and to propose further steps to develop the final prototype, as the focus of the prototype in relation to museological research, web development and design was defined.

8.2.3 The final prototype

The development of the main prototype was based on the evaluation of the previous stages. While the previous versions were designed to test certain propositions and ideas, and thus implemented as content management systems (Web CMS), the final was developed only as a demonstrational version. The main idea behind this prototype was to gather the results from the previous prototyping processes and to demonstrate the minimum set of basic features that should be implemented in the working version. It demonstrates only those features that are necessary to explain the concept of the system. The aim was only to create a prototype that demonstrates the concept, so the role of the web developers was very limited. The prototype is implemented as a set of linked layouts. The features are not active. The administrator or user of the system cannot insert any data. In this stage, the most important is the graphical proposition, as it shows how the system can feel and look. In this sense, it demonstrates the basic functionalities that are characteristic of the museum portals and museum websites.

FIGURE 64 The main page of the final prototype

Secondly, the prototype can be used to demonstrate how a collaborative prototyping can be used to create new digital products. This may be explained through the concept of a semiotic unit[189]. The semiotic unit is an individual sign, or a group of strongly interrelated signs, conveying a complete meaning, and in this sense it is a

189 The final research prototype was demonstrated at Museums and the Web 2011 and 2012 (Laine-Zamojska 2011, Laine-Zamojska & Zamojski 2012) conferences, and this part has been partly presented in the paper published in 2012.

part of the "W-Semiotic Interface Design Evaluation" framework (Speroni, Bolchini & Paolini 2006). According to Speroni, Bolchini and Paolini (2006), the semiotic unit has two layers of meaning:

> A "content meaning" relating the semiotic unit to pre-existing knowledge of the user about the "real world". In order to understand the label "exhibitions", for example, the user must have a previous idea of what the concept "exhibition" means.
>
> A "functional meaning" relating the semiotic unit to the interactive behaviour of the application. In order to make effective use of the application, the user should figure out the effect of "clicking" (or performing a similar action) on a specific semiotic unit. (Speroni, Bolchini & Paolini 2006).

The semiotic unit was used as a starting point the development of the final prototypes. The concept of semiotic unit was also tested in the previous versions. The evaluation of the previous versions indicates that the semiotic unit can be used in the whole system. The interface is divided into a number of semiotic unit. The first semiotic unit is a museum card. On the main page there are a number of museums, each presented with a museum card. The museum card displays basic information: "name", "address", "type", "date of adding", "short description" and "image". This is a set of categories necessary to identify and understand what the card represents. The same museum card is displayed on the main page in different categories, such as "recently added museums" and "the most popular museums".

FIGURE 65 Two different cards, the Jyväskylä University Museum's card and the exhibition card, opened in new windows

In this prototype, the card consists of certain activating elements in relation to the functional meaning. The card has some additional buttons, such as "remember me", which the user can click on to save information for further reference. The behaviour of the card is also developed. It can be opened, closed, minimised or expanded by clicking on the appropriate buttons in the upper right-hand corner. There may be the need to provide larger parts of text; in that case the card has a red triangle button

after a part of the textual description, used for expanding it and showing the whole text. The link "more" takes the user to the museum unit, which works as the museum's own virtual museum. Another important function is that the cards open as new windows. The user can open many cards at the same time. She can open the museum card, the event card from another museum and visits some other institutions. She can leave interesting cards open. This feature is helpful if she wants to browse many museums, events, or objects and compare them. She can also save the most important cards for the future reference. This solution offers different levels of interaction with information about museums, their activities and collections.

At the time of designing the prototype, this kind of solution was not very popular, but in the late 2010s it seems to become more and more popular. For example, one characteristic of responsive web design approach is to use proportion-based grids, and the semiotic units can be easily fitted into the grids. During the collaborative process, we were able to propose this solution as it was feasible for our own domains, and in this sense it demonstrates an interdisciplinary approach to prototyping. The final prototype is designed according to a responsive web design approach. From a museological point of view, it shows that creating a virtual museum requires this kind of collaboration. Moreover, the museum must be able to review its own activities and objectives to be able to propose the content that may be organised in the form of semiotic units. Prototyping gave us an opportunity to work interdisciplinarily and collaboratively on a digital creation, and select the concepts and elements that are crucial to build it.

Finally, the prototype was used in discussions with the representatives of the museums to investigate the role it may play in their museum practices and which elements should be taken into consideration when designing a working system.

8.3 Prototyping the future with small museums

The prototype was used to make a presentation that was shown and discussed during the interviews organised in December 2011 in Satakunta. During the semi-structured interviews, the prototype was demonstrated and discussed in relation to the use of online applications in museum work. There were six sessions, involving 11 museum representatives from seven museums (5 small local heritage museums and one regional professionally maintained museum). The results are discussed in relation to creation, access, management and administration, sustainability and preservation of digital content within their institutions.

8.3.1 Creation of digital content

1) Lack of resources required to catalogue digitise collections. There has been identified several problems related to the creation of content: both metadata and digital representations. Only one museum was able to regularly digitise its collection. The rest is aware that they do not have enough knowledge and skills needed to start a process of digitisation. Cataloguing is also perceived as

a problematic task in all the museums, as it requires skills, knowledge and appropriate resources. Catalogues are mainly paper based and they have not been updated for years. Some museums try to get support, for example from students, who catalogue objects during their summer internships.

2) Validation of provided data. It was proposed that the museum could get support from a professionally managed institution, in this case the regional museum, to validate the data on collections. The regional researcher from the regional museum could have access as an administrator and review inserted information.
3) The selection of material is also challenging and this is related to the purpose of digitisation. Many museums have similar objects, for example agricultural machinery and tools, and they think that it is not necessary that all museums digitise them. The value of these objects is connected to the stories related to the owners or places. They recognise their educational value, as local schools visit them. Moreover, the objects are important in relation to the stories they trigger in the local community. In this sense, it is not important that all these objects are digitised and accessible through a joint museum portal. It would be more convenient to show a selection of objects that are the most representative for the whole place. Some museums are specialised to show a particular phenomenon connected to the place, for example specific techniques or the history of a tenant farmer community.
4) It would be feasible to digitise only a few objects to make online exhibitions to demonstrate the character of the place.
5) In relation to providing information about the museum, the museum representatives do not perceive it as a problem. Moreover, if a new system is introduced, they can find a younger person to help them. Some of them use Skype or other digital tools and know that if they are trained, they will learn how to use it.
6) The regional museum would like to support the representatives of the small museums in their work. However, it is considered a problem that each museum could independently insert information into the system, as it could change the character of the service for example if non-museum related activities are added to the calendar.
7) One of the museum representatives uses online collections to learn how to catalogue own objects. Having more digitised resources from different institutions in a one system could help other representatives of the museums to learn about their own collections.

8.3.2 Access

8) The demonstrated prototype was perceived as a good idea that would improve the activities of small museums in many ways. It was recognised that providing information about the museum in a convenient way can support tourism, also internationally. Another reason is that it could improve communication between the museum and its audiences. They receive inquiries by phone because it is difficult to find information online at present.

9) Providing information about the museum and its surroundings, its collection and the time required to visit the place could enhance the visitor experience. Sometimes the groups spend too little time on site, because they are not aware of the size of the place. It dissatisfies the museum representatives, who would like to provide an interesting experience and have enough time to receive their visitors.
10) Providing access to digitised collections could be important for museum audiences and to reach new visitors, also online. The museums that digitised some objects from their collection also get some inquiries.
11) A virtual museum could reach new audiences and online statistics could demonstrate that the museums are important. It could be used as an asset while trying to get more recognition and external support.
12) The educational aspects of the virtual museum were also recognised. Schools could use the virtual museum when they cannot access the physical museum. The museums are mainly open during the summer when the schools have their holidays.
13) The virtual museum could provide access to its collection in a very convenient way, as it may be "always open". The museum representatives are volunteers, and some of them have other jobs and cannot always be in the museum to give a tour and present the collection.
14) The virtual museum could show the objects that are no longer in the museum's collection, but have been collected or found in that area. This could encourage visitors to come and see the place.

8.3.3 Management and administration

15) It should be possible to manage the information on museum and its collection by many users. The museum is usually managed by many persons and some of them have more skills and resources to manage the tasks related to the management of the virtual museum. It should be possible to distribute the tasks among the association's members.
16) The system should be user-friendly and similar to other systems so that it would be easy to learn how to insert and manage data.
17) The regional museum should be able to administer and manage other museum's accounts and access level to validate data on collections.

8.3.4 Sustainability

18) One of the most important issues was that there are not many overlapping systems that have the same functions.
19) The system should be developed in collaboration with other institutions responsible for the cultural heritage, or their use should be accepted by them.

8.3.5 Preservation

20) The representatives of the museums recognise the importance of digital preservation, but they are struggling with the preservation of their collections and buildings and its perceived as their priority. They recognise that they have neither the skills nor the resources to preserve digital content.

8.3.6 Co-creation

21) The museum's representatives would like to collaborate in the system development and have impact on the end result.

8.4 Conclusions

This part of the research has demonstrated that prototyping is an approach that may be used to examine design problems and evaluate solutions (Houde & Hill 1997). During the first steps of the iterative process, the focus of the prototype was being selected. In a collaborative process that involves different participants representing different domains, prototyping can facilitate interdisciplinary investigations. In this research, the semiotic unit (Speroni, Bolchini & Paolini 2006) demonstrates how different domains could be brought into a development of the virtual museum.

Prototyping can be also understood as a tentative mode of doing culture (Guggenheim 2010: 51-52). The discussions on the prototype with the representatives of the museums showed how a new digital artefact may function within their present activities and how it may change their future. In addition, the prototype of the virtual museum was demonstrated to the representatives of the museums in order to map their "communicative ecologies" (Slater & Tacchi 2003 cited in Tacchi 2004) and enable a discussion about the museums' digital development. The small museums function in a network of museums, schools, institutions, visitors and other. The immediate circle of participants are people from the association responsible for the museum, their spouses and children. The museums are supported by the regional museum and these collaboration and relation should be reflected in a way the system works.

In the semi-structured interviews, the actual practices were identified and discussed in relation to the potential digital tool. The discussed issues show how the museums' representatives see the role of the new digital artefact in relation to creation, access, management and administration, sustainability and the preservation of digital content within their institutions. The museums representatives would like to receive the tool that is adequate to the resources they have. They would like to improve their digital presence, but are also aware that cataloguing and digitisation processes are challenging. The new digital artefact, the virtual museum, could help to improve communication with their current communities and reach new audiences. The virtual museum could be maintained collaboratively, but the system should not require much input and should be easy to maintain. They would like to participate in the process of prototyping and developing, and as this case showed, this ap-

proach, based on "user involvement and ongoing change and improvements of products and practices" (Guggenheim 2010: 51-52) would be feasible.

