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Openness and Fairness in the Digital Ecosystem: on the Participation Gap in Cultural Knowledge Production

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Στους γονείς μου

To my parents

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Abstract

Since the early 2000s, the open knowledge movement has created a fertile ground for democratising access to and production of knowledge. However, emerging digital media technologies have brought challenges that need to be addressed when evaluating the potential for openness for democratic knowledge production and participation. Despite increased attempts to involve the public in cultural knowledge production, the participation gap remains wide, as barriers have been identified to prevent people from (re)using cultural heritage collections. In addition, social media platforms do not seem to stand up to their promise of providing participatory culture in open and fair forms. These large-scale commercial platforms have acquired monopolistic tactics by having control over the digital ecosystem and ultimately, are monopolising cultural knowledge production. The first research question of this doctoral study looks at the conditions of the openness of cultural data. The second concerns the resources that are required for opening up knowledge in an equitable and participatory way in the digital economy. The methodology of the doctoral work is qualitative, combining expert interviews, observations and Grounded Theory approaches. The findings of this research propose moving away from obfuscate practices and/or digital "gatekeepers". Through my thesis, I propose a knowledge stewardship model, which can be used in two ways: a) within a participatory stewardship framework and b) within a collective approach to knowledge stewardship, fostering the public's meaningful participation in the production of cultural heritage knowledge through open and fair ways. In this way, cultural heritage institutions can renegotiate their relationship with communities in the digital era and tap into their potential for social value and their impact on civic welfare.

Keywords: open knowledge, digital heritage, cultural heritage institutions, digital ecosystem, digital economy

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Abbreviations

AI: Artificial Intelligence

API: Application Programming Interface

CC: Creative Commons

CHI: Cultural Heritage Institution

FAIR guiding principles: Findable, Accessible, Interoperable, Reusable guiding principles

GAFAM: Google, Amazon, Facebook, Microsoft

GDPR: General Data Protection Regulation

GLAM: Galleries, Libraries, Archives and Museums

GT: Grounded Theory

IPRs: Intellectual Property Rights

KS: Knowledge Steward

ML: Machine Learning

OKFI: Open Knowledge Finland

Chapter 1. Researching the Potential of Open Knowledge in Digital Cultural Heritage

Cultural heritage institutions (CHIs) have been traditionally considered agents of shaping cultural knowledge production, as well as collective memory (Hooper-Greenhill 1992). The advent of digital media and emerging technologies created a fertile ground where CHIs could attract and build new audiences, generating possibilities where people could actively participate in cultural knowledge production. CHIs have a strong social dimension as people participate in the heritage making and the co-production of cultural heritage through their practices for transferring it to future generations (Smith 2006; Byrne 2008). Cultural assets have been made increasingly available online to users since the early 2000s. However, a growing body of literature suggests that the promise of digital media to democratise knowledge production and strengthen the public's meaningful participation has partially failed (van Dijck and Nieborg 2009; Fuchs 2015; Kidd 2018). Hence, how to open up knowledge embracing a bottom-up approach aiding CHIs in establishing a bidirectional relationship with their audiences and incorporate practices of co-creating and co-producing knowledge (Simon 2010; Galani et al. 2019; Perry 2019) requires further research. Through my doctoral work, I explore issues of access and accessibility to cultural data, reflecting on the prevalence of large-scale commercial platforms for cultural knowledge production and participation, as well as critically analysing issues of ownership that emerge through that. Through my thesis, I propose a knowledge stewardship model, which can be used in two ways: a) within a participatory stewardship framework and b) within a collective approach to knowledge stewardship. This work aims to explore this partial failure of participation in cultural knowledge production and empower people to be active participants in the decision-making processes in the digital ecosystem.

The emergence of the open knowledge movement during the last few decades has been transforming and regenerating cultural heritage work. The idea for an open and democratic sharing of knowledge was introduced prior to the emergence of the Internet. One aspect that has aided strengthening of the openness of data in cultural heritage is the emergence of the open GLAM (Galleries, Libraries, Archives and Museums) movement, which is part of the wider Open Knowledge Foundation. The Open Knowledge Foundation is a global, non-profit network that promotes and shares knowledge at no charge, including both content and data. It was founded by Dr Rufus Pollock on 24 May 2004 in Cambridge, UK. According to Open Knowledge Foundation, "open knowledge is any content, information or data that people are free to use, re-use and redistribute without any legal, technological or social restriction" (Open Knowledge Foundation 2021b). The participation gap of the public in cultural knowledge production, that is, using and reusing cultural assets online, is still wide (Kidd 2018). Numerous barriers, such as being able to understand licences or interface design (Terras 2015b; Valeonti et al. 2020), have been identified complicating and intercepting users' use of the collections. At the same time, digital media do not seem to stand up to their promise for a participatory culture (van Dijck and Nieborg 2009;

Fuchs 2015; Kidd 2018). Although the Internet was first established in the vision of a truly democratic medium (Berners-Lee and Fischetti 1999), the growing commercialisation of the Web by large tech companies has intensified inequalities and amplified the gap for meaningful participation (Fuchs 2015, 2021; Zuboff 2015, 2019; Srnicek 2017; Lund and Zukerfeld 2020), where CHIs have increasingly become co-dependent on their infrastructure and logic for audience engagement and participation. In part, this dependency is motivated by a perception of these infrastructures as open (Lund and Zukerfeld 2020). However, considering their obfuscate business models, the question of how open these platforms are requires further exploration. The domination of large-scale commercial platforms has established a digital normalcy that fetishises nearly any kind of digital interaction for profiting purposes in the name of open, implying that the commercial services are to be used without charge. The ideology of profiting from openness (Fuchs 2020b; Lund and Zukerfeld 2020), describes providing free access in platform services to users while data monetisation and related advertising practices are the actual revenue. This phenomenon is inextricably linked with the ramifications of cognitive capitalism (Moulier-Boutang 2012), a form of capitalism based on the accumulation of immaterial capital. The value is created by its users, contributors and producers, where some are paid, but others are not (Lund and Zukerfeld 2020). The profit from the openness business model is a very characteristic feature of cognitive capitalism, exploiting free labour and the user attention. The ramifications of cognitive capitalism have led to the emergence of certain practices such as surveillance capitalism, platform capitalism and attention mechanisms, which have been quantifying as well as analysing user behaviour and ultimately leading to the commercialisation of the users and their data (van Dijck 2020a; van Dijck et al. 2018b; Poell et al. 2019; Zuboff 2019).

CHIs have intensively integrated social media networks into their digital strategies, supporting in a way the commercialisation of users. CHIs are dependent on large-scale commercial platforms, like GAFAM (Google, Apple, Facebook, Amazon and Microsoft), for user engagement as well as to attract new audiences (Proctor 2010; Kidd 2011; Giaccardi 2012) and are dependent on the products of platforms. The new forms of the commodification of knowledge have raised crucial questions concerning the openness of knowledge, the participation of the public towards social inclusion and equity, as well as power imbalances. The latter aspect refers to the imbalances between the few large-scale commercial platforms that are running the Internet and the rest who are essentially powerless while following them. These platforms dominate the digital economy, as they control the current market while acting as monopolies. Due to the rapid technological advances, society has not been well equipped to immediately deal with digital and data governance mechanisms needed for the digital realm.

1.1 Research context

The research methodology of this thesis comprises multiple different methods to approach and explore the interdisciplinary of the research project; cultural heritage, open knowledge and digital economy. I have conducted semi-structured interviews with twenty-three experts and used Grounded Theory (GT).

Also, I have organised a colloquium on the topic of open knowledge in the cultural heritage sector, attended relevant conferences to explore and navigate the different domains better and organised a formative evaluation of the research results. My doctoral research work is conducted in the context of the EU Horizon 2020 Marie Skłodowska-Curie programme-funded project titled Participatory Memory Practices[1] (POEM). The POEM project explores mediatised memory ecologies and studies concepts and frameworks for envisioning possible positive futures through culture, focusing on participatory memory work. The doctoral network consists of twelve other doctoral studies that were carried out in the framework of the project and the work is distributed in three work packages (WP), each of them working with different lenses on participatory memory work; WP1 looks into Memory Institutions, WP2 concerns People and Groups and WP3 involves Memory Modalities. In this constellation, my PhD work is part of WP3, Memory Modalities. The focus of WP3 is the investigation of the qualities hindering, enabling and/or encouraging participation in the digital ecosystem. Indisputably, the knowledge production carried out within WP3 had a significant impact on my thinking and research process during the doctoral work. WP3 comprises the WP leader, Prof. Dr Isto Huvila based at Uppsala University and the doctoral fellows Quoc-Tan Tran, Jennifer Krueckeberg, both based at the University of Hamburg, as well as Dydimus Zengenene also based at Uppsala University and me. In addition, my research on the topic of Memory Modalities thinking benefited from discussions with Prof. Dr Gertraud Koch.