FIGURE 66 Relationship between different development versions

8.5 Version A & Version B: layouts and screenshots

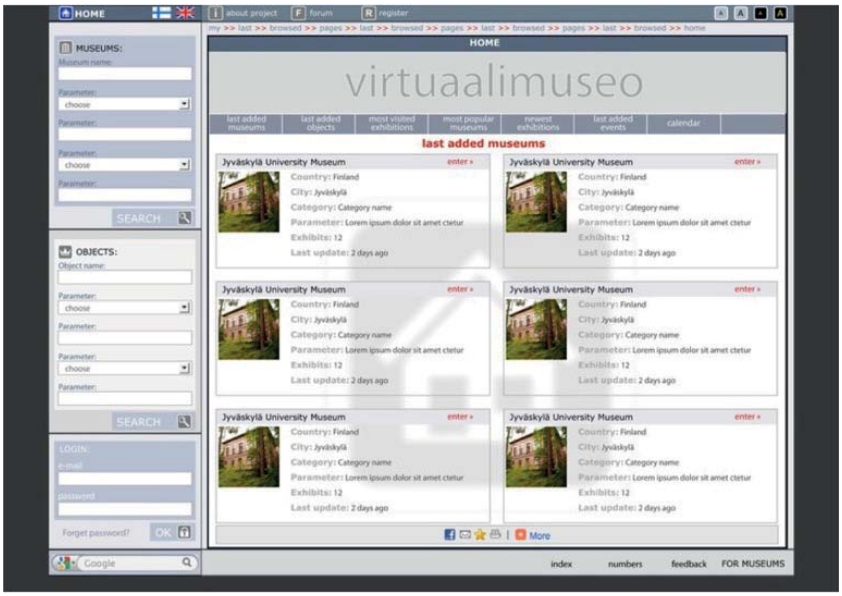

FIGURE 67 The layout presenting the main page with recently added museums

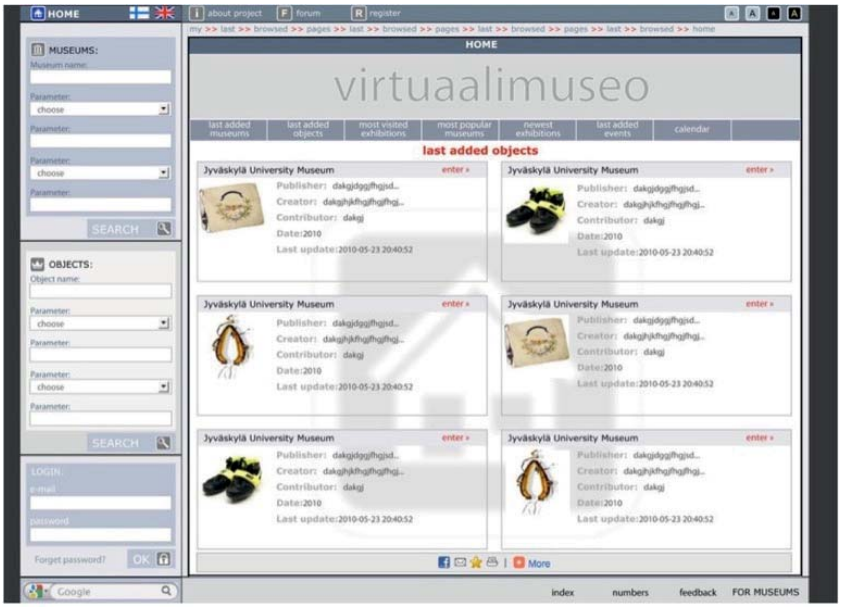

FIGURE 68 The layout of the main page with recently added objects

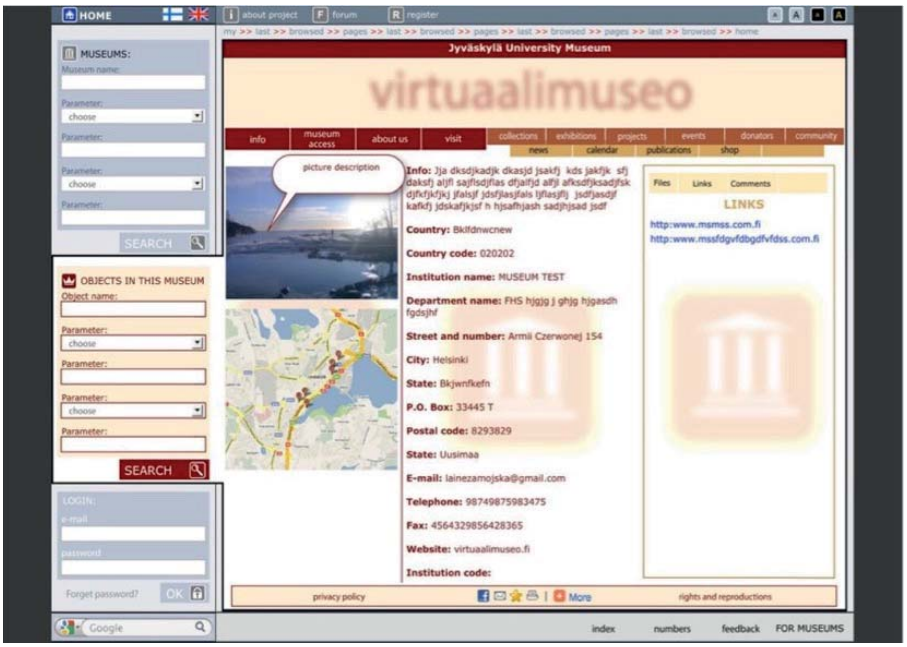

FIGURE 69 The layout presenting the museum and basic information

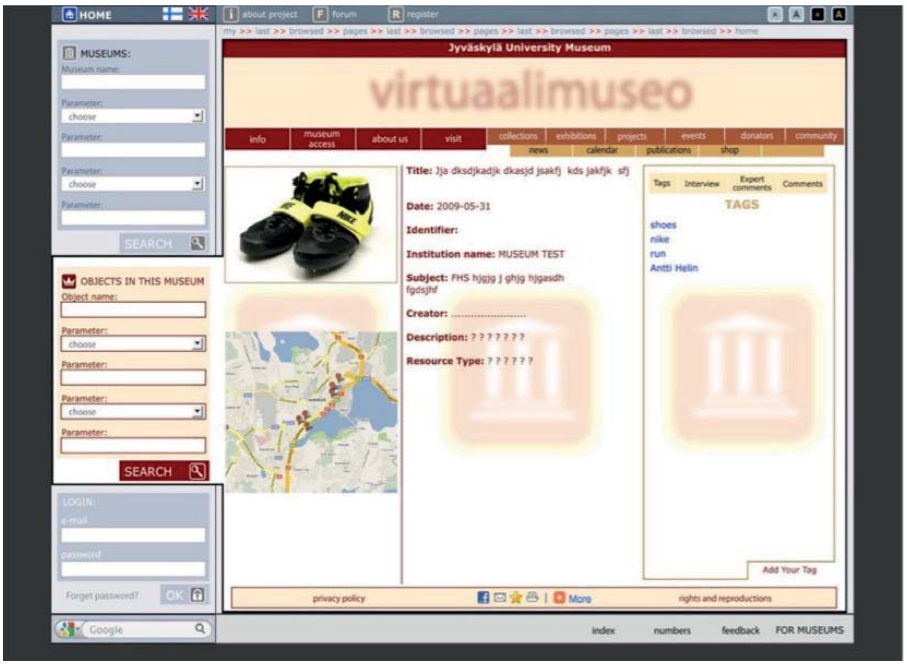

FIGURE 70 The layout presenting the main page with recently added museums

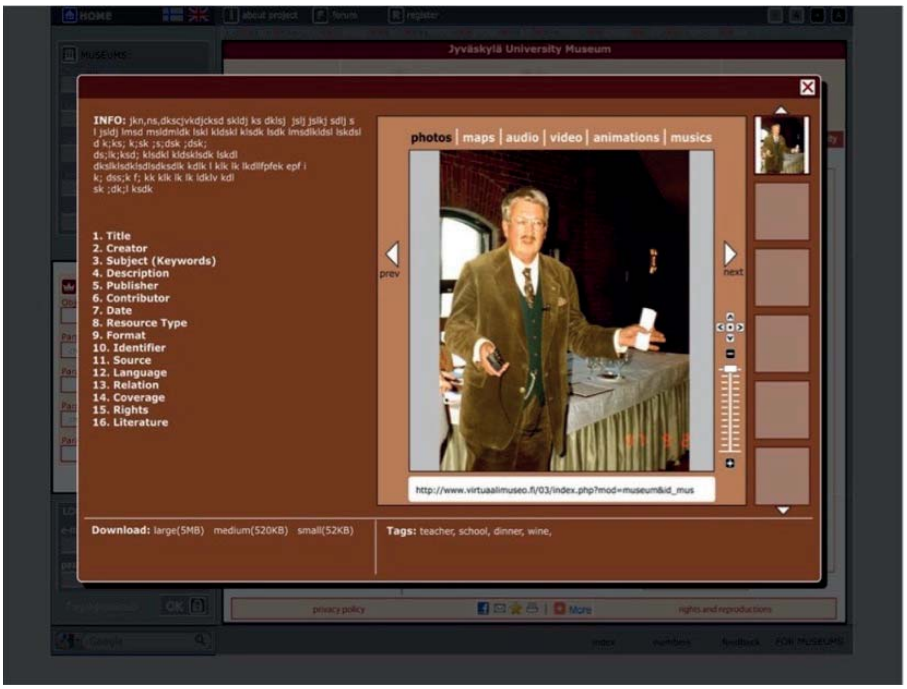

FIGURE 71 The layout presenting the object opened in a new window

FIGURE 72 The layout presenting the exhibition opened in a new window

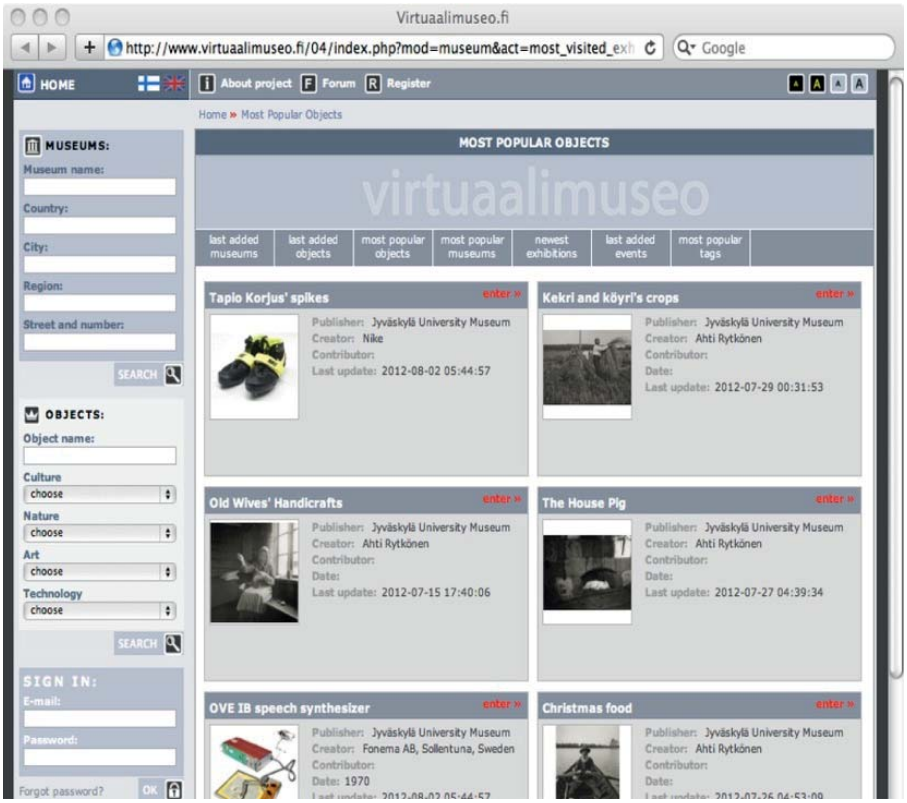

FIGURE 73 Version A: screenshot presenting the main page and "the most popular objects"

FIGURE 74 Version A: screenshot presenting the exhibition "Old teaching pictures"