1.2 Research problem and research questions

The research problem that mobilised this work is twofold. Firstly, it was motivated by the fact that CHIs have been heavily reliant on large-scale commercial platforms for their digital communication and engagement. Commercial platforms operate through non-transparent practices, that is, their obfuscate business model and the algorithms used and their values are not aligned with those of CHIs. Research on this challenging problem was pertinent in crystallising the current situation in cultural knowledge production and exploring fairer and equitable ways of memory making. Secondly, although in the last two decades cultural assets have been made available online, a growing body of literature shows that there is a lot of open data that are not used, whereas it has been evident that users struggle to overcome issues in (re)using digitised cultural collections, in particular licencing and data quality issues (Terras 2015b; Valeonti et al. 2020; Wallace 2022). Therefore, the participation gap of the public in cultural heritage production is wide. The approach of adopting open and participatory practices could aid in establishing the bidirectional relationship with CHI audiences and incorporate practices of co-creating and co-producing knowledge (Simon 2010; Galani et al. 2019; Perry 2019). There is a direct link between open knowledge and participation, which can be seen as follows: open knowledge allows, as well as invigorates, the dissemination of knowledge and encourages the public's participation in the (re)use of knowledge. This means that one can build in existing knowledge by reusing or remixing

[1] For more information on the POEM project, see the project's website (https://www.poem-horizon.eu/).

knowledge and thus opportunities for co-creation and co-production are offered. Open knowledge encompasses the potential for participation. I have developed two research questions to investigate the above-mentioned research problem. The first question explores conditions that enable or hinder people's participation in cultural knowledge production. By investigating this, I can deduct the conditions for opening up cultural data that could aid in establishing foundations towards closing the participation gap I discussed earlier. The second research question examines opening up knowledge in the current digital economy, which is dominated by large-scale commercial platforms. Thus, it explores resources, elements or strategies that are required for opening up knowledge in a fair and participatory way in the current digital economy. Resource in this research is considered anything that has utility and adds value to the digital ecosystem. In such a way, I aim to investigate emerging practices towards fairness, as opposed to the way large-scale commercial platforms exploit knowledge production. The two research questions are:

- What are the conditions of openness of cultural data?
- What are the resources required for opening up knowledge in a fair and participatory way in the digital economy?

In order to address the above-mentioned issues, this research proposes distributed and decentralised approaches for cultural knowledge production. This work explores the new emerging sociotechnical modes, the modalities needed to fill the inequalities and participation gap in the ever-changing memory landscape in the digital era.

1.3 Significance of the research

As my doctoral work focuses on the participation gap in cultural knowledge production towards fairer practices, it investigates policies, motivations, sociotechnical arrangements, as well as the role of the digital economy; issues that have often been overlooked in the digital heritage domain in the past. In 2018, when I started my doctoral work, most of the academic literature emphasised the digitisation and the opening up of CHI collections in a more engaging and participatory way. A lot of discussions had taken place on how digital technologies could aid CHIs in attracting and building new audiences (Kotler and Kotler 2000; Proctor 2010; Kidd 2011; Giaccardi 2012). At the same time, the emergence of the FAIR (Findable, Accessible, Interoperable and Reusable) guiding principles development (Wilkinson et al. 2016), was at a nascent state regarding the accessibility and reusability of cultural data. At that point, the discussion focused more on audience engagement and participation through digital media, than studying the issue in a more comprehensive way as embedded in the wider contexts of everyday practices, cultural policies and personal motivations, as well as the driving role of the digital economy. This doctoral research work explores the modalities for bridging the participation gap in cultural knowledge production in the context of the domination of large-scale commercial platforms, towards openness and fairness. The findings of my research show that CHIs are still reserved in some cases when

it comes to opening up their collections online, considering the risks associated by losing control over data. This hesitancy is linked to the hierarchical structure of CHIs. My research work shows that digitisation strategies and the open knowledge movement have played a key role in nudging museums to shift their perspective from "absolute authority", to embrace decentralised practices towards the control over cultural data. From the analysis of the research results I derived that the open GLAM Working Group of Open Knowledge Finland (OKFI) facilitated change empowering CHIs in Helsinki to open up and make their collections accessible and usable for the wider public. Moreover, through my research it has been evident that the term "open access" has been regarded as limited in the analysis of the data, while opening up knowledge, is not merely to provide access, but that (open) access is precisely one part of the process. It was evidenced that the crucial part for participation is that the digital assets can be accessible and usable for and by the public. On the other hand, my research findings make evident that large-scale commercial platforms' practices impede the meaningful participation of people in being active in the process of knowledge production due to opacity, for example, intelligible algorithms, or by implementing anti-competitive strategies that impede other initiatives' ability to flourish. Moreover, other kinds of (data) logic, which dictate distributed and decentralised modes of managing and sharing knowledge, derived from the analysis of data, are capable of actually enhancing the possibility and potential of equity and co-creation. Digital and data sovereignty are at the heart of a fair open digital ecosystem. Through the analysis of the data, I derived that it might be useful to explore other forms beyond ownership, amplifying the uses or rights of data. I observed from the findings that an intermediary could help limit the existing monopolies through decentralised and distributed forms of managing knowledge while potentially facilitate augmenting the uses of data. Through my thesis, I propose a knowledge stewardship model, which can be used in two ways: a) within a participatory stewardship framework and b) within a collective approach to knowledge stewardship. Both frameworks encourage participation in open cultural knowledge production, by empowering users to make (good) (re)use of the data, as well as aid in treating data beyond the current data commodification model that has prevailed in the current digital economy. The first prototype suggests knowledge stewards (KS) as potential mediators and facilitators between the CHI and the user. The second prototype proposes a stewardship framework for collective organisation, in the form of a co-operative and puts forward an emerging distributed socioeconomic model to tackle the obfuscate practices of large-scale commercial platforms. In such a way, CHIs can renegotiate their relationship with the communities in the digital era, to tap into their potential for social value and their impact on civic welfare.

1.4 Overview of the thesis structure

In Chapter 2, I review literature on the topic of open cultural heritage in the digital economy and set the scene for the ensuing doctoral work. Chapter 2 discusses knowledge production in the digital and pre-digital condition. I contextualise knowledge production in the digital era, taking into consideration the

impact of large-scale commercial platforms, while reflecting on the impact of the so-called cognitive capitalism (Moulier-Boutang 2012) in knowledge production.

I then present the research design of the doctoral work in Chapter 3. I have implemented qualitative methods combining expert interviews, observations and GT approaches. The research was designed in such a way to reflect the fluidity of the evolving digital ecosystem and has acquired multifaceted methods and perspectives to achieve this. A pivotal point is the implementation of GT, which is a systematic way of analysing data, while at the same time allowing the researcher to be flexible enough and use multimodal ways to explore an emerging field.

I present the findings and analyse them in relation to the research questions in the following four chapters. In Chapter 4, titled "Opening up Cultural Heritage Institutions", I discuss the vital role of open GLAM members, acting as activists in the GLAM scene, advocating for openness and related practices. In addition, I discuss the shift of CHI from protecting the digital collections to realising their benefits. From the research findings it was evident that this requires a shift in practices, leaving behind the simile of CHIs as monolithic structures living in an "Ivory Tower" and rather, embracing a participatory approach. Such an approach of adopting new practices could aid in establishing the bidirectional relationship with CHI audiences and incorporate practices of co-creating and co-producing knowledge (Simon 2010; Galani et al. 2019; Perry 2019).

In Chapter 5, I explore how to transition from open access to open knowledge. In my work, "open access" refers to the notions, policies and practices that CHIs implement for opening up their collections online and not to the "Open Access (OA)" publishing term. I also discuss how the open access terminology has partially failed to achieve the focus on the accessibility of the assets and therefore issues emerge around reusing assets and data in a new context (Terras 2015a). Also, access and accessibility of cultural data are not interchangeable terms. "Access" refers to a user's ability to access an asset; "accessibility" denotes the possibility for the user to actually make use of that asset. In this chapter, I explore how to make digital assets accessible, that is, make them reusable and useful. Moreover, I present the concept of the conditions of openness of cultural data, as derived from Chapters 4 and 5.

In Chapter 6, I investigate issues arising from the domination of large-scale commercial platforms in the digital economy in relation to cultural participation, through the lens on open knowledge. I explore how the business model of large-scale commercial platforms is essentially monopolising cultural knowledge production, while at the same time, I investigate the pitfalls of big techs in cultural participation. Moreover, I discuss the ideology of "profiting for free" that is prominent in large-scale commercial platforms, such as social media platforms. Another crucial element that is being brought forward is the (anti-)competitive practices that monopolies are constantly incorporating to enable them to grow even more. The research findings denote that such practices are not aligned with openness and knowledge sharing, which have always been perceived as the premise of the Internet. The often-called "winner takes all economy" (Pollock 2018; Fuchs 2020b, 2021) resembles digital colonial powers and needs to

be rethought (and possibly redesigned) in more inclusive ways, towards participatory approaches, where diversity could thrive.

The last analysis chapter is titled “Independence and Sovereignty: Leveraging Openness for a Fair Digital Ecosystem”. In Chapter 7, I analyse practices to address the growing inequalities in the digital economy. In my doctoral research work the notion of fair and fairness reflects social inclusion, diversity and the potential of evenly distributed tools and resources. I therefore discuss ways for regaining digital independence and sovereignty, by tapping into the potential of controlling the data and introducing such mechanisms that would be capable of promoting ways of fairer distribution of knowledge. Moreover, I propose that the *dogma* of opening up everything, which is entangled with Western ideologies of openness, portraying openness as a virtue (Koch 2018; Lund and Zukerfeld 2020), can be redefined to introduce different levels of openness, as openness is situational and contextual.

In Chapter 8, the discussion chapter, I synthesise the research findings and propose one knowledge stewardship model and two frameworks for knowledge production aiming at envisioning memory ecosystems driven by openness, meaningful participation and fairness. My work proposes two knowledge stewardship frameworks to facilitate in fostering participation in open cultural knowledge production, by empowering users to make (good) (re)use of the data, as well as aiding in treating data beyond the current data commodification model that has prevailed in the current digital economy. The first prototype suggests KS as potential mediators and facilitators between the CHI and the user. The second prototype proposes a stewardship framework for people to organise themselves in the form of a co-operative.

In the Conclusion, I discuss the limitations of my doctoral research, as well as future endeavours and further work that would realise the implementation of the proposed model(s). Future work holds both opportunities and challenges. The most crucial aspect of future work is how to put into practice the framework that my doctoral work proposes. I suggest that this attempt requires incremental steps towards innovation.

Chapter 2. Setting the Scene for Studying Open Cultural Heritage in the Digital Economy

Since the early 2000s, open knowledge has been gaining more and more ground and plays a crucial role in heritage work. Cultural heritage experts have been advocating for the benefits of opening up knowledge to the public for increasing engagement to digital heritage, as well as building new audiences. This chapter sets the scene and contextualises the doctoral work in relation to knowledge production and the advances that digital transformations have brought, as well as the relation of knowledge production to the non-digital era. I discuss the evolution of the Internet towards a dominant market place, where indisputably cultural knowledge production has been impacted by this development, due to the fact that CHIs have been using large commercial platforms for their digital communication strategy. Also, I look into the emergence of cognitive capitalism, a new type of capitalism, based on the accumulation of immaterial capital and the way the dissemination of knowledge takes place (Moulier-Boutang 2012). I also explore the wider connection of cognitive capitalism to cultural heritage knowledge production. Understanding cultural issues, one can study the domains that are intertwined with them, such as social, political and economic issues (Du Gay and Pryke 2002; Hesmondhalgh and Baker 2011; Piketty 2014), which form a complex net of interrelations and practices in the digital ecosystem. Approaching these cultural configurations as digital heterogenous assemblages (Ong and Collier 2005; Koch 2013; Birch and Cochrane 2022), could help unravel the complexities of the ecosystem, reflecting on the practices and activities carried out within the ecosystem, taking into consideration both human and non-human actors.

As knowledge plays a key role in my work, I will share an understanding of what knowledge is or rather, how it is understood in my work. Scholars have long argued that there is not yet a universal understanding of what knowledge is (Choong and Leung 2021). In this thesis, knowledge is understood according to Barth (2002) to be composed of three aspects, or faces. These aspects are: 1) the stocks of knowledge, namely the knowledge that existed before; 2) its (i.e. knowledge) communication through the media and 3) how it is being disseminated, providing a social dimension of it (Barth 2002). The three aspects complement each other and are interconnected in the production of knowledge (Barth 2002). Even though traditional approaches to the understanding of knowledge have focused on the idea that knowledge is located in a textbook, this approach neglects the *process* of knowing and focuses more on the classification aspect, without providing further analysis. However, for Barth, knowledge focuses on the "knowing" beyond an individual cognitive process. Therefore, knowledge is not very different from what anthropologists call culture, as a means of analysing phenomena of the society (Barth 2002). Although Barth provides an analytical tool for knowledge production, the domination of emerging digital technologies has transformed the landscape of knowledge production. As Koch (2013) observes, "Barth's perspective, however, is not sufficient as he does not consider the central significance of the media for societal change as we currently observe it" (p.179). Therefore, rather than considering the

three aspects of knowledge as provided by Barth as equal in the process of knowledge production, the permeation and pervasiveness of digital technologies in our everyday life place the digital aspect as a fundamental factor due to the continuous mediation of knowledge through the digital (van Dijck 2007; Koch 2013). In this context, knowledge is relational as well as situational (Haraway 1988) and is always entangled and co-dependent with its economic, social and technical configurations (Haraway and Goodeve 2018). Before reflecting on the process of knowledge production in the digital era, I will firstly briefly discuss the openness of knowledge as a concept that emerged before the digital era.

2.1 Introducing open knowledge

There is a general understanding of open knowledge as an after-effect or consequence of digitalisation (Pollock 2018), but this is not the case per se. The idea for an open and democratic sharing of knowledge was introduced prior to the emergence of the Internet. When tracing the concept of open knowledge throughout history, it is evident that it has not emerged merely through the digital transformation era, as I discuss later. Notwithstanding and undoubtedly, the digital advances of recent decades and more specifically the World Wide Web (www), aided the open knowledge movement to flourish by providing appropriate sociotechnical infrastructures and services. According to the founder of Open Knowledge Foundation, Dr Rufus Pollock (2018), "open knowledge" is a relatively new term, but an old concept, although the notions of open knowledge and openness are intertwined with the open knowledge movement and the digital transformation. Pollock has been a leading figure in advocating for open knowledge since 2004 and this might have an impact on his view of the concept and its historicity. In *The Open Revolution* (Pollock 2018), Pollock gives an example of openness in the pre-digital era referring to the discovery of a precious paper scroll; "a copy of the Diamond Sutra, one of the most significant texts of Buddhist faith" (p. 11), which was found in 1900.[2] Pollock (2018) argues that "the scroll is precious not because of its content but because of its form. Rather than having been written by hand, the text is printed, using the wood-block printing technique which the Chinese invented a thousand years before Gutenberg" (p. 11). Remarkably, the scroll even gives the date of the printing: inscribed on the scroll is the date of 10 May 868. What is pertinent to my doctoral work is the characteristic dedication of the scroll stating that it is "for universal free distribution", as discussed by Pollock (2018, 12). This dedication traces the idea of free sharing for everyone as far back as the date of this printed record. It is precisely the aspects of free sharing and distributing that Pollock (2018) discusses as a central element of open knowledge. Through this example Pollock shows how the idea of sharing and openness did not emerge through the digital age, although digital advances helped bring about a fertile ground for open knowledge to blossom. The notion of openness and open knowledge has been linked to the ideology of sharing and distributing in relation to culture through the centuries.

[2] On the edge of the Gobi Desert in north-west China.

Throughout the centuries intellectual property rights (IPRs) have been developed to regulate the sharing and distribution of knowledge assets. The invention of the printing press by Johannes Gutenberg in 1440 brought about a historic change. It made books widely accessible, while printing enabled knowledge to be preserved, allowing its accumulation, which consequently led to public knowledge (Eisenstein 1980). In 1710, the British Parliament passed the first known copyright act, or copyright law, which became known as the Statute of Anna. This law recognised author copyrights for a certain period of time. In this way, the concept of intellectual property was introduced (Deazley 2010). The 1886 Berne Convention first established that copyrights do not have to be asserted by the author to be in force and extended the copyright term for fifty years after the death of the author. Currently, the default length of copyright in Europe is for a period of seventy years after the death of the author. Copyrights expire at the end of the calendar year and 1 January is now celebrated as "public domain day", when many creative works enter the public domain. According to the World Intellectual Property Organization (WIPO), intellectual property "refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce" (WIPO 2022b). Moreover, copyright (or author's right) "is a legal term used to describe the rights that creators have over their literary and artistic works. Works covered by copyright range from books, music, paintings, sculpture and films, to computer programs, databases, advertisements, maps and technical drawings" (WIPO 2022a). Although the role of IPRs secures the creators of intellectual assets a fair compensation for their work, there is a substantial body of literature which critically reflects on the use of property rights about culture, as IPRs can potentially hinder access to knowledge (Brown 1998; Bendix and Hafstein 2009), as well as how something would be remembered (Marttila and Hyyppä 2014). Brown (1998) in his seminal work, "Can Culture Be Copyrighted?", reflects on the challenges that culture faces in the light of IPRs, investigating how regimes relate to copyrights.