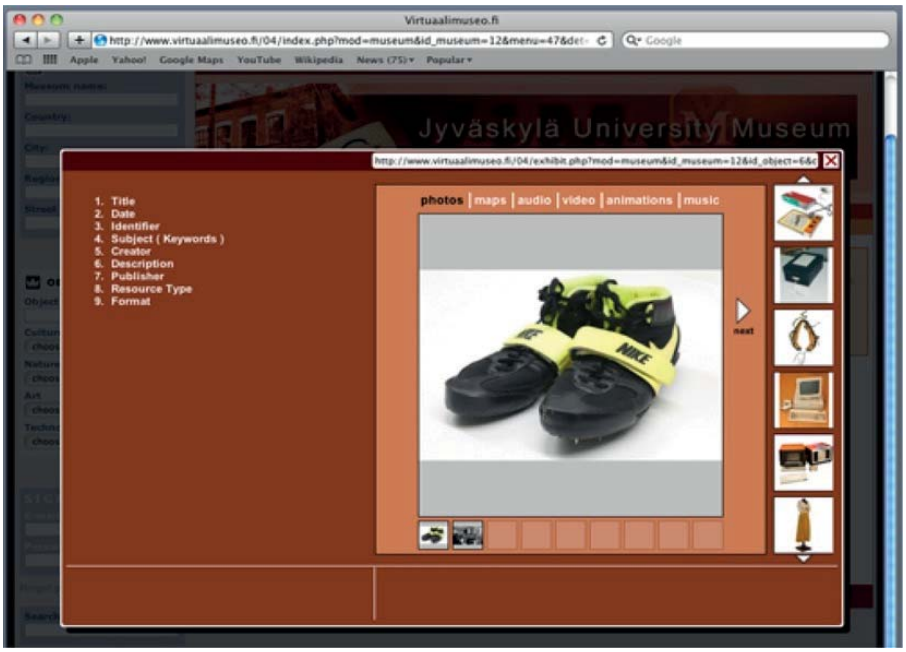

FIGURE 75 Version A: screenshot presenting an object opened in a new window

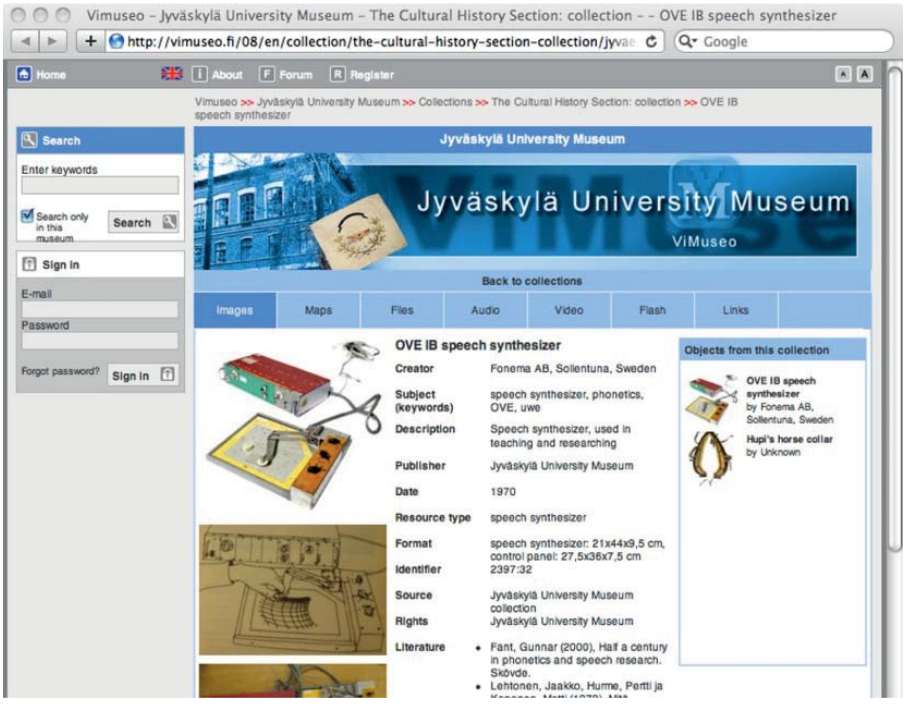

FIGURE 76 Version B: screenshot presenting an object

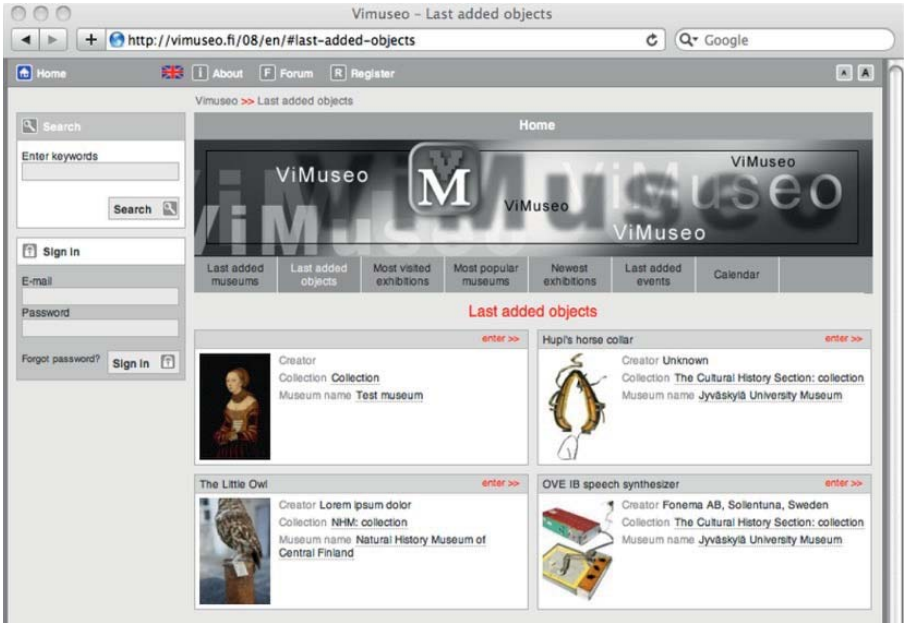

FIGURE 77 Version B: screenshot of the main page with recently added objects

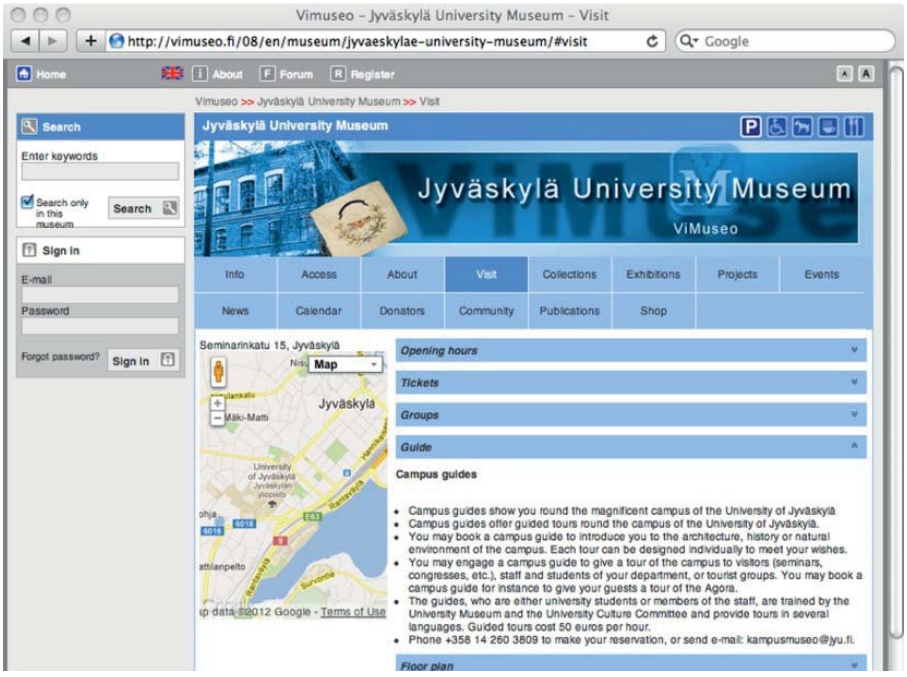

FIGURE 78 Version B: screenshot of the museum's webpage: the "Visit" category and "Guide" subcategory

9 DISCUSSION

9.1 Two directions of development in Finnish museums

The present research is located within new museology (Vergo 1989, Desvallées & Mairesse 2009) and Finnish heritology (Vilkuna 2007). The interdisciplinarity of the approach has been driven mainly by the power of new technologies (Facilitating interdisciplinary research 2004: 40). Central to this research were the concepts of the virtual museum (Farouk & Pescarin 2013, Pescarin, Clay & De Luca 2013) and the ways in which small local heritage museums can contribute to its development. In this research, the role of these museums was investigated through several research activities. Despite the focus on non-professionally managed, local heritage museums, the whole museum sector and its digital creations have also been considered, as the museums of both type influence each other's activities and their ways of functioning. The current role of small museums in creating digital heritage is relatively minor, and it motivated the design activities carried out within this research. In order to improve the situation of voluntarily managed local heritage museums and to discuss how they may become an active contributor to the Finnish virtual museums, it was important to identify their current situation. Prototyping, as an approach and technique (Houde & Hill 1997: 1-2, Guggenheim 2010: 51-52) was deployed to explore the issues related to the design, implementation and maintenance of the virtual museum in small museums, and to demonstrate the concept and explore the role of small museums in the creation of the Finnish virtual museum.

The general overview of the museum websites and virtual museums was constructed through a survey of Finnish virtual museums presented in Chapter 7. In this survey, I used the research framework proposed within the most prominent European network of excellence, the V-MUST project. I reviewed the museums' digital online creations in relation to their content, interaction technology, duration, type of communication, level of immersion and level of sustainability. Fifty-two museums responsible for 62 museum units from the region of Satakunta were selected, and altogether 67 digital creations were analysed. The survey resulted in a general picture of the Finnish museums' websites and virtual museums.

In general, there are difficulties related to the identification of the virtual museum, because this term is very often overused and the digital products of different kinds of museums are called "virtual museums". As the survey showed, the majority of the investigated creations do not meet the definitions of the virtual museum proposed within the V-MUST project (Farouk & Pescarin 2013, Pescarin, Clay & De Luca 2013). Only seven creations can be defined as virtual museums. Other creations are museums' websites that inform only about the institution and its activities. What is also interesting is that the museums create digital products that can be defined as virtual museums, but are very often described as "online exhibitions". In the discussion on virtual museums also social media are important, as they play a role in all types in museums and may be used to construct the virtual museums.

The results of the survey do not differ much from the results obtained within the V-MUST project, but they do not allow for stating whether the number of virtual museums in Finland is high or not. However, almost all the digital creations are interactive, permanent and non-immersive, and the educational aspect plays an important role. They have been also created to enhance the visitors' experience. The main difference was identified in relation to their content and usability. The Finnish products were mainly cultural-history oriented, while in the V-MUST projects the categories were archaeology, architecture, and art. In addition, the Finnish projects represent a higher level of reusability, even though they are not completely reusable either.

The results also show that the level of available resources in the museum is proportional to the complexity of the online presence, which is visible in relation to the digital creations of museums run on a full-time basis and by voluntarily managed institutions. Small museums are present in the services and on the websites that do not require much maintenance from the museum staff or representatives, such as information about the museum, its address and opening hours on the municipality's website, the regional museum portal or a simple profile in a social media service. Generally, these creations are not virtual museums. Creating and maintaining a more complex digital creation, which can be defined as the virtual museum, such as a mobile, web-delivered or multimedia virtual museum require much more resources. The virtual museums that were developed in the region do not incorporate small museums. The most complex digital creations that provide access to digitised resources are the national aggregators. These projects are outcomes of the most important development projects in the GLAM sector. Small museums can participate in them only through professionally managed institutions. Finally, the results show that some solutions are characteristic of small museums and some of professionally run institutions, whose spectrum of tools is much wider. Mainly the institutions run by professionals can provide access to digitised context, because they are able to plan, create, maintain and develop digital creations. However, all institutions can take advantage of egalitarian social media services.

In order to analyse the reasons behind this situation and to draw the consequences from these reasons, it is necessary to consider both development in the domain of virtual museums and in museum documentation practices in relation to online access to collections in Finland. The origins of the virtual museum are connected to artistic and philosophical explorations triggered by emerging technologies

that occurred in the late 19th century (Huhtamo 2002, Sviličić 2010). According to Huhtamo, concepts and movements such as Futurism and avant-garde art, the "world brain" (Wells 1938), "memex" (Bush 1945), the "Xanadu model" (Nelson 1999) and the "museum without the walls" (Malraux 1947) may be considered as the intellectual and historical foundations of the concept of the virtual museum (Huhtamo 2002). If we consider present-day virtual museums, such as the majority of the projects presented in the previous chapters, we can recognise the same elements. For example, when we think about aggregators, such as "Finna"[190] or "Europeana"[191] and the objectives underlying these initiatives, they are not far for the idea of a global database storing complete knowledge of the whole world (Huhtamo 2002: 1, Sviličić 2010: 588). In the development of their interfaces, user experience and user interaction have been important, and their principles can be recognised in an exploration of early avant-garde artists, who in a search for new ways of displaying their works, made the viewer an active participant. The avant-garde artists offered the visitor an individualised and customised experience, because the exhibition and artworks could be dynamically modified, reassembled and activated (Huhtamo 2002). We experience the same today as online visitors to these virtual museums, when we can interact with the content and customise the digital creation according to our own preferences.

The museums, however, were not able to develop such initiatives until very recently. Moreover, the research that could enhance their development had been very fragmented before the launch of the V-MUST network of excellence. In general, museums that want to develop their own virtual museum lack resources. Usually, their expertise does not lie in the areas that are rather necessary for launching this kind of project, such as product/service design, ICT, communication and marketing, to mention only a few (Virtual Museums Transnational Network 2009: 6). There is evidence of underdevelopment and fragmentation in the Finnish context as well. Firstly, only professionally run institutions have been able to experiment with the development of the virtual museums, but in many cases there were apparent problems with sustainability, so many projects have also been quite early abandoned (for example VIRMA). Secondly, there were very few initiatives launched at different research and educational institutions, but these initiatives were dispersed and the research on the virtual museum is still fragmented, even though there are some signs of increased specialisation. Finally, there is evidence that professionally and voluntarily managed institutions can contribute to this process at different levels.