Regimes, as governance, generally accept, implement, reinforce and maintain infrastructures that define the framework for identities and culture. However, culture is not static, it is co-produced and co-created by people (Kirshenblatt-Gimblett 2004). Brown (1998) highlighted that "culture is not a bounded, static entity, but a dynamic, constantly renegotiated process" (p. 196). A growing body of literature discusses that copyrights and property rights could lead to regimes in relation to culture (Brown 1998; Bendix and Hafstein 2009; Marttila and Hyyppä 2014) dictating what and how something would be remembered. Brown (1998) stated that institutional secrecy could potentially threaten democratic societies and lead to power abuse. For that reason, Brown (1998) strongly advocated that once information is in the public domain it should remain there. Practising "openness whenever is possible" (Brown 1998, 198) could aid in envisioning more democratic societies that would encourage practices of accountability and transparency. As a response to the IPRs' issue came the Creative Commons (CC) which is a non-profit organisation advocating for fair sharing and distribution of knowledge. It taps into the potential of openness and (re)sharing. There are six different licence options, where a CC licence at its most permissive "allows re-users to distribute, remix, adapt and build upon the material in any medium or

format, so long as attribution is given to the creator. The licence allows for commercial use." (Creative Commons 2022). Also, a seventh option is the Public Domain Dedication (best known as CC0 or CC zero), where assets that have been attributed the public dedication tool have entered the public domain and can be redistributed and remixed unconditionally. CC licences revolutionised the way knowledge can be distributed, as they effectively address the sometimes obscure gap between authors and users; the author is in a position to decide the conditions of that reuse, whereas users have given freedom and power to use that knowledge accordingly (Scharf 2017). CC licences or the Traditional Knowledge labels (Local Contexts 2022), are striving for a fairer attribution of knowledge production and distribution.

2.2 The opening up of cultural heritage institutions

CHIs have been agents that have shaped knowledge since the fifteenth century (Hooper-Greenhill 1992). As Hooper-Greenhill (1992) stated, a contemporary museum still abides by the normative challenges of what or how a public museum should appear. These notions are still rooted in museum practice as a residue of the early nineteenth-century French model of the ideal museum, on which most museums thereafter based their model. However, in that European model paradigm, the museum abides and reinforces the notions of shaping knowledge, in a somehow top-down encyclopaedic way, by forming "regimes of truth" (Bennett 2018) and unfolding the power relations inherently intertwined with their role and establishment. A substantial body of literature has discussed that traditionally, CHIs might have had a tendency to develop hierarchical structures through canonised norms of practice, preconceptions with regards to authorship, issues of control and organisational structures, which involve institutional hierarchies as well and can perpetuate tensions with the digital (Macdonald 2012; Fouseki and Vacharopoulou 2013; Tan 2013; Lynch et al. 2020; Crooke 2021). In the 2000s, Hooper-Greenhill observed an emerging model of museums, the post-museum, which would be able to foster diversity, collaboration and community outreach (Hooper-Greenhill 2000). Indisputably, CHIs have undertaken advances in the last few decades for a more bottom-up approach by making efforts to involve people in the cultural production through participatory mechanisms (Simon 2010; Giaccardi 2012) and striving to enhance their social, dialogical, emotional as well as digital amplitude (Simon 2016; Perry 2019; Galani et al. 2019; Katifori et al. 2020; Morse 2021). However, a burgeoning body of literature argues that CHIs are failing to stand up to their role as agents of social change stumbling upon the hierarchical – at times monolithic – structures (Sandell 2002; Lynch 2011, 2017; Riedler 2017; Lynch et al. 2020; Crooke 2021). Riedler (2017) states "Yet, despite its notion of democratic openness, the public museum also carries and conveys ideas of inequality and hegemony" (p. 64). Therefore, such structures can often stunt or impede attempts of co-creation (Govier 2009; Mucha 2022), participation (Lynch 2017) and meaningful community engagement (Perry 2019) in the cultural heritage setting.

The vision of CHIs to digitise and open up their collections to the public has been at the core of their digital communications plan over the past two decades. CHIs followed the wider movement for the

democratisation of knowledge, where the movement found fertile ground to develop. The values of the open knowledge movement are aligned with those of CHIs, in terms of the openness, transparency and sharing of knowledge (Kelly 2013). The Rijksmuseum, located in Amsterdam, was at the forefront of this transformation (Gorgels 2018) amongst other CHIs including the Getty, in Los Angeles, with the Open Content Program (Getty, 2018). Although medium-sized and large museums were at the forefront, small institutions lagged behind due to lack of resources for acquiring the technical equipment required, or staff with relevant expertise to initiate the digitisation process (Institute of Museum and Library Services 2002). Currently, many CHIs have followed the open access movement. CHIs such as the Smithsonian Institution (Smithsonian Institution 2021), located in Washington, digitised their collections and opened them up free of copyrights, embracing the public domain. The advent of CC licences helped CHIs to address the heated topic and requirement on access and reuse of their collections, due to copyrights and related IPRs issues. The traditional copyright fee model, where CHIs receive copyright fees from the users for accessing digitised cultural assets has slowly started to fade due to open access policies (Kelly 2013), which have become more prevalent. CHIs consider themselves to be responsible and therefore accountable for controlling the use(s) of digitised cultural assets, striving to prevent any potential misuse of the assets (Crews and Brown 2011; Crews 2012). However, this perspective reproduces hierarchies when it comes to the production of knowledge, which consequently can be seen as a hindrance for the meaningful involvement of the public in the knowledge production process. On the other hand, studies have shown that CHIs which have incorporated a copyright fee in their business model, were, in reality, rarely profiting by generating new income from it (Tanner 2004; Kelly 2013; Wallace 2022).

Moreover, most CHIs in Europe have partnerships with either public or private aggregators and providers when it comes to opening up their collections. Few have established such mechanisms to carry out and accomplish it by themselves. The partnerships differ regarding their approaches and their organisational background and although these platforms have proposed good practices with regards to the openness of data, there is still much room for improvement. Such partnerships exist on a national level, such as, for example, the Digital Repository of Ireland (Digital Repository of Ireland 2022) and the National Documentation Centre (National Documentation Centre 2022) in Greece, Europeana (2021) on a European level and Wikimedia and more specifically Wikimedia Commons and GitHub (GitHub 2022) and other open source platforms on an international level. Furthermore, CHIs engage their users via social media platforms. There are arguments that platforms such as Wikimedia and its sister projects have the potential to achieve more community and engagement outreach compared to CHIs themselves (O'Neill 2021).

One element that has aided the strengthening of the openness of the data in cultural heritage is the emergence of the open GLAM movement, which is part of the wider Open Knowledge Foundation. As discussed in Chapter 1, Open Knowledge Foundation is a global, non-profit network that promotes and shares knowledge free of charge, including both content and data. According to Open Knowledge

Foundation, "Open knowledge is any content, information or data that people are free to use, re-use and redistribute" (Open Knowledge Foundation 2021a). In December 2011, through Open Knowledge Foundation, open GLAM was established (Baltussen et al. 2013). The open GLAM movement advocates opening up cultural collections, through participatory and creative mechanisms via open licencing. In addition, the open GLAM community has been expanding and has received a lot of attention since its establishment in 2011. A report from McCarthy (2021) describes the current state[3] of open GLAM by counting that "more than 1,200 instances of open GLAM practices have been recorded" whereas the institutions that have adopted these open access practices are 36.3% museums, 26.5% libraries, 11.4% universities, 11.3% archives, 2.8% galleries and 11.7% other actors (McCarthy 2021).[4] Even though a substantial body of literature suggests that CHIs would "inevitably" adopt open access as a strategy (Sanderhoff 2013; Kelly 2013; Tanner 2016; Wallace and Euler 2020), nevertheless, a recent report published in early 2022 suggests that CHIs in the UK have not reached a consensus as to what open access really means (Wallace 2022). Undoubtedly, there are several CHIs that have already participated and actively championed the open access and open knowledge movement, as it is being suggested by the open GLAM survey co-produced by Douglas McCarthy and Dr Andrea Wallace (McCarthy and Wallace 2018).[5] Notwithstanding, there is much room for improvement to open up digital heritage collections, as was highlighted by Wallace (2022) in her recent report "A Culture of Copyright: A scoping study on open access to digital cultural heritage collections in the UK" commissioned by the Towards a National Collection programme (TaNC).

Furthermore, many issues arise in relation to the accuracy of the data and their quality, for example, good and highly organised metadata in the production as well as the distribution of the data. Metadata hold a crucial position here, as they provide structural and contextual information about data (Greenberg 2003). Although some providers and platforms make their data available online, this alone is not enough, as data without a context could potentially not be meaningful and therefore usable. The close link between open knowledge and open data is provided by the definition of Open Knowledge Foundation as follows: "Open data are the building blocks of open knowledge. Open knowledge is what open data becomes (sic) when it's useful, usable and used" (Open Knowledge Foundation 2021b). This is particularly relevant to the heritage sector as cultural data could have high-quality characteristics (high-quality metadata) so that people can easily and reliably interact with them. An aspect that aids this issue is the implementation of the FAIR guiding principles (Wilkinson et al. 2016). The FAIR guiding principles acronym refers to a set of guiding principles in order to make the data Findable, Accessible, Interoperable and Reusable. On the other hand and although the FAIR principles have in their core the notion of reuse, reuse is not merely about making the data digitally available, sharing and resharing it

[3] As of December 2021.

[4] For the visualisations, see McCarthy 2021 https://douglasmccarthy.com/2021/12/whats-the-latest-picture-of-open-glam/.

[5] See the survey of GLAM open access policy and practice: https://docs.google.com/spreadsheets/d/1WPS-KJptUJ-o8SXtg00llcxq0IKJu8eO6Ege_GrLaNc/edit#gid=1216556120.

(Huggett 2018), but rather finding ways to creatively reuse the data by attributing a different characteristic to them. However, the literature has shown that users struggle in some cases to overcome issues when it comes to (re)using digitised cultural collections, particularly issues of licencing, interface design and data quality (Terras 2015; Valeonti et al. 2020; Wallace 2022). Given that in the digital world, technological advances dramatically change the public realm, mechanisms and infrastructures can be developed for the merging culture of sharing in order to be relevant to society (Simon 2016) engage public interest and aid the formulation of a common, collective memory. In addition, heated discussions have taken place with regards to the necessity of CHIs to "modernise open business models" (Wallace and Euler 2020) and that "Institutions should explore fairer business models designed for users rather than commercial markets and publish these new fee-models online" (p. 851). This doctoral work particularly focuses on the intersection of these issues, where the research problem has been identified. CHIs still have to reposition themselves and strive to realise their mission, while overcoming the challenges provoked by the ramifications of the digital realm through forming instances to dynamically co-create with the public, in a participatory approach. Also, CHIs have to address issues deriving from the opening up of their collections, related to the quality of the assets, open access policies, while adapting vigorously to a new culture of openness and sharing.

2.4 A participatory (digital) culture or a culture of attention?

The evolution of the Web brought plenty of promising opportunities for knowledge accessibility, dissemination and participation in the cultural heritage context (Proctor 2010; Kidd 2011; Giaccardi 2012), as well as some challenges. A significant number of scholars argue that it did not actually fulfil all the promises for the democratisation of knowledge, that is, fostering co-creation and fairness for the cultural sector (van Dijck and Nieborg 2009; Fuchs 2015; Kidd 2018). To begin with, "Web 1.0" refers to the first stage of the World Wide Web evolution, also known as "informational Web". The "read-only-web" was introduced by Tim Berners-Lee. In April 1999, the term "Web 2.0" was coined by Darcy DiNucci (DiNucci 1999). Then in 2004, at the first ever Web 2.0 conference, the term "Web 2.0" was popularised by Tim O'Reilly – known as the "Social Web". The advances of "read and write" (networking platform), where users can generate content, led to the emergence of social media, applications, blogs, wikis and video sharing (van Dijck 2013). Web 2.0 is often referred to as "the participatory Web" indicating that it allows the potential for collaboration and participation. However, for more than a decade, there have been critics of this approach (Fuchs 2015), as it is evident that currently the digital ecosystem offers, somehow, possibilities for participation, but still it has not yet tapped into its full potential as a truly emancipatory medium which can foster meaningful participation and collaboration. As I discuss further, the existing approach of the Web is quite top down and allows more superficial engagement, rather than a meaningful co-creation process.

2.4.1 What actually is a platform: a medium or more than that?

Over the last two decades, the Internet inundated with platforms promised to democratise and open up access to knowledge and scholars have stirred up discussions on a "platform society" (van Dijck et al. 2018) which has led to the so-called "platformisation" of the Web (Helmond 2015; Nieborg and Helmond 2019) and even platformising of knowledge(s) (Iliadis et al. 2020), as well as platformising or platformisation of cultural production (Nieborg and Poell 2018). However, there are still many open questions as to how open these platforms really are. This is an issue that is being critically explored through this doctoral work. Yet, firstly, it is necessary to discuss how to define a "platform". In the context of this thesis, "platform" refers to a new predominant type of business model (Kenney and Zysman 2016; Kenney et al. 2019), which has been thriving since the early 2010s. There have been many attempts to describe what platforms are, as well as what or whom they serve. A more traditional approach suggests that platforms mediate social and economic interactions online, they facilitate multisided markets and overlap each other in the economy (Kenney and Zysman 2016), implying that platforms are somehow neutral mediums (Gillespie 2010; van Dijck 2013). On the other hand, this approach and definition suggest platforms' neutrality as a medium in the online exchange and distribution of information, while at the same time exclude the notion that they are powerful agents (Helmond 2015), discussed later. Helmond coined the "Platformisation of the Web" to denote the rise of platforms as prevailing infrastructures, penetrating the Web at large, while having a huge impact beyond their frontiers (Nieborg and Helmond 2019; Helmond et al. 2019); "the rise of the platform as the dominant infrastructural and economic model of the social Web and its consequences, in its historical context" (Helmond 2015, 1). The platformisation of the Web perception highlights how platforms exercise power, impact democratic society and how power is asymmetrically distributed. In that respect, platform acquires another connotation (and agency as well) other than merely a neutral mediator between respective parties.

Although the notion of platforms might suggest that platforms are flat and everyone on the platform is equal, nevertheless this expectation does not reflect the actual vertical concentrations of power. Platforms are very hierarchical structures (Srnicek 2017). This is quite evident when looking behind the scenes and at the alluring and impressive user experience design of platforms. It is important to look closer and examine who it is that designs platforms, who their users are and finally, who it is that imposes the rules, all of which make their hierarchies and powerful structures explicit. The power dynamics incentivised by platforms are the way in which they attract new users and create network effects by accumulating more users and data. Furthermore, the Convergence Thesis (Srnicek 2017) is also linked to a means of accumulation of more data and users, too. According to Srnicek (2017), it describes a particular platform characteristic – their "tendency" to resemble other platforms because they seek to triumph over them in the same market segments. This is easy to grasp when looking into, for example, social media networks. Many of them have the same features and in some cases, the same functionalities, as well as limitations. Similarly, platforms can also restrict user access. For example, in early 2021, Twitter (Rebranded in July 2023 to X) permanently suspended the account of Donald Trump, the ex-

president of the United States who served from 2017 to 2021, from its platform as he was violating its rules. Indisputably, digital media platforms have become critical infrastructures as users have been quite dependent on them (Kenney et al. 2019). Platforms are used in and for our everyday lives, either for mundane activities, ranging from facilitating communication and online transactions, or even for more significant and special occasions. Digital media platforms are part of our current lives. This was also evident and highlighted during the ongoing COVID-19 pandemic, where due to restrictive measures against the spread of the virus imposed by governments and the World Health Organisation, a large portion of activities were carried out online, through digital (media) platforms. Although the pandemic is an emergent situation, it was and still is apparent that people are dependent on digital platforms and that there are interdependencies that are created in the current digital ecosystem. Platforms are, therefore, powerful infrastructures which include hierarchies and currently, as discussed earlier, it is pertinent to consider them to be more than merely a medium.