However, generally the same trends in the development can be traced as those identified and presented in Chapter 4: Trends in virtual museum's development (2000-2010). There is the interest of companies providing technologies, know-how and funding to make virtual museums, with the Google Art Project as the most spectacular example. In relation to growing trends, there are also experiments with immersive systems in Finland, both as online and on-site virtual museums. Furthermore, cultural data is also used in research projects on the semantic web that has been recognised internationally. Another important approach in creating virtual mu-

190 Finna, https://www.finna.fi [16-03-2015]
191 Europeana, http://www.europeana.eu/portal/ [16-03-2015]

seums, described as culturally sensitive virtual museums, is also visible in the Finnish context concerning the heritage of the Sámi community. Social media services and user-generated content are also widely used by Finnish museums and they are directly reachable by representatives of voluntarily run museums. In addition, there are numerous private initiatives. However, the main initiatives in the museum sector have been developed by and mainly for professionally managed institutions.

Moreover, the small museums are not so active in the domain of virtual museums not the least because they do not have enough expertise in areas such as product/service design, ICT, communication and marketing. At the core of the virtual museum are heritage and its documentation, because the virtual museum is focused on topics of heritage (Pescarin, Clay & De Luca 2013). The distinction between professionally and voluntarily managed museums is visible in the way that their collections are catalogued and digitised. For example, in relation to cultural history objects, the professionally museums have about 5.9 million cultural history objects (n=127) of which around 2.1 million have been digitally catalogued (n=123) and 1.2 million digitised (n=120) (Museotilasto 2014), while the non-professionally museums have ca. 2.4 million objects of which around 1 million have been traditionally catalogued and digitally catalogued (Rakkaudesta kulttuuriperintöön 2012: 35-36). Even though these numbers are not fully comparable and answers were not received from all the museums, it is evident that the documentation level in professionally and voluntarily managed museums differs a great deal.

Cataloguing practices in non-professionally and professionally managed museums are different. Small museums still mainly use paper-based catalogues, as we can see in the image from the Luvia Museum, and in the museums I visited it was the most popular way of documenting collections. In only in a few of them were digital collection management systems deployed, as in the Local Museum in Hinnerjoki, whose collections are partly available online. It would be easy to draw the conclusion that non-professionally museums are underdeveloped. In some ways, their practices resemble the cataloguing practices of the early 20th century. Also, the development projects managed by the National Board of Antiquities are focused on overcoming the gap between these two types of museums. The financial support it provides is aimed at improving digital cataloguing practices.

However, the development of these two types of museums has gone in two different directions, and therefore the voluntarily managed museums should rather not be considered as underdeveloped. The process of digitisation may show the differences between them. In the interviews the representatives of the small museums were very eager to identify the purposes of digitisation and providing access to collections, but their museums do not have written policies. What was regarded as important was the opportunity to communicate with their audiences and share knowledge about local communities, their traditional skills and ways of life. The museums that have partly opened up their collections know that their collections may be used in many, sometimes even unexpected, ways. Furthermore, the representatives of the museums are aware of the fact that their collections are not very unique, and they know what questions should be answered before selecting objects for digitisation (Gertz 2007). According to them, the most valuable and representative objects become a part of the professionally run institutions. Although the small

museums have objects that are of value for various audiences, mainly the local communities, local schoolchildren and people interested in traditional skills, for example carpentry.

In relation to the complexity of the collection documentation process, the evidence shows that the small museums are not able to manage the process in the same way as the professionally managed museums. Even though the objective of the professionally managed institutions is to document collections, they face serious challenge. The currently recommended museum cataloguing instructions prepared within the "Museum 2015" project number around 500. However, the professionally run museums are facing the problem of "cataloguing deficit", discussed by Kalle Kallio in the blog of the Finnish Association of Museums concerning the release of the museum cataloguing instructions (Kallio 2014). Using the National Board of Antiquities' statistics, Kallio shows that there is a cataloguing deficit, which means that museum collections are growing faster than their documentation and digitisation. This deficit can be reduced by improving working practices, making digitisation and the disposal and use of museum objects faster. Moreover, he argues that the SPECTRUM-based instructions are very detailed, and regarding effectiveness and customer needs, it may be more reasonable to document more objects, but in a less detailed way. He also considers that in the future cataloguing practices may be focused on connecting, together with clients, objects to phenomena, places, periods and stories (Kallio 2014). Connectedness is also considered as a basis of the virtual museum Hoptman (1992: 141–142, 146). If the professionally managed museums face such a problem, how can small museums be able to document their collections comprehensively?

Another issue which is important for the documentation of collections is that professionally managed museums mainly collect primary contextual information. In the context of voluntarily run institutions, the secondary context may be more important, as the objects they collect are much more familiar to audiences. Janne Vilkuna discusses this problem in view of the challenges and opportunities of open data from a collection documentation point of view (Vilkuna 2013). He states that opening up collections can improve secondary, parallel context information that has usually been neglected, because the documentation of objects with very little information can be enriched by visitors who may have experiences and memories of analogical objects (Vilkuna 2013). In relation to the case of the small museums in Satakunta, the representatives of the museums could tell about different types of objects, such as tools, because they or their families used to have and use them. Improving the descriptive metadata would be one of the most important issues, but also creating connections together with the clients would be possible and valuable.

9.2 Small museums and possible scenarios for the Finnish virtual museum

Small museums, however are eager to be present online. In the analysis of the virtual museums in Satakunta, the projects that incorporate heritage small museums to some extent represent mainly three scenarios: "the web-based virtual museum, the

unique museum" (Theory Design 2012: 22), "the narrative mobile virtual museum" and "the web-based virtual museum, aggregators, portals and large scale collaborations" (Theory Design 2012: 23). These scenarios can be discussed in relation to their characteristics and the small museums' resources to show which scenario is the most possible one in the Finnish context. The most discussed will be the last scenario, "web-based virtual museum, aggregators, portals and large scale collaborations", as this scenario is currently being realised and it influences the small museums the most.

The virtual museums representing the first type, the "web-based virtual museum, the unique museum" have been prepared by the professionally managed institutions in collaboration with the small museums, and as an example may serve the "Aikamatka Satakunnassa" ("A Journey through Time in Satakunta") project. The strength of this kind of project is that it has been created in close cooperation with the small museums, but the required resources and infrastructure have been provided by the professionally managed museums. This project is not focused on collection documentation, but rather on promotional and educational aspects. The weakness of this project is its low level of sustainability, as it is in many other cases as well. Almost all regions in Finland have their own regional museum portals similar to "Aikamatka Satakunnassa" ("A Journey through Time in Satakunta"), but they have been developed independently. The researchers from the regional museum have established a network and discuss the problems together at annual meetings, but they have not been able to develop a museum portal.

This kind of problem has been noticed very early in Finland and there are a few examples of creating sustainable solutions for all regions. An interesting example is "Finnica"[192], a project aiming at presenting cultural heritage from different Finnish regions. This ambitious project maintained by the Virtual Centre for Finnish Culture (Suomalaisuuskeskus Finnica), was one of the first initiatives aiming at producing new cultural content in the networked environment[193] and it was financed by the European Regional Development Fund (ERDF Operational Programmes). The content was produced by experts from research, cultural and educational institutions. The pilot website, developed between 2001 and 2003, is focused on the past, present and future of the region of Central Finland[194]. The content, which includes more than 40 articles by experts, a huge number of images, video clips and games, was designed to offer information to different visitors: teachers, students, tourists and tourism operators, entrepreneurs, and new and old inhabitants of Central Finland[195]. The primary idea was that "Finnica" may become a national initiative. However, there were no funding for such an ambitious initiative, and the project succeeded in receiving support from the regional fund. It was expected that other regions would like to follow this model, but unfortunately this was the case only in Kymenlaakso, where "Finnica Kymenlaakso"[196] was launched.

192 Finnica, http://www.finnica.fi [26-10-2012]
193 Finnica, Info, http://www.finnica.fi/info.php [26-10-2012]
194 Finnica Keski-Suomi, http://www.finnica.fi/keski-suomi [26-10-2012]
195 Finnica Keski-Suomi, Info, http://www.finnica.fi/keski-suomi/info.php [26-10-2012]
196 Finnica Kymmenlaakso, http://www.finnicakymenlaakso.fi [26-10-2012]

Unfortunately, the "Finnica" project covers only these two regions and it had difficulties with further funding. "Finnica" was dependent only on commissioned professional content. At that time the Web 2.0 tool had already become popular and there were not many examples of digital heritage projects based on user-generated content or local community involvement. If "Finnica" could receive further funding and allow user-generated content, it could become as successful as "1001 stories of Denmark", which is based on the contribution of a wider audience. However, the experiences gained from "Finnica" resulted in a new initiative, "Museum24"[197], which started in 2004. Unlike "Finnica" and "Finnica Kymenlaakso", which were initiated at the regional level, "Museum24" is a local initiative. It aims at improving the accessibility of cultural memory in the Jämsä region[198]. The project involves many stakeholders, but it succeeded in engaging the local community. Since 2011 "Museum24" has also been active on Facebook[199]. It demonstrates that the engagement of a local community is a key issue that should be considered prior to the development strategy for a local heritage project.

What is important in these projects is that they were supported by the networks of different institutions and organisations, including educational institutions. "Aikamatka Satakunnassa" ("A Journey through Time in Satakunta") was accompanied by several smaller projects, for example about the history of theatre in Pori[200], in which students from the University of Turku and the Satakunta University of Applied Sciences created the content and the site. "Finnica" was initiated in the academic context, but also the content was created by the research, cultural and educational institutions. "Museum24" was developed as a tool to serve students, researchers and local heritage enthusiasts. The system is based on the CIDOC CRM standard. Some of the projects have developed within academia, such as "CultureSampo". The relations between academia and digital heritage projects can occur at all stages of the project and they can vary, from initiation to providing services, and from students' projects to higher level research. There are several faculties at the Finnish higher education institutions that are involved in teaching, researching, developing or providing services related to cultural and digital heritage, museology, digitisation and long-term preservation, mainly the Faculty of Humanities at the University Jyväskylä (digital culture and museology subjects); the and School of Arts, Design and Architecture at Aalto University (for example the Systems of Representations' research group); the Technology Research Centre and School of History, Culture and Arts Studies at the University of Turku; and at the University of Applied Sciences in Mikkeli. At the latter institution, there are the Digitalia - Research Centre of Digital Information Management [201] and Digital Archiving and eServices. They are also a part of Digitalmikkeli, a cluster that "promotes, supports and develops digitalisation and

197 Museum24, http://www.museo24.fi/ [12-03-2013]
198 Museum24 - Virtual Museum of Jämsä Region, Museum24, http://www.museo24.fi/?action=INavigation::viewArticle%281921%29 [12-03-2013]
199 Museo24.fi on Facebook, https://www.facebook.com/pages/Museo24fi/157744840944571?ref=ts&fref=ts [26-03-2015]
200 Porilaista teatteria 140 vuotta, Aikamatka Satakunnassa, http://www.aikamatkasatakunnassa.fi/teatterihistoriaa/info.html [21-3-2016]
201 Digitalia, http://www.mamk.fi/en_/r_d/digitalia [24-03-2016]

the use of information"[202] and that involves the public sector, educational and research institutions, as well as companies. In Rovaniemi, in the 2000s, the University of Lapland's Faculty of Art and Design, the Rovaniemi Art Museum and the Provincial Library of Lapland jointly carried out several digitisation and archiving projects (Ihalmo 2008). This, however, does not mean that their activities are not fragmented, as it is in many other European countries, as the initiators of the V-MUST project argue. No matter what scenario is being discussed, all of them require both the material of the memory institutions and the expertise of academia.

The examples that have been classified as "narrative mobile virtual museums", such as the "Museum without Walls" ("Seinätön museo"), avoid these problems, as their content is created by the museums, while organisational support is provided by the Finnish Museums Association, an umbrella institution looking after the museums' interests and supporting them in their development. However, the small museums cannot currently make use of a narrative mobile virtual museum. Their own resources are limited. In the survey on the virtual museums in the Satakunta region, there were no examples of a narrative mobile virtual museum developed by the small museums in Finland.

At present, the scenario of the "web-based virtual museum, aggregators, portals and large scale collaborations" is the most important one for the whole museum sector and consequently also influences small museums. There are already virtual museums of these kinds and they provide access to heritage from museums representing both professionally and voluntarily managed institutions. In this case, however, the professionally run museums provide the infrastructure and support. The representatives of the small museums receive support, such as training from the regional museums. Some institutions also provide different types materials, such as manuals and instructions.

The analysis of the situation of the small museums shows how they may contribute to the Finnish virtual museums, implemented as aggregators. In Finland, the most important examples of aggregators are "Finna"[203] and "Finnish Museums Online"[204], but the latter will be replaced by "Finna". One of the most important questions is whether the digitised collections of small museums can attract the aggregator's large audiences. The majority of aggregators are designed for the general audience and the number of visitors demonstrates that the audience is very wide, for example as the statistics show, in 2014 "Europeana" was visited by approximately 4 million visitors[205]. At the moment, there is very little evidence of the online attractiveness of the digitised collections of small museums, since online access to them is very limited. What we know is that the small Finnish museums are important places for local communities and mainly Finnish visitors, and the objects that can be found through the Internet, have attracted some users. In addition, the objects that are collected in these museums are important to their local communities, because they are familiar to them and trigger memories or stories. According to Paul F. Marty's sur-

202 Digital Mikkeli, http://www.digitalmikkeli.fi/inenglish [24-03-2016]
203 Museum Finna, https://museot.finna.fi/?lng=en-gb [26-03-2015]
204 Finnish Museums Online, http://suomenmuseotonline.fi/en [14-05-2015]
205 Europeana Statistics Dashboard, http://statistics.europeana.eu/page/traffic-usage/2014/traffic-usage-2014 [31-03-2015]

vey on the use of digital museum resources on museum websites (Marty 2007, Marty 2008), the on-site and online visits are complementary, and so it may be assumed that there would be interest in online resources. To conclude, the strength of the small museums lies in their knowledge of their own, local communities, communicated with the collections. Moreover, the museums recognise their collections' educational potential and value and have established relationships with local institutions.

Consequently, there are several constraints and conditions that affect the creation of the Finnish virtual museum implemented as an aggregator. Providing accurate metadata is a necessary precondition. In the small museums, the collections are mainly catalogued in the traditional, paper-based way, and in relation to digital documentation several non-collection management systems are applied (Rakkaudesta kulttuuriperintöön 2012: 36). Digitally catalogued material is a prerequisite for any kind of aggregator, and even the professionally managed museums struggle with the "cataloguing deficit". The National Board of Antiquities supports digital cataloguing practices in small museums by providing grants, and some of the regional museums offer a simpler, online version of the collection management system (e.g. web Musketti). Museum institutions also provide instructions and guidance in different forms, such as online publications, training and manuals. Discussions with the representatives of the museums indicated that they understood the importance of documentation, but not all of them could or wanted to commit so much time to it. Collection documentation was considered as less beneficial to the museum and its audience than other activities, for example events, guided tours or any other collective activities. This characteristic could be utilised in the development of the Finnish virtual museum, by implementing social media tools or other features allowing for user-generated content. As the current trends in the development of virtual museums show, user-generated content and social media are utilised in the museum sector, even in institutions with limited resources. As Giaccardi states:

> (…) social media create infrastructures of communication and interaction that act as places of cultural production and lasting values at the service of what could be viewed as a new generation of "living" heritage practices. (Giaccardi 2012)

Furthermore, some of the functions that are present in this kind of virtual museum can be considered as an element of this infrastructure. Users can add their own metadata, create their own "exhibitions" and share them with others, and save and reuse content, as in the excellent example provided by "Rijksstudio". Due to these functionalities, this type of virtual museum as the "place of cultural production" (Giaccardi 2012) and make communication and interaction between the museums and their audiences possible. In this process the representatives of the museum can use the virtual museums as a method of communication, interaction and exchange with users (Drotner & Schrøder 2013: 12). They acknowledge this and know how to make use of possible digital technologies, for example through social media services, such as Facebook.

On the other hand, other functions and characteristics of the aggregating virtual museum are related to creation and preservation of digital content. The quality of the digital representation should meet certain criteria. Otherwise, tools such as

zooming are rather superfluous. Digital imaging requires professional skills and the representatives of the museums from Satakunta were aware of that. This challenge can be overcome in several ways. One of them is to provide necessary training. These skills can be gained during training. Another solution is to provide easy access to digitisation services, for example as an external service. In the pilot project "Digitizing small sized GLAM into Culture Commons with local communities" coordinated by Samir Bhowmik, an open source autonomous scanning robot (the digGLAM Assistant Robot) was being used and tested in the Gallen-Kallela Museum (Bhowmik 2013). In the digGLAM the Gallen-Kallela Museum's archive and its community were brought together. In 2014, during two theme days (February 9, 2014 and March 9, 2014) the museum community was invited to participate in the process of digitisation and digital archive creation. Participants brought their own archival material, such as images and postcards that were digitised and published in an online archive – "Haloo Akseli"[206]. The Gallen-Kallela Museum is a professionally managed museum, but its number of staff is small (10 man-years in 2013, according to Museotilasto). It demonstrates that the participatory framework that uses technology can improve digitisation processes in a museum and facilitate the opening up of collections.

It is important to mention that the quality of digital imaging is considered important in the process of digitisation and in relation to certain functionalities offered in the online services, but for certain purposes a low-quality digital representation can be enough. The digital images of objects from the collections of local museums published in "Finnish Museums Online"[207] give an overview of objects, but cannot be considered to be high quality digitisation. The illustration below demonstrates the quality of a typical image of an object[208] from the Hinnerjoki Local Museums available in the "Finnish Museums Online" service.

206 Haloo Akseli, http://halooakseli.fi/ [07-04-2015] and Mikä arkisto, Haloo Akseli, http://halooakseli.fi/collections/fi/mika-arkisto-0 [07-04-2015]

207 Finnish Museums Online, http://suomenmuseotonline.fi/en [07-04-2015]

208 Yöpaita; Naisten yöpaita (Night shirt, Women's nightshirt) Finnish Museums Online, https://museot.finna.fi/Record/sarka.M016-50313 [08-04-2015] Yöpaita; Naisten yöpaita (Night shirt, Women's nightshirt) , Finna https://museot.finna.fi/Record/sarka.M016-50313 [04-10-2016]

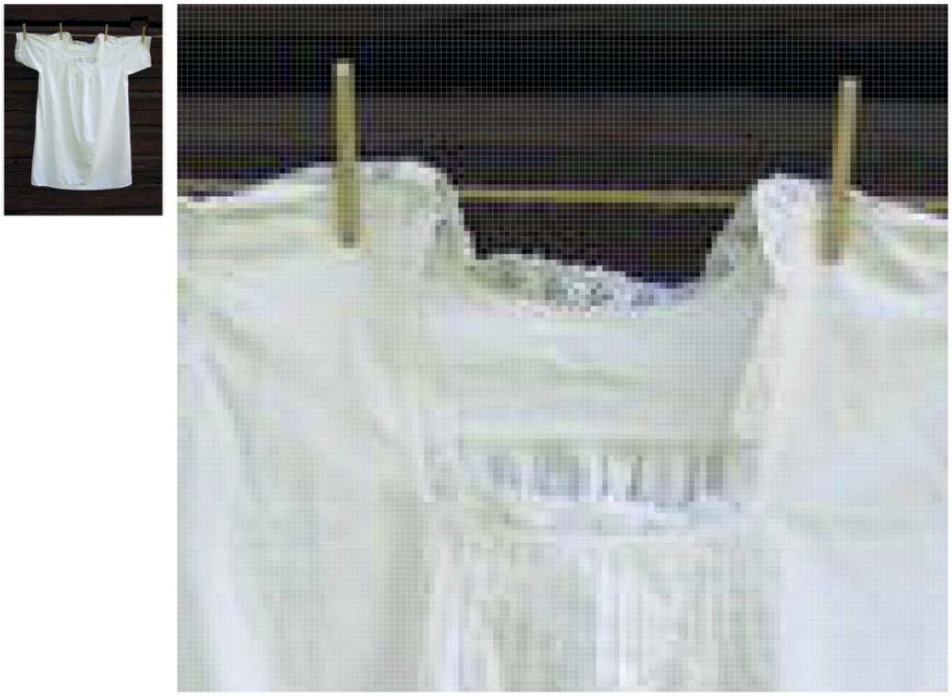

FIGURE 79 Image and a zoomed detail

The size of the picture available online is 300 x 400 px, which means that it can serve as a relatively good preview image, but cannot provide any other details about the object and for example its texture, material or used technique (Fig. 80). Obtaining much higher quality is relatively easy at present. For example, an image taken with an iPhone 5 or iPhone 6 can be around 667 times bigger[209]. This means that the online published image has been edited and made smaller on purpose, regardless of what kind of standard digital camera was used. There may be many reasons for that, from practical ones because it is easier to handle smaller files to ideological arguments of concern that a larger file can be "stolen" and easily re-used without the museum's consent, for example in printed materials. Museums must review these kinds of issues and include them in their digital strategy, but as the example illustrates, the quality of this image was satisfactory for the museum representative and the user was able to get basic information about the object to contact the museum to obtain further details. In addition, the museum must prepare copyrights and terms of use of the metadata and digital representations of objects, requiring the appropriate knowledge and approach towards its digital strategy.

There are also functions that could support communication between the museum and its users in connection with small museums. Exhibitions and tours are characteristic of the aggregators and in the survey three main types were identified: (1) a

209 Compare - See all iPhones, Apple, http://www.apple.com/pl/iphone/compare/ [08-04-2015]

selection of objects collected together with a title, displayed in the same way as search results in the case of a service providing access to a collection from a single institution; (2) a selection of objects collected in a separate set, with a title and additional description in the case of a service providing access to collections from many institutions, and the sets can be made by the system users: the museum staff or audiences and (3) an exhibition that has its own structure and narrative, created as in a collaborative and documentary project and based on user-generated content. These three types of exhibitions are a result of a certain approach towards the digital presence of the museum. The first type does not require any interaction between the museums and the user. The second type is slightly more participatory because the user can make his or her own collections/exhibitions and browse others. The third type represents the most participatory approach and it is the result of certain strategy. It is based on user-generated content and facilitates two-way communication and knowledge negotiation. The first two types are based on objects and knowledge on them that is hidden in the collection management systems. With regard to the small museums we know that these systems are not present at all or are just paper-based.

Moreover, the small museums have similar collections that are not as valued as those in professionally managed museums. Consequently, the third type is best suited to the context of small museums. The museums organise thematic days and enabling digital technologies during these kinds of events would thus be possible. As the project "Haloo Akseli" shows, it is possible to organise theme days during which the museum staff and its community can jointly create digital content. Finally, the strength of the Finnish virtual museums lies in online exhibitions created as educational resources. In the group of analysed digital creation within this research projects, there were several exhibitions created as educational projects and they also serve educational purposes (Kallio 2005). As already discussed, the small museums play an important role in local education and the virtual museum could supplement already existing relations and practices.

Further elements of the aggregating virtual museum, such as features characterised as "additional" (for example ordering an image, obtaining a license to use an image, booking a museum visit or the use of the museum shop) requires adequate infrastructure and staff. As we already know, small museums currently do not have this kind of infrastructure and their representatives cannot contribute so much time.

9.3 Final conclusions: conditions for the Finnish virtual museum

As the final conclusions, I would like to present a list of conditions of the virtual museum that includes both voluntarily and professionally managed museums. I use the definition of the virtual museum proposed by the V-MUST project (Farouk & Pescarin 2013, Pescarin, Clay & De Luca 2013). The points presented below are not presented in any chronological order, as certain tasks may overlap. They are divided into these groups to show which elements should be most importantly considered at which stage. I use the term "developer" to define an institution or other agent responsible for the virtual museum's development.

9.3.1 Initiating

When starting a new initiative aimed at the creation of a virtual museum, several aspects should be carefully considered: the objectives of the project, milestones, expected results and evaluation criteria, available resources, dependencies, schedules and risks. The objectives of the whole project and the digital creation should be differentiated. The virtual museum is only one outcome of the whole project. The project objectives should be connected to the strategy of the museum, for example the development of the virtual museum can be connected to the improvement of collection documentation by enabling tools allowing for user-generated content. As proposed within the V-MUST project, the purpose of the virtual museum can be education, research, enjoyment or enhancement of visitor experience, or promotion (Farouk & Pescarin 2013).

1) Launching the virtual museum should not be the last milestone. Digital projects require constant maintenance and redevelopment, and it may thus be better to place the development of the virtual museums within the strategy of museums. This issue is demonstrated with the problem of obsolete virtual museums encountered in this research, as well as interviews with museum professionals. In Finland, this issue is also indirectly addressed by the National Board of Antiquities, as they have changed their grants policy and prefer to support projects that are more sustainable due to their focus on digitisation and documentation, which are prerequisites of the virtual museum.
2) The developer should define the expected results and evaluation criteria to be able to evaluate the project and develop it in the future. These should be connected to the purpose of the virtual museum. For example, if the purpose of the museum is to promote a new physical exhibition, the number of visitors should be monitored to evaluate whether the virtual museum has impact on it. This issue was addressed in the V-MUST project, because lack of evaluation criteria is an obstacle in the development of the field and research on virtual museums.
3) Furthermore, the developer should review available resources. In Chapter 7, I included a diagram illustrating the correlation between the level of available resources and the complexity of digital creation in relation to small and professionally run museums. It can be used to help the museum diagnose its current situation and evaluate how complex their new digital creation may be.
4) In relation to the available resources, it is important to consider the museum's dependences. For example, the resources from the small Finnish museums are partly available through the national aggregators, but it is possible that the infrastructure and resources are provided by professionally managed museums and institutions. Not every institution has to develop its own virtual museum.
5) The schedule of the project should take into account the nature of the museum, the museum sector and other important factors that may influence the success of the virtual museum. For example, in relation to small museums it is worth bearing in mind that these museums are open mainly in the summer, which means that access to the collections is most convenient during the

summer months, but at that time the museum volunteers are very busy with the maintenance of the museum, other events and activities as well as other work, as for example crop harvests. Other important dates are connected to funding opportunities, such as calls for grant applications, or other dates depending on the purpose of the project and the virtual museums concerned.