2.4.2 The evolution and transformations of the economy towards cognitive capitalism

The ramifications of the domination of large commercial platforms in the digital economy brought the emergence of a new form of capitalism, namely, cognitive capitalism. As discussed earlier, knowledge is dependent on economic, social and technical configurations (Haraway and Goodeve 2018). It is pertinent, therefore, to reflect on the advances and the evolution of the economy and investigate how knowledge production has been impacted by digital advances in recent years. It could be a tendency that humans acquire more by exploiting and making use of available resources and in this regard, capitalism has proven itself to be a dominant force in today's economy, relying on its aims to increase work efficiency and maximise profits which lead to higher rates of economic growth and result in individual prosperity. However, what led capitalism to prosper as a reliable system was its proven adaptability in light of the socioeconomic changes it encountered and the emergence of new technologies that had major effects on the economy in general. Capitalism is and always has been, a dynamic system (Targetti 1992). At its core lies its capability to be transformed, adapt to ever-changing socioeconomic circumstances and overcome crises. The transformations of capitalism and the so-called circles (Fuchs 2020b) it performs, has facilitated its survival as a system over the years. An important quality of capitalism has been its ability to adopt new ways of accumulating capital. A new phase of capitalism emerged after mercantilism and industrial capitalism, which is often referred to as "third capitalism", "cognitive capitalism", "information capitalism". These terms reflect a theory emphasising the socioeconomic effects created by the Internet and Web 2.0 technologies, shifting the mode of production and the landscape of labour (Peters and Bulut 2011; Moulier-Boutang 2012). According to Moulier-Boutang (2012), this new phase of capitalism is based on the accumulation of immaterial capital. In this constellation, where technology plays a crucial role, there is a shift to a knowledge economy (Choong

and Leung 2021)[6] where the most important act of production has become the creation, dissemination, use and reuse of knowledge. The form of production alters as the goods that are being produced are immaterial; cognitive work and knowledge(s). This new stage is often called "Fourth Industrial Revolution" or "Digital Revolution", which has profoundly changed the way economy works and has had a great impact on business models (Schwab 2016). In addition, there are several opportunities that digital technologies have contributed to open knowledge, which is different in the digital age and is inextricably linked with the accumulation of cognitive capital. These are, according to Pollock (2018):

1. Immediate communication and disappearance of distance
2. Information overload – simply too much data
3. Costless copying

2.4.2.1 Understanding the third form of capitalism: what is cognitive capitalism and why does it matter?

The third form of capitalism was realised with a paradigm shift from industrial capitalism to cognitive capitalism. Cognitive capitalism differs from the previous forms of capitalism with regards to the mode of production. Moulier-Boutang (2012) in *Cognitive Capitalism*[7] explains this distinct third form of capitalism that is thriving in today's global economy; the transformation from industrial capitalism and the distinctions which define this paradigm shift. Cognitive capitalism is based on the accumulation of immaterial capital, knowledge(s), cognitive work (i.e. creativity), innovation and emotions. It has completely transformed the mode of production, as well as how knowledge is assembled, organised, distributed and consumed. In this new phase, knowledge, science and technology are the leading productive forces. The most important act of production has become the creation, dissemination, use and reuse of knowledge(s). The two previous forms of capitalism, on one hand, merchant capitalism in the sixteenth and seventeenth centuries, with its main focus on merchant and finance accumulation and on the other, industrial capitalism, which came to be after the Industrial Revolution and was based on mass production and standardisation, differ from the third form of capitalism; cognitive capitalism. Moulier-Boutang (2012) extensively discusses the change in division of labour and the mode of production from previous economic systems, with immaterial capital and the power of innovation at the centre of his discussions. He argues that cognitive capitalism has a profound impact on both an

[6] For Choong and Leung (2021) the terms "knowledge society" and "knowledge economy" are synonymous. For learning about the precursors to the knowledge economy, where Choong and Leung thoroughly and extensively discuss these terms, refer to their article: Choong, K.K., Leung, P.W. A Critical Review of the Precursors of the Knowledge Economy and Their Contemporary Research: Implications for the Computerized New Economy. J Knowl Econ 13, 1573–1610 (2022). https://doi.org/10.1007/s13132-021-00734-9.

[7] "This term originated in France in the early 2000s from the research of the Laboratoire Isys-Matisse, Maison des Sciences Economiques, Université de Paris I, La Sorbonne, under the direction of B. Paulré and it is diffused by the journal *Multitudes* with very heterogeneous texts by A. Corsani, M. Lazzarato, Y. Moulier-Boutang, T. Negri, E. Rullani, C. Vercellone and others." (Fumagalli 2015). Fumagalli, A. (2015). The Concept of Subsumption of Labour to Capital: Towards Life Subsumption in Bio-Cognitive Capitalism. In: Fisher, E., Fuchs, C. (eds) Reconsidering Value and Labour in the Digital Age. Dynamics of Virtual Work Series. Palgrave Macmillan, London. https://doi.org/10.1057/9781137478573_13.

intellectual and political level (Moulier-Boutang 2012, 7). He sets cognitive capitalism in the context of a globalised economy which has completely changed the parameters of space and time and deterritorialised the process of production. In the context of the knowledge economy, cognitive capitalism thrives (Moulier-Boutang 2012; Lund and Zukerfeld 2020). Due to this constellation, however, knowledge is considered to have been commodified. In this emerging phase, the particularity is the dominance of the value and accumulation of cognitive labour (Fumagalli et al. 2020; Fuchs 2021).

The exploitation of knowledge is catalysed by open knowledge and open access movements that are thriving through cognitive capitalism mechanisms (Lund and Zukerfeld 2020; Fuchs 2020b, 2021). Thus, it is safe to argue as demonstrated by Lund and Zukerfeld (2020) that cognitive capitalism is heavily dependent on profit from openness (p. 273). The corporate capitalist openness ideology, or profiting from openness (Lund and Zukerfeld 2020, 7) ideology of past decades has been thriving. The profit from the openness business model, which is a very characteristic feature of cognitive capitalism is the exploitation of free labour and capture of user attention. The value is created by its users, contributors and producers, where some are paid, but others are not (Lund and Zukerfeld 2020). The main revenue comes from advertising. The critical issue arising from the above-mentioned transformations is linked with the ideology of profiting for free (Lund and Zukerfeld 2020; Fuchs 2021, 2020a). This is precisely what Lund and Zukerfeld (2020) call "Corporate Capitalism's use of openness". Fuchs (2020b) explains how the exploitation takes place: "Creativity, participation, sharing, openness and co-operation have become new ideologies of digital capitalism: Digital corporations such as Facebook, Google, for-profit (sic) open access publishers, etc., practice the communism of capital: They advance the production of particularistic types of commons that are subsumed under the logic of capital. Facebook and Google accumulate capital through the free labour of users, who create, share and participate in the production of data and content on platforms that are open for anyone to use as a gift" (p. 114).

With the evolution of platforms, cognitive capitalism, its explicit ramifications on knowledge production (Fuchs 2021) and the immensely growing inequalities in the digital era are correlated with economic practices exploiting data and human attention for profit purposes. I now reflect upon the commodification of knowledge that takes place in the context of cognitive capitalism through various mechanisms that take place in the digital economy.

2.4.3 Attention mechanisms, platform and surveillance capitalism's practices in the digital economy

Currently, there is a burgeoning body of scholarship (Citton 2017; Celis Bueno 2017; Pollock 2018; Patino 2019; Nixon 2020) considering the attention mechanisms in place to attract (user) attention online. To begin with, the idea of an attention economy can be traced back to when it was first introduced by the American economist and psychologist Herbert A. Simon in 1971. Simon argues that in the post-industrial economies, attention was an essential element of the production process, together with

knowledge and information, as attention was required to process the respective knowledge and information accordingly (Simon 1969, 1971). With the development, advances and commercialisation of the World Wide Web, the concept of the attention economy became widely accepted and extremely topical, as the Internet provides an environment where it can thrive. Indisputably, one of the main particularities of the Internet and the new media age is the proliferation of information that is floating around the net. How is it possible for a human being to be able to see, grasp and process all the information that is offered on the Internet? This is simply impossible. As a result, attention becomes a scarcity and ultimately a valuable commodity (Goldhaber 1997; Celis Bueno 2017; Patino 2019). This is a vicious circle on which social media networks in particular have based their business model.

The attention economy has been growing rapidly since the 1990s (Marazzi 2008; Citton 2017; Celis Bueno 2017; Patino 2019). According to Citton (2017) "While the calculations of the classical economy of material goods are based on the scarcity of factors of *production*, the attention economy is based on the scarcity of the capacity for the *reception* of cultural goods" (p. 2) where cultural goods may include films, books and music. The creation of value of these goods depends on the way attention is distributed around them (Celis Bueno 2017; Citton 2017). Irrespective of the materiality of the good, its value always comes from the attention of the user. Consequently, the attention economy identifies human attention as a quantifiable yet scarce commodity (Marazzi 2008). With the development of the Internet, the scarcity of human attention greatly deepened (Citton 2017; Celis Bueno 2017; Patino 2019). The supply of cultural goods boomed through the infinite capacity of copying and sharing provided by the Web 2.0., as discussed earlier, whereas human attention became relatively more scarce, hence more valuable.