6) Finally, the developer should consider the risks for the whole project. Usually, the project includes several stakeholders and appropriate agreements should be made in advance.

9.3.2 Development

In the development of the virtual museum several issues must be planned and decided. Firstly, there are several categories proposed within the V-MUST network that should be reconsidered: content, interaction technology, duration, communication, level of immersion, type of distribution and level of sustainability. Furthermore, as the virtual museum is focused on heritage, also the quality of digital content is important: the metadata of objects and their digital representation.

7) The development team should include persons responsible for different aspects: researchers, experts in ICT, experts in social-cognitive studies, museum staff and curators, final-users (visitors, tourists, students), professionals in the field of communication, marketing and art (Virtual Museums Transnational Network 2009: 7). I argue that there should especially be experts in user experience and interaction design, as the category of interaction is one of the most important ones in the virtual museum and most of the Finnish digital creations are interactive. As the interviews with the museum representatives demonstrate, in smaller and less complex projects, the same person can be responsible for several areas, but their roles and responsibilities should be reviewed and covered in some way. In addition, collaboration with academia may provide the necessary level of expertise at different stages of the project.
8) The content of the virtual museum is related to the museum's factual collection. The small local heritage museums in Finland mainly have cultural history collections (Rakkaudesta kulttuuriperintöön 2012), and thus the scope may be the same, but it does not necessarily have to be. The museums have in their collections different kinds of material, for example artworks and archival material, so combining resources from the collections of different museums may be also possible.
9) The type of interaction deployed in the virtual museum is considered as one of the most important elements, and in the V-MUST project this category was not properly defined. The developers should consider what kind of experience the virtual museum will offer its visitors. It is important to know the museum's audience and to perceive the virtual museums as a vehicle for communicating with them. The small museums surveyed in this research have a fairly good understanding of the needs of their communities and they know their visitors.

10) The duration of the virtual museum depends on the objectives of the project. In Finland, the most popular ones are permanent virtual museums, as they are broad nationwide initiatives. However, in relation to smaller institutions, the projects that are temporary or periodic can more suitable because many of their activities are seasonal and they are mainly open during the summer. Projects of these kinds can also be easier to manage.
11) In relation to the type of communication, the majority of the Finnish virtual museums are descriptive. However, many of the online exhibitions developed as separate projects are narrative. The representatives of the small museums know their collections very well. The way they present them is connected to certain events or stories, and when transformed into digital format the presentations may take the form of the narrative virtual museum.
12) The type of distribution should also be carefully considered. The scope of the research covers neither off-line distributed VMS (separate products distributed for example on CD or DVD) nor non-distributed VMs, and this should also be taken into account. The most popular VMs are online, but the number of mobile VMs is growing and this type should be especially considered in connection with small museums. As opposed to on-site installations, developing the mobile VMs does not require investment in devices. In addition, the small museums are dispersed geographically and visits to them are part of local tourism, and the mobile virtual museum could thus reach tourists. This trend is also visible in the Finnish context, with "Seinätön museo" ("Museum without Walls") project as an example.
13) Furthermore, one of the most important issues is the level of sustainability. The Finnish VMs are generally more sustainable than the VMs in Europe surveyed in the V-MUST project. Nonetheless and especially in connection with the small museums, the level of sustainability is relatively low. However, the newest projects in the Finnish museums sector demonstrate that this issue is considered as important and they are much more sustainable than the previous ones due to new regulations (mainly the act on steering information management in public administration, Laki julkisen hallinnon tietohallinnon ohjauksesta 10.6.2011/634). One can expect that non-sustainable solutions would be neither recommended nor supported in the near future. In addition, novel, ecological media infrastructures should be considered, and a set of design principles reviewed (Bhomik 2016).
14) Finally, as the origins of the virtual museums are connected to certain artistic and intellectual movements (Huhtamo 2002), this aspect should be also taken into account. Some current trends, such as open movements and social media are already visible in the newest initiatives, but it is much more difficult to trace artistic and exploratory initiatives. I argue that in every project some space should be left for artistic and exploratory investigations.

9.3.3 Maintenance and long-term preservation

Once developed, the virtual museum requires further maintenance and long-term preservation services. These issues are connected to the sustainability of the project,

and should be considered before the project starts. The level of required services can vary depending on the complexity of the solution. Many of the early projects have been abandoned, but currently these issues are considered as important and there are already projects that address them.

15) The maintenance plan for the virtual museum should be prepared. The small museums are not able to maintain the digital creations themselves, because they do not have appropriate resources.
16) Another important issue is the long-term preservation of both the virtual museum and the digital content. The long-term preservation of the digital creation depends on the deployed technologies. In Finland, a long-term preservation plan is already being implemented (Digital Preservation Implementation Plan of the National Digital Library 2002). The most important development projects for the museum sector are connected to the National Digital Library. Consequently, the new initiatives can take advantage of a centralised long-term preservation solution. The developer can use the system to preserve the material, but certain conditions should be met (Teräs 2009).

9.3.4 Digital content creation and management

There are several aspects related to digital content creation and management. In the context of small museums, digital content is mainly created through digital imaging and scanning. The amount of digital born material is much smaller. Management includes mainly the process of controlling the content but also managing the process of interaction between the museum and its audience enabled by and facilitated through the virtual museum.

17) A very small part of the collections of small museums have so far been digitally documented or digitised, since their resources are limited. However, they receive support from other institutions, for example regional museums, the Finnish Museums Association and the National Board of Antiquities.
18) Collection documentation and management are not the most preferred activities of persons involved in museum work, as traditionally they are very solitary and monotonous tasks. However, as some examples demonstrate, short events connecting the representatives of the museums with their audiences and organised around collection documentation and digitisation are successful.
19) Providing simple and affordable tools can facilitate the process of digitisation and documentation in small museums.
20) Moreover, easy to use tools are already used by the small museums, so they are eager to develop their presence online, but the community aspect is one of the most important.

9.3.5 Characteristics of the museum sector

The development of the virtual museum should be planned with regard to the characteristics such as ownership, funding, staff and volunteers, audience, collections, exhibitions and events, as well as the museum's operational mode, as they influence the kind of digital creation considered to be the most appropriate. In addition, it is important to consider it in relation to the organisation of the whole museum sector, along with current and future projects that may influence it.

21) Small museums should be differentiated from the professionally managed museums. Kimmo Levä, General Secretary of the Finnish Museums Association, argues that one of the problems faced by the small museums is that they are not trying to distinguish themselves from professionally managed museums. Instead, he proposes that the small museums should be developed as a brand, that voluntary museum work be recognised as a hobby, and that the volunteers should receive training (Levä 2012).
22) The funding of small museums is very limited and received from many sources. In addition, the museum's budget can vary annually and it is difficult for them to make financial commitments for longer periods in advance. This makes long-term commitment, for example, to maintenance and long-term preservation very difficult and risky.
23) One of the most important issues is that the small museums are managed voluntarily. The persons involved in the museum activities are very often personally connected to the place and know a great deal about the whole community. The museum work is their hobby. Consequently, the developer of the virtual museum should consider their motivations and needs. The tool should support their activities in the physical environment. As the current examples show, collection documentation and cataloguing are not the most favourite activities among the representatives of the small museums, even though they may be the only persons who have so much knowledge on the objects in the museum collection.
24) Small museums function within the network of both professionally and non-professionally managed museums and these relations must be taken into account. Even though small museums are managed by separate organisations, such as museum associations, they receive support from other institutions, for example their regional museum and the National Board of Antiquities. They do not want to change their *status quo* in a way that could affect future opportunities to receive support.
25) Moreover, the small museums are run collectively. There are persons involved directly in the organisation, but also their spouses, other family members or friends that may play an important role. The same tasks can be managed by several persons over a longer period of time, or they redistribute them very often. In some museums, there are problems with managing the basic activities, as there are not enough persons involved in the management of the museum. Thus, the developer should take into account while planning who will be responsible for the management of the virtual museum.

26) Both professionally and non-professionally managed museums have very large collections, but their levels of documentation and digitisation are different. However, they are both struggling with the cataloguing deficit (Kallio 2014). In relation to the collections of small museums, the secondary contexts of the museum objects can be very important and opening up collections to audiences in the digital environment could generate new knowledge (Vilkuna 2013). The collections of the small museums are very often similar and do not include very valuable objects, as these have been taken into the collections of professionally managed museums.
27) The most important projects for the GLAM sector (the Finnish Digital Library and the Museum 2015 for the museum sector) should be taken into account, as new projects should be compatible with them and can take advantage of the solutions developed within them.

9.4 The contribution of the research

Due to new digital technologies museums are undergoing rapid changes that are widely discussed in the related literature (Anderson 2004, 2012, Din & Hecht 2007, Hooper-Greenhill 2011, Lang et al. 2006, Runnel et al. 2013, Simon 2010, Weil 2002, Witcomb 2003). The literature is concerned with museums that have been considerably influenced by these new technologies, because they were able to introduce them in their institutions. However, there is also another side to the phenomenon. There is a vast number of museums that have not been actively participating in these processes. In Finland, they are mainly small local heritage museums that are managed by volunteers. The objective of this thesis was to explore their current situation in the context of new technologies and to identify their potential role in the development of the Finnish virtual museum. This research provides a critical overview of the virtual museums and digital heritage in Finland, with special focus on these small local heritage museums to bring attention to their potential in this area. This thesis aims at fostering change in the digital heritage area in Finland by opening up discussion on this subject and proposing conceptual prototypes. With its all limitations, it is the first doctoral thesis in museology in Finland that focuses on this subject.

Furthermore, the research provides not only a critical overview of the current situation in the domain of virtual museums in the Finnish museum sector, but it also places it within the wider context of research on virtual museums in Europe. In addition, the theoretical part of the dissertation provides a historical insight and a general overview of general trends in the development of virtual museums.

Moreover, from the methodological point of view this research contributes to the domain of research on virtual museums. Here, I used the methodology and concepts proposed within the European V-MUST Network of Excellence. I investigated the digital creation of the Finnish heritage institutions from the Satakunta region. Even though I was not able to fully compare the results, because I could not access data from the V-MUST survey, I was able to demonstrate some differences between virtual museums in Europe and Finland respectively. Moreover, I showed some of

the limitations of this methodology. The main limitation is that the framework proposed in the V-MUST project are defined from the point of view of the developers and researchers, and that some categories are too general to be used by an external investigator.

From a museological point of view, this project shows how concepts and methods from other disciplines and fields of studies can be brought into a project that examines the issues that are central to heritology (Vilkuna 2007: 51). The research investigates the role of new technologies in taking possession of objects that serve as an evidence of the present and past, and thus, is related to the perception and control of their temporal and spatial environments. It shows how the traditional activities of museums are transformed in the new environment.

From a practical point of view, this research demonstrates how certain methods and concepts can be used to design and create the virtual museum for small museums. Even though the practical contribution of this research is very limited because its outcome is in the form of a prototype, it demonstrates what aspects should be taken into account and how they are connected to the practices of small museums as well as the wider museum context. The research is interdisciplinary and it is obvious that the concepts and methods from other disciplines are not used so critically that it could contribute to these disciplines, but they open up the domains of museology and virtual museums for researchers representing those disciplines.

9.5 Limitations and further research

In this final section of the last chapter I would like to present the main limitation of this research and identify areas that require further research. One of the main limitations is related to the studied material. Erkki Huhtamo, who discussed the origins of the virtual museum (Huhtamo 2002) is also a media archaeologist. The problem we face while dealing with digital projects is their temporariness. Many of the online projects launched in the early 1990s have not been archived or preserved. In addition, technologies are changing so rapidly that in many cases these early examples, even if stored somewhere, cannot be fully experienced because of obsolete technology. Consequently, there are twofold implications. Firstly, the research does not give a historical overview of the development of digital creations in museums. Secondly, there may be several digital creations that influenced newer initiatives that were not covered by this research because I could not find or access them to investigate them further.