There are two major interpretations of the social effects of new media technologies that emerge from these related digital economic practices and indisputably are related to the emergence of cognitive capitalism; namely, platform capitalism (Srnicek 2017) and surveillance capitalism (Zuboff 2019). The multitude of capitalism terms reflects the attempts of scholars, theorists and experts to make sense of and analyse those changes the digital transformation brought into the emerging digital economy. Platform capitalism, surveillance capitalism and attention mechanisms are practices operating in the new stage of capitalism: cognitive capitalism. However, each term focuses on and analyses different practices and aspects of it. The emergence of cognitive capitalism is inextricably linked to the prevalence of platforms. Moreover, the prevalence and domination of platforms in the digital ecosystem brought about "platform capitalism". "Platform capitalism" (Srnicek 2017) refers to the transformation of businesses into digital platforms, as well as to the activities derived from digital platforms. In addition, "surveillance capitalism" stands for the deployment of such platforms for surveillance purposes (Zuboff 2015, 2019). In a nutshell, platform capitalism makes these prevalent large-scale commercial platforms powerful, whereas surveillance capitalism makes them even more powerful (Zuboff 2015). Surveillance capitalism is intrinsically linked to a platforms' business model and can be seen as a further evolution of capitalism. Zuboff (2019) states "Surveillance capitalism unilaterally claims human experience as free raw material

for translation into behavioural data" (p. 8). In this regard, the commodification of data for profit purposes, by extracting behavioural data to make predictions, becomes the new significant practice, with the "big players" competing over it. Similarly, what has become commodified at the core is people's attention. I purposefully wrote "people's attention" and not merely "user attention", owing to the fact that the limits and boundaries of the physical and the digital realm are blurred more and more nowadays. These platforms are not only targeting users' but rather humans' attention. The attention economy actually talks about an economy that constantly fights over our attention. Digital media and in particular, commercial platforms, are companies, such as in the 2020s, the "Big tech companies" are also known as GAFAM, where they attract and grab our attention through obfuscate practices, such as complex algorithms. Human attention is not infinite; it has its limits. The public is being bombarded constantly with targeted advertisements derived by tracking consumer behaviour through surveillance mechanisms, specifically with the aim to be liked. In the new form of capitalism, cognitive capitalism, the essence of capitalism has transformed with regards to value creation. Value is created through innovation. Users are part of this process due to the fact that their data, actions and moves online are being tracked and used for emerging innovation and marketing purposes. Zuboff (2019) calls this "behavioural surplus" where companies manipulate data to create value. Moreover, in this complex net, commercial platforms, including social media, are monetising social exchanges online (Stark 2009; Dean 2012) while at the same time, are transforming all different types of activities "into a form of labour" (Jordan 2020, 167).

2.4.4 Ownership issues in the digital economy

Concerns have been raised over ownership issues around big questions such as "who owns the Internet?" (Ball 2020), as well as issues around the ownership of data as well, or implementing property rights on data. These issues primarily derive from the topic of how capitalism has changed through digitalisation with regards to ownership and the form of production. The connotation of "digital disruption" that, it is suggested, digital platforms have caused, denotes that the "biggest players" own and/or create nothing themselves. This means explicitly that, for example, the social media platform Facebook, creates no content itself. Similarly, the largest accommodation provider, Airbnb, does not own any accommodation and equally, the largest photo sharing provider, Instagram, does not create any images. Questions can be posed as to how and why platforms make it possible to "strangers" to trust them and what guarantees they offer to users. The answer can vary from ratings to insurances, where the trust element is provided and reinforced. The lack of an adequate regulatory framework and an appropriate mechanism to allow the user to have and maintain ownership of or control of their data, has allowed large-scale commercial platforms online to exploit user data and thus reap the benefits of it (Asswad and Marx Gómez 2021) through exploitation processes and mechanisms, discussed in the next section. For some scholars and activists, ownership is a key for envisioning inclusive futures, but it is also at a critical stage at the moment (Asswad and Marx Gómez 2021). According to Asswad and Marx Gómez (2021), although there is still no consensus on what data ownership is, they suggest that "data ownership is widely

considered as the possession of complete control over the data and its rights including, but not limited to, access, creation, generation, modification, analysis, use, sell (sic), or deletion of the data, in addition to the right to grant rights over the data to others" (p. 2). In the current GAFAM ecosystem, data and infrastructures are owned primarily by big corporations and people do not have control over them. Moulier-Boutang (2012) discusses the less clear ownership rights of a system that deals with immaterial goods and knowledge by stating: "The immaterial nature of the goods produced in cognitive capitalism induces a strong specificity of information-goods or knowledge-goods as regards their learning processes, their use, their depreciation, their enrichment and the conditions of their exclusive expropriation. These characteristics in turn affect the way in which information and knowledge move around in the company and in society (…) but they also create growing tensions over the issue of intellectual property rights. We shall return to this; but this feature, which inserts knowledge as a public or 'free' good – in other words open access – into the very heart of market relations cannot be separated from the revolution in information technology" (p. 54–55). Therefore, the question as to which level social media networks and platforms are open and participatory, has yet to be explored. This issue is inextricably linked to the question posed in this section's title. It critically reflects upon which level we actually live in of a participatory digital culture and asks whether we are living in a culture of attention scrolling through the net and passively consuming huge amounts of data daily. Jordan (2020) in *The Digital Economy* has been focusing on exploring digital economic practices to understand the shifts that these new sociotechnological modes have brought to society. Focusing on the practices that Jordan is suggesting has influenced my research thinking and so investigating the practices – not limited to economic practices – holds a prominent position in my doctoral work. In the next section, I discuss invisible work which takes place in/through infrastructures, as practices in the current digital economy can be opaque, so therefore further exploration is needed.

2.4.5 Invisible work and opaque practices

Pollock (2018) highlights that "It is essential we understand the true causes of this unsustainable concentration of wealth and power: the exclusive ownership of digital information in combination with platform effects and costless copying" (p. 4). Thus, Pollock (2018) makes a dichotomy of the Open and Closed world. The Closed world is the one we are currently experiencing, where commercial platforms' algorithms are working in opacity in the digital economy (Gillespie 2018). At the core of these problematic issues of Open versus Closed worlds in the light of the attention economy (Celis Bueno 2017) is that people (on the whole) are not aware of the practices implemented behind the scenes of the visible interface and its infrastructure. Moreover, according to Plantin et al. (2018) the concepts of "infrastructure and platform refer to structures that underlie or support something more salient" (p. 294) and owing to the fact that their boundaries have become blurred, they demonstrate that a "cross-articulation" of the two concepts could aid in enhancing what digital media have become. Infrastructures are "sociotechnical systems that are centrally designed and controlled, typically in the invention and

development phases of new technologies" (Plantin et al. 2018, 295). Infrastructures are both "relational and ecological" (Star 1999, 377), while the sociotechnical elements necessary for their functionality interact in an iterative process (Koch 2017). Undoubtedly, infrastructures contain a lot of invisible work (Star 1999; Star and Strauss 1999), which is usually not seen by the public eye, unless the work breaks. This is work that cannot be seen by the users, usually it is referred to as the "back-end work". This is typical for infrastructures operating in a digital format like the commercial platforms discussed (Plantin et al. 2018; Plantin and Punathambekar 2018). The back-end is involved with what could be conceived of as more mundane or trivial issues (Star 1999) in some cases, but it is most important for each organisation that it operates and runs smoothly. Invisible work in digital platforms and the digital ecosystem at large, is (even more) prominent, which is particular to the way they operate. To put it simply, users are interacting directly with an interface – the front-end. The front-end refers to the parts of a machine, for example, computer or website, that are used immediately by the user. For example, when we use digital media platforms and compose a post, or contact someone over a messenger application, we are using the user interface – the front-end. The frond-end receives a lot of attention and plays a crucial role in the sense that users might choose a specific application or platform due to its design, ease and convenience of use. It is no secret that commercial platforms' user interface design has addictive features to attract users (Scholz 2016). However, most of the work is conducted behind and beyond the front-end; at the back-end. The back-end refers to the parts of system that are not used directly by a user. In that respect, the back-end is where all the processes take place, such as where codes are running. When, therefore, these processes are closed, operating in opacity, they do not encourage, let alone enhance, the sharing of knowledge, rather they hinder it. However, the open source code movement has made a pivotal contribution to the growth and empowerment of open ecosystems through the sharing, reusing and remixing paradigm, being central to open knowledge. Moulier-Boutang (2012) discussed the challenges of free software as a mode of production and outlined some key principles and challenges. The free software strives to be ethical and has specific values; it needs to be accessible for everyone, it should be of high quality. Not all free software, however, is safe and it is not homogenous (Moulier-Boutang 2012).