Moreover, digital projects are very often poorly documented. Even the initiators do not always document and monitor their projects. To some extent the situation of the professionally managed Finnish museums is monitored by the National Board of Antiquities through annual statistics, but the questions are limited to only a few aspects of the museum's digital presence. Fortunately, this problem has been recognised and new questions on the numbers of online visits and the online acces-

sibility of collections have been added to the Board's questionnaire[210]. It is important to notice that this problem has been recognised internationally, and there are several new initiatives focusing on museum and audience data, such as the large Enumerate project, funded by the European Commission "to create a reliable baseline of statistical data about digitization, digital preservation and online access to cultural heritage in Europe"[211], and an online platform Museum Analytics[212], initiated by the INTK[213] in the Netherlands. However, much less information is collected on non-professionally managed museums. Furthermore, beside statistics and wider surveys, very little is known about digital projects in general. As shown by the most important Finnish projects, there are several activities behind them, but mainly the initiatives that include research institutions have been accompanied by publications. Recently, there have been several initiatives focusing on digital long-term preservation. This will certainly help future researchers access current materials, but it will not replace information that can be provided by the authors of the projects, such as information on their objectives.

Consequently, there is the need for a long-term national survey on digital technologies in relation to museums and their audiences and collaboration frameworks between research and museum institutions. For example, a National Museum Web User Survey was recently conducted in Denmark, commissioned by the Heritage Agency of Denmark (Moos & Brændholt 2010). In relation to this survey, further research on the online museum practices of Danish public museums and their users by Nanna Holdgaard was established as a co-financed project with the Danish Agency for Culture, the former Heritage Agency of Denmark (Holdgaard 2014). I argue that collaborations of this kind would be needed in the Finnish context as well, as there is still a gap between the heritage and research institutions. Designing and carrying out a long-term national survey could be done in collaboration by these types of institutions. As I presented in the first chapter of this dissertation, there are already connections between research, heritage and museum institutions, but these initiatives are dispersed and fragmented.

An additional limitation of this research was related to access to already existing data. While the National Board of Antiquities provided data from its survey on small museums, I was not able to receive data from the V-MUST project, and so I could not fully compare my results with theirs. The problem with accessing and using research data has been recently identified at the international level. For example, the overarching goal of the current European initiative Digital Research Infrastructure for the Arts and Humanities (DARIAH) is "to facilitate long-term access to, and use of, all European Arts and Humanities (A+H) digital research data"[214] .

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210 Museotilasto 2013 - Tilaston rakenne, Museovirasto https://www.museotilasto.fi/tiedostot/museovirasto/files/Museotilastokysely%202013.pdf [20-04-2015]

211 ENUMERATE, http://www.enumerate.eu/en/about_enumerate/ [20-04-2015]

212 What is Museum Analytics, Museum Analytics, http://www.museum-analytics.org/about [20-04-2015]

213 INTK, http://www.intk.com/en [20-04-2015]

214 DARIAH-EU Digital Research Infrastructure for the Arts and Humanities, https://www.dariah.eu/about.html [20-04-2015]

A further limitation of this research is connected to the interdisciplinarity of its approach, even though it is considered as intrinsic to the concept of museological research (Mensch 1992). Using methods and concepts from different disciplines can lead to problems of validity and reliability of research. However, to avoid this problem I focused on a small group of museums from one region and used the results in connection with the results of a survey on small museums carried out by the Local Museums' Committee (Rakkaudesta kulttuuriperintöön 2012). Furthermore, I did not want to anonymise their responses to show that my data is different in its nature and plays a different role in the whole research. I wanted to give the representatives of the museums their voice to present the phenomenon of local heritage museums, not only to collect research data. Pescarin et al. state that combining different methods of collecting both qualitative and quantitate data is suitable in the area of virtual museums, even though it has its limitations (Pescarin et al. 2012: 83).

Furthermore, developing a prototype of the virtual museums should be considered as a limitation. Prototypes do not offer full functionality, and thus the degree to which they can be tested and evaluated is limited. The final evaluation of the system, as a technological solution, can be done only if it works. In this case, it was not possible. Moreover, on the basis of this method I cannot say what would be the dynamic of the process of developing and using the new digital tool in the small museums.

Another important limitation is that this research did not include studies on museum visitors. This, however, was not within the scope of the research, and the results from this project can serve as a foundation for other, audience-oriented studies.

This research did not focus on ecological aspects of digitisation either. A set of design principles for ecological media infrastructures for museums was proposed (Bhowmik 2016), and a further research on the ecological impact of digital heritage on cultural memory is being carried out[215]. This issue is extremely relevant in relation to small local heritage museums in Finland. Even the most sustainable digital solutions have its material and energetic footprint. Most of the small Finnish museums do not digitise their collections, and some of them do not have an access to electricity. I argue this issue should be taken into account before they start digitising their collections and thus increase their ecological footprint. Maybe these museums should stay "technology free" institutions, with a very small ecological footprint?

Finally, I argue that there is need for further research on digital heritage conducted in the Finnish language. As I have shown, the studies that have Finnish museums in their scope are generally in English. In order to be able to develop and research virtual museums in the Finnish context, we must be able to speak about them and have appropriate terminology. In this sense, the limitation of this research is that it is in English and does not contribute to this area.

In this research, I focused on small local heritage museums, but the study did not cover the aspects of "home region" or "home" (Riukulehto & Rinne-Koski 2014, Riukulehto & Rinne-Koski 2015, Riukulehto 2015) in relation their activities and role

215 Samir Bhowmik, http://samirbhowmik.cc/ and http://samirbhowmik.cc/2017/03/02/awarded-finnish-cultural-foundation-grant-2017/ [12-03-2017]

of creating digital heritage. However, it could certainly be studied, as the key elements that constitute the home region were present in discussions with the representatives of the museums. Virtual museums have been created with and for diaspora and also descendant communities (e.g. Eklund, Lawson & Wray 2010, Goodnow & Akman 2008, Hennessy at al. 2012), and therefore this aspect could be also investigated.

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LINKS TO DIGITAL PROJECTS (Chapters 6 and 7).

Service	Institution	Link
Agence photographique de la Réunion des Musées Nationaux / Photo Agency	Réunion des musées nationaux et du Grand Palais des Champs–Elysées	http://www.photo.rmn.fr/c/htm/home.aspx?FR=T
Alfred Flechtheim. Art dealer of the Avantgarde	Bayerische Staatsgemäldesammlungen / The Bavarian State Picture Collections	http://alfredflechtheim.com
Digital National Museum in Warsaw	Muzeum Narodowe w Warszawie / National Museum in Warsaw	http://cyfrowe.mnw.art.pl/
Digitalt Museum	KulturIT	http://www.digitaltmuseum.no
eSbírky	Národní muzeum / The National Museum	http://www.esbirky.cz
Europeana	Europeana	http://www.europeana.eu/portal/
Finna, Museum Finna	Kansallinen digitaalinen kirjasto / National	https://museot.finna.fi

	Digital Library	
Google Art Project	Google	http://www.google.com/culturalinstitute/project/art–project
Het Geheugen van Nederland / The Memory of the Netherlands	Koninklijke Bibliotheek / The National Library of the Netherlands	http://www.geheugenvannederland.nl/?/en/homepage
Joconde – Portail des collections des musées de France / The national collection database Joconde	Ministère de la Culture / Ministry of Culture	http://www.culture.gouv.fr/documentation/joconde/fr/
Kunstindex Danmark / Art Index Denmark	Stolts- og Kulturstyrelsen / Danish Agency for Culture and Palaces	https://www.kulturarv.dk/kid/Forside.do
LIMIS Lietuvos integrali muziejų informacinė sistema / Lithuanian Integral Museum Information System	The Lithuanian Art Museum	http://www.limis.lt
Nationalmuseum: Samlingara Online / The National Museum: Collections online	The National Museum	http://www.nationalmuseum.se/collectionsonline
NYPL Digital Collections Beta	The New York Public Library	http://digitalcollections.nypl.org
NZMuseums	National Services Te Paerangi	http://www.nzmuseums.co.nz/
Rijksmuseum Rijksstudio	Rijksmuseum Amsterdam	https://www.rijksmuseum.nl/en/explore–the–collection
SI Collections Search Center	Smithsonian Institution	http://collections.si.edu/search/
Staatliche Kunstsammlungen Dresden – Online Collection	Staatsbetrieb Staatlichen Kunstsammlungen Dresden /State Enterprise – State Art Collections in Dresden	http://skd–online–collection.skd.museum
Tate Collection Online	Tate	http://www.tate.org.uk/art/
The National Gallery Collection Online	The National Gallery	http://www.nationalgallery.org.uk/artists/

V&A Collections	The Victoria and Albert Museum	http://collections.vam.ac.uk
Virtual Collection of Masterpieces (VCM)	Asia–Europe Museum Network	http://masterpieces.asemus.museum/

TABLE 4 Links to services analysed in chapter 6.

Service	Institution	Link
Agence photographique de la Réunion des Musées Nationaux / Photo Agency	Réunion des musées nationaux et du Grand Palais des Champs–Elysées	http://www.photo.rmn.fr/c/htm/CSearchZ.aspx?o=&Total=500&FP=1559761&E=2K1KTSJZR4D@9&SID=2K1KTSJZR4D@9&New=T&Pic=9&SubE=2C6NU04U6OGX
Alfred Flechtheim. Art dealer of the Avantgarde	Bayerische Staatsgemäldesammlungen / The Bavarian State Picture Collections	http://alfredflechtheim.com/en/works/maennliche–akte–1/
Digital National Museum in Warsaw	Muzeum Narodowe w Warszawie / National Museum in Warsaw	http://cyfrowe.mnw.art.pl/dmuseion/docmetadata?id=17993
Digitalt Museum	KulturIT	http://www.digitaltmuseum.no/things/sag/SM/SM.009722
eSbírky	Národní muzeum / The National Museum	http://www.esbirky.cz/detail/172656/?series=d26d8c92d81398a9c6a419
Europeana	Europeana	http://www.europeana.eu/portal/record/2026115/Partage_Plus_ProvidedCHO_Wojciech_Weiss_Museum_Foundation_0336.html?start=1&query=renia+portrait+of+wife&startPage=1&rows=24
Finna, Museum Finna	Kansallinen digitaalinen kirjasto / National Digital Library	https://www.finna.fi/Record/metsastysmuseo.M011–109144
Google Art Project	Google	http://www.google.com/culturalinstitute/asset–viewer/portrait–of–john–iii–sobieski–with–the–battle–at–the–background/8QHGCLyO5k5wzg?projectId=art–project
Het Geheugen van Nederland / The Memory of the Netherlands	Koninklijke Bibliotheek / The National Library of the Netherlands	http://www.geheugenvannederland.nl/?/en/items/RA01:30051001496196/&st=cepelia&sc=%28cepelia%29&singleitem=true
Joconde – Portail des collections des musées de France / The national collection database Joconde	Ministère de la Culture / Ministry of Culture	http://www.culture.gouv.fr/public/mistral/joconde_fr?ACTION=CHERCHER&FIELD_98=REF&VALUE_98=07350001028

Kunstindex Danmark / Art Index Denmark	Stolts- og Kulturstyrelsen / Danish Agency for Culture and Palaces	https://www.kulturarv.dk/kid/VisVaerk.do?vaerkId=538250
LIMIS Lietuvos integrali muziejų informacinė sistema / Lithuanian Integral Museum Information System	The Lithuanian Art Museum	http://www.limis.lt/greita-paieska/perziura/-/exhibit/preview/1493167?s_id=og1ufwPvfXS1D9Ir&s_ind=2&valuable_type=EKSPONATAS
Nationalmuseum: Samlingara Online / The National Museum: Collections online	The National Museum	http://emp-web-22.zetcom.ch/eMuseumPlus?service=ExternalInterface&module=collection&objectId=9922&viewType=detailView
NYPL Digital Collections Beta	The New York Public Library	http://digitalcollections.nypl.org/items/510d47db-a947-a3d9-e040-e00a18064a99
NZMuseums	National Services Te Paerangi	http://www.nzmuseums.co.nz/account/3021/object/49693/Eggcup
Rijksmuseum Rijksstudio	Rijksmuseum Amsterdam	https://www.rijksmuseum.nl/en/search/objecten?q=Giulio+Bonasone&p=1&ps=12&ii=3#/RP-P-OB-35.343,3
SI Collections Search Center	Smithsonian Institution	http://collections.si.edu/search/results.htm?q=poland&gfq=CSILP_1
Staatliche Kunstsammlungen Dresden – Online Collection	Staatsbetrieb Staatlichen Kunstsammlungen Dresden /State Enterprise – State Art Collections in Dresden	http://skd-online-collection.skd.museum/en/contents/show?id=244631
Tate Collection Online	Tate	http://www.tate.org.uk/art/artists/marcel-duchamp-1036
The National Gallery Collection Online	The National Gallery	http://www.nationalgallery.org.uk/paintings/paul-cezanne-bathers-les-grandes-baigneuses
V&A Collections	The Victoria and Albert Museum	http://collections.vam.ac.uk/item/O139808/pyramid-sunglasses-oliver-goldsmith-eyewear/
Virtual Collection of Masterpieces (VCM)	Asia-Europe Museum Network	http://masterpieces.asemus.museum/masterpiece/detail.nhn?objectId=10241

TABLE 5 Links to objects analysed in chapter 6 [Accessed 28-05-2014].

Museum	**Destination**	**Link**
Antinkartanon museo (Antinkartanon keskuslaitos ja kehitysvamma-	Antinkartanon museo	http://www.ulvila.fi/ulvila.asp?url=matkailu/MatkailuHistoriallisetKohteet.x

työn erikoismuseo)		ml
Eurajoen Kotiseutumuseo	Eurajoen Kotiseutumuseo	http://museo.eurajoki.fi/aukiolo.html
Friitalan Nahkamuseo	Friitalan Nahkamuseo	www.nahkamuseo.fi/home.asp
Harjavallan museotoimi	Emil Cedercreutzin museo	www.harjavalta.fi/palvelut/museo www.facebook.com/emilcedercreutzinmuseo
Harjavallan museotoimi	Huittisten museo	www.huittinen.fi/museo
Harjavallan sairaalan museo	Harjavallan sairaalan museo	http://aikamatkasatakunnassa.fi/kohteet/harjavallan-sairaalan-museo/
Hinnerjoen kotiseutumuseot	Hinnerjoen kotiseutumuseot	www.eura.fi/fi/palvelut/kulttuuri/muut-euran-museot.html
Honkajoen museo	Honkajoen museo	http://www.honkajoki.fi/matkailu/nahtavyydet
Jalomäen umpipiha	Jalomäen umpipiha	http://www.ulvila.fi/ulvila.asp?url=matkailu/MatkailuHistoriallisetKohteet.xml
Jämijärven kotiseutumuseo	Jämijärven kotiseutumuseo	http://www.jamijarvi.fi/matkailu/nahtavyydet/museot
Jämin ilmailuperinnehuone	Jämin ilmailuperinnehuone	https://sites.google.com/site/jamijarviseura/home/jaminilmailuperinnehuone
Kankaanpään kaupunginmuseo	Kankaanpään kaupunginmuseo	www.kankaanpaa.fi/museo
Karvian museo	Karvian museo	http://www.karvia.fi/index.php?sivu=1/21/30/99
Kauttuan Tehtaan museo	Kauttuan Tehtaan museo	www.eura.fi/fi/palvelut/kulttuuri/museot-.html
Kiikoisten kotiseutumuseo (Myllymäen torpparimuseo)	Kiikoisten kotiseutumuseo	http://www.kiikoinen.fi/kiikoinen/sivu.tmpl?sivu_id=1155
Kirkkomuseo (Kodisjoen kirkkomuseo)	Kirkkomuseo	http://www.kodisjoki.fi/kirkko2.htm
Kiukaisten museo Wanha Pappila	Kiukaisten museo Wanha Pappila	http://www.eura.fi/fi/palvelut/kulttuuri/muut-euran-museot.html
Kivirannan kotimuseo	Kivirannan kotimuseo	http://www.sataviestinta.fi/kivirannan_kotimuseo/
Kodisjoen kotiseutumuseo	Kodisjoen kotiseutumuseo	www.kodisjoki.fi/matkailu.htm#kotis
Kokemäen maatalousmuseo ja ulkomuseo	Kokemäen maatalousmuseo	http://www.kokemaki.fi/palvelut/vapaa-aika/kulttuuri/museot/
Korvenkylän Alinen Mylly	Korvenkylän Alinen Mylly	http://www.sakyla.fi/museot.htm
Kotimuseo Kukkilintu	Kotimuseo Kukkilintu	http://www.maisa.fi/matkailijat/nae-ja-koe/kukkilintu-museo-esineistoa-karjalasta
Kotiseutumuseo Muina	Kotiseutumuseo Muina	www.muina.fi

Kotiseututalo Kahari	Kotiseututalo Kahari	http://www.noormarkunkotiseutuyhdistys.fi/kotiseututalo.html
Kullaan kotiseutumuseo	Kullaan kotiseutumuseo	personal.inet.fi/yhdistys/kkmy/
Lapin kotiseutumuseo		nd
Lavian kotiseutumuseo	Lavian kotiseutumuseo	kirjasto.lavia.fi/lavia_kirjasto/sivu.tmpl?sivu_id=1146
Lönnströmin koti- ja taidemuseo	Lönnströmin taidemuseo	http://www.lonnstromintaidemuseo.fi
Lönnströmin koti- ja taidemuseo	Teresia ja Rafael Lönnströmin kotimuseo	www.lonnstromintaidemuseo.fi
Luvian kotiseutumuseo	Luvian kotiseutumuseo	http://www.luvia.fi/palvelut/vapaa-aika-ja-kulttuuri/kulttuuri/museo/
Mannilan museo	Mannilan museo	http://mannila.net/Mannilan-museot.php
Matilda Roslin-Kalliolan kirjailijakoti	Matilda Roslin-Kalliolan kirjailijakoti	http://www.merikarvia.fi/?p=/matkailu_ja_vapaa-aika/nahtavyydet/matilda_roslin-kalliolan_kirjailijakoti
Merikarvian kalastusmuseo	Merikarvian kalastusmuseo	http://www.merikarvia.fi/?p=/matkailu_ja_vapaa-aika/nahtavyydet/kalastusmuseoalue
Merikarvian kotiseutumuseo	Merikarvian kotiseutumuseo	http://www.merikarvia.fi/?p=/matkailu_ja_vapaa-aika/nahtavyydet/kotiseutumuseo
Nakkilan kotiseutumuseo	Nakkilan kotiseutumuseo	http://www.nakkila.fi/?lang=fi&url=muut/nahtavyydet.xml
Panelian Rivimylly ja Museo	Panelian Rivimylly ja Museo	http://www.eura.fi/fi/palvelut/kulttuuri/muut-euran-museot.html
Porilaismuseo	Porilaismuseo	http://www.porinrykmentin-porinpri-kaatinkilta.fi/default2.asp?active_page_id=335
Porin taidemuseo	Porin taidemuseo	http://www.poriartmuseum.fi
Porin taidemuseo	Poriginal galleria	http://www.poriartmuseum.fi/fin/poriginal-galleria/galleria.php
Pyttymakasiini	Pyttymakasiini	http://www.merikarvia.fi/?p=/matkailu_ja_vapaa-aika/nahtavyydet/pyttymakasiini
Rauman merimuseo	Rauman merimuseo	http://www.rmm.fi
Rauman museo	Rauman museo	www.rauma.fi/museo
Rauman museo	Kirsti	www.rauma.fi/museo
Rauman museo	Marela	www.rauma.fi/museo
Rauman museo	Savenvalajan verstas	www.rauma.fi/museo
Rauman museo	Vanha Raatihuone	www.rauma.fi/museo
Rauman museo	Kodisjoen kotiseutumuseot	http://www.kodisjoki.fi/matkailu.htm#kotis
Rauman Taidemuseo	Rauman Taidemuseo	www.raumantaidemuseo.fi

Säkylän kotiseutumuseo	Säkylän kotiseutumuseo	http://www.sakyla.fi/museot.htm
Säkylän talvi- ja jatkosotamuseo	Säkylän talvi- ja jatkosotamuseo	www.sakylantalvijajatkosotamuseo.fi
Satakunnan Museo	Satakunnan museo	www.pori.fi/smu
Satakunnan Museo	Korsmannin talo ja Rakennuskuttuuritalo Toivo	http://www.pori.fi/kulttuuri/satakunnanmuseo/rakennuskulttuuritalotoivojakorsmanintalo.html
Satakunnan Museo	Luontotalo Arkki	http://www.pori.fi/kulttuuri/satakunnanmuseo/luontotaloarkki.html
Satakunnan Museo	Rosenlew museo	www.pori.fi/kulttuuri/satakunnanmuseo/rosenlew-museo.html
Satakunnan palomuseo Waluvaara	Satakunnan palomuseo Waluvaara	http://www.satapelastus.fi/waluvaara.html
Sepän torppa	Sepän torppa	www.kodisjoki.fi/matkailu.htm#sepant
Siikaisten kotiseutumuseo	Siikaisten kotiseutumuseo	http://matkailu.siikainen.fi/fi/matkailukohteet/museot.html
Tuiskulan torpparimuseo / Köyliön torpparimuseo	Tuiskulan torpparimuseo / Köyliön torpparimuseo	http://www.koylio.fi/kulttuuri-ja-vapaa-aika/museot
Vampulan kotiseutumuseo	Vampulan kotiseutumuseo	http://huittinenfi.eteinen.fi/matkailu/?pageKey=Kotiseutumuseo
Yttilän museokoulu	Yttilän museokoulu	http://www.koylio.fi/kulttuuri-ja-vapaa-aika/museot
Satakunnan Museo	Hotelli Otava	http://www.pori.fi/kulttuuri/satakunnanmuseo/verkkonayttelyt/hotelliotava.html
Satakunnan Museo	Kadunnimet - Kaupungin muisti	http://www.aikamatkasatakunnassa.fi/kadunnimet/
Satakunnan Museo	Naisia Porissa	http://www.pori.fi/kulttuuri/satakunnanmuseo/verkkonayttelyt/naisiaporissa.html
Satakunnan Museo	Paperitehtaalaisen muistoja	http://www.pori.fi/kulttuuri/satakunnanmuseo/verkkonayttelyt/paperitehtaalaisenmuistoja_3.html
Satakunnan Museo	Puukaupungin tarina	http://arcgis.pori.fi/Puukaupunki/index2.html?webmap=df060483943e40929080cd6f6aa5f6cf
Satakunnan Museo	Teollisuustyön jäljillä	http://www.pori.fi/kulttuuri/satakunnanmuseo/teollisuustyonjaljilla.html
Satakunnan Museo / Rosenlew museo	Varo vaaraa!	http://www.pori.fi/kulttuuri/satakunnanmuseo/verkkonayttelyt/varovaaraa_2.html

TABLE 6 Museums and sites from Satakunta analysed in chapter 7 [Accessed 01-04-2014].

INTERVIEWS

Interview Hinnerjoki 2011, Hinnerjoki Local Museums, Matti Perävainio, Lea Heikkilä, 01-11-2011, Hinnerjoen kotiseutumuseo, Valon tupa, Hinnerjoki.
Interview Lappi and Muina 2011, Museum in Lappi TI, Homestead Museum Muina, Ulla Antola, Leena Kekäle, 08.11.2011, Kahvila Pyörni, Lappi.
Interview Panelia 2011, Panelia Mills, Heiska Jaakko, Juhani Vihervuori, Mikko Tolvi, 03-11-2011, Panelian kotiseutumuseo ja rivimylly, Panelia.
Interview Säkylä 2011, Säkylä Museum, Mirja Vuorinen, Raimo Kostalo, 02-11-2011, Säkylän kirjasto, Säkylän kotiseutumuseo, Säkylä
Interview Vampula 2011, Vampula museum, Tapani Kotaja, 07.11.2011, Vampulan kotiseutumuseo, Vampula
Interview Satakunta 2011, Satakunta Museum, Pori, Akuliina Aartolahti, 08-11-2011, Satakunta Museum, Pori.

PHOTO SESSIONS

Jaakko Heiska, 02-01-2012, Panelia Mills, Panelia

Ulla Antola, 02-01-2012, Museum in Lappi TI, Lappi

Raimo Kotsalo, 03-01-2012, Säkylä Museum, Säkylä

Matti Perävainio, 03-01-2012, Hinnerjoki Local Museums, Hinnerjoki

Tapani Kotaja, 16-01-2012, Vampula Museum, Vampula

Leena Kekäle, 17-01-2012, Homestead Museum Muina, Vasarainen

Pertti Lehtimäki, 16-01-2012, Agricultural Museum, Eurajoki

Hannu Rinne, 17-01-2012, Cheesemaking Museum, Nakkila

Paula Härkälä, 18-01-2012, Köyliö Croft Museum, Tuiskula

Heidi Helkiö-Mäkelä, 20-01-2012, Luvia Museum, Luvia