Building on the issues discussed on the domination of large-scale platforms in the digital economy, I now reflect on the larger digital ecosystem and how the dynamics of platforms operate for knowledge production and eventually memory making. In the digital era, most of the access to online information is organised, managed and disseminated through central platforms. The search engine plays a pivotal role and could be seen as an attention condenser (Citton 2017), which holds the responsibility of filtering information to optimally meet user needs. Little is known about how commercial platforms' algorithms actually work and how they operate through automation and artificial intelligence (AI). AI is described as a "fast evolving family of technologies that can bring a wide array of economic and societal benefits across the entire spectrum of industries and social activities" (European Commission 2021). Automation and algorithms provided by commercial platforms usually operate through opaque techniques and are

considered as blackboxing technologies (Pasquale 2015). A black box "is an object, piece of software, or system in which the user can direct input but cannot examine or verify the processes that occur before the produced output" (Dennis 2021, 108). Although the black box comparison might be considered by some people to be cliché or even outdated, it reflects the obfuscated practices performed by the large commercial platforms people are using for everyday tasks fairly. The opaque way that a black box operates has been discussed by Latour (1999) and the way it functions through non-transparency opposes the transparency and sharing of knowledge. The notion of "understanding" as a user how a technology or tool works, is crucial and concerns ethical aspects as well. Initiatives like the Explainable AI (XAI) realise the essentiality of focusing on how AI actually functions so that it becomes comprehensible enough for non-experts (Barredo Arrieta et al. 2020). Through the XAI initiative the concept of "responsible AI", promotes "a paradigm that imposes a series of AI principles to be met when implementing AI models in practice, including fairness, transparency and privacy" (Barredo Arrieta et al. 2020, 46) for fostering an ethical AI paradigm in the digital ecosystem.

2.4.6 Unfolding power asymmetries: infrastructural and sectoral platforms

The current global digital ecosystem is operated by data flows driven both by companies and countries. The landscape indicates two main tendencies; operating through "corporate and state-controlled practices" (van Dijck 2020b). In that respect and according to van Dijck (2020b), there are two main prevalent ecosystems, the American ecosystem, which is currently operating under corporate surveillance practices and the Chinese system, working under state-controlled practices. The American version comprises GAFAM, whereas the Chinese ecosystem consists of Baidu, Alibaba group and Tencent. The American ecosystem dominates all but China (van Dijck 2020b). Europe might be seen somehow squeezed between the two ecosystems and because this work focuses on the European landscape, I focus on the American ecosystem since Europe is more dependent on it (van Dijck 2020). In her recent work, van Dijck (2020a) reflects on the topical issue of "governing digital societies". According to her "Europe has become increasingly dependent on the American platform ecosystem dominated by the Big Five tech companies (GAFAM), which techno-commercial architecture is rooted in neoliberal market values. But beyond market value, the platform ecosystem revolves around societal power and influence" (p. 2). In that respect, power asymmetries have been emerging from the prevalence of the ecosystems dominating the digital world towards the market sector and are having a huge impact on knowledge production and therefore memory making. These aspects are further examined in Chapter 6. Accordingly, van Dijck, Poell and De Waal (2018) observe that there are two main platform types operating in the present digital ecosystem which shape current dynamics and power relations. These are the infrastructural and sectoral platforms. The majority of infrastructural platforms are owned and operated by the Big Five, namely the GAFAM, where they actually serve as the structural backbone of the platform ecosystem. There are also the sectoral platforms which are integrated into this structural backbone, for example, platforms such as Yahoo News, Uber, Coursera and Airbnb. Infrastructural

platforms can acquire a lot of power as "all platforms outside of the Big Five constellation are dependent on the ecosystem's infrastructural information services" (van Dijck, Poell and De Waal 2018, 15). Large-scale commercial platforms create network effects and are part of a digital ecosystem which adds value to them (Zuboff 2015; Srnicek 2017). According to Srnicek (2017), platforms have specific characteristics, one of which is that platforms create and produce "network effects" which means that "digital platforms produce and are reliant on 'network effects': the more numerous the users who use a platform, the more valuable that platform becomes for everyone else" (p. 32). This means that some platforms become powerful agents as users will join a platform which is already popular, or has a lot of users, for example, in order to socialise, or will trust a financial transaction platform which is already trusted by other users (i.e. see reviews). To put it simply, the more users on the platform, the more valuable the platform becomes for others, thus creating a cycle that ultimately leads the platform to gain more market value, as capitalism and market practices demand. This tactic sets the barrier very high for new players to join in the digital economy and makes it almost impossible to have a healthy and competitive market. It leads to platform monopolies and what Srnicek (2017) coined as "platform capitalism", leading to monopolies of knowledge. This practice has many implications for the current digital ecosystem and economy, creating power asymmetries. However, rather than focusing on platforms as infrastructures, focusing on the practices that evolve around the digital economy might be useful, as also discussed earlier. Jordan (2020) explicitly argues that "it is not platforms that drive the digital economy", but rather, "platforms are one of the mechanisms needed to create practices, no more no less" (p. 149). Indisputably, platforms are significant elements of the digital economy. However, it is important to take into consideration that they are not only part of an ecosystem, which they influence, but that they are also influenced by it. As Jordan (2020) suggests, one approach which examines the topic holistically is to focus on the practices and its complex interrelations of the ecosystem's elements, namely the ecologies. To examine this issue, I discuss assemblage theory as a perspective to understand the ecosystem and focus on the dynamic interrelations and practices that form these complex digital practices.

2.5 Digital ecosystem as assemblage

In order to understand culture – and thus also cultural issues – it is important to appreciate that culture can aid the exploration of fields that are embedded within it and that are linked to it, such as sociology, politics and economic issues (Du Gay and Pryke 2002; Hesmondhalgh and Baker 2011; Piketty 2014). In this context, approaching these new cultural configurations as assemblages (Ong and Collier 2005; Koch 2013) could prove useful. Drawing from the assemblage theory (Deleuze and Guattari 2007) I use this perspective as a lens to address and explore the digital ecosystem – rather than platforms. The assemblage is the concept that combines ecological thought with the technological. The aim is to reflect the wide range of practices and activities which take place within the ecosystem which are carried out primarily by large commercial companies that are not merely digital platforms (Cusumano et al. 2019;

Jordan 2020; Birch and Cochrane 2022; Birch and Bronson 2022). The practices discussed earlier that are carried out through and in the digital economy form an assemblage; the digital ecosystem. Digital ecosystems are "heterogenous assemblages of diverse techno-economic components including devices, platforms, users, developers, legal rights, contractual agreements, standards and so on" (Birch and Cochrane 2022, 47–48). In order to be able to fully comprehend what the digital ecosystem means and how it profoundly impacts knowledge production, I discuss some aspects of it in more detail in this section. Although it might be difficult to directly identify the types of economic activities affected by platform pervasiveness, however, it is clear that digital platforms permeate the economy through emerging technologies such as AI and machine learning (ML) (Furman and Seamans 2019). The ecosystem thinking refers to the idea and notion that things or objects do not exist alone, but rather they are interconnected. It considers heterogeneity, as well as human and non-human actors in the making of the assemblage, as sociotechnical – constant – negotiations. It helps in exploring the relationship between entities as configurations, or arrangements, while focusing on their formation and evolution. In this context, assemblage theory focuses on the relationality of these configurations. The assemblage perspective is particularly important here as it highlights the complexities, co-dependencies and interrelations of the different elements of the ecosystem, while focusing on the process and dynamism.
It is important to note that the concept of ecology and ecosystem are not related to biology in my work, but the ecosystemic approach aids my research task to take up a comprehensive and holistic perspective considering both human and non-human actors, observing and analysing the interrelations and co-dependencies of the different aspects. The co-dependencies are a significant issue concerning the digital ecosystem: its elements could not function and/or operate at their full potential, if standing alone. More simply, this means that the platform needs its users to be able to function and create (more) network effects and the users need the infrastructure(s) to operate their online activities. In that sense, digital platforms are not merely digital infrastructures as their generated value does not come solely from their own activities, but rather, they are part of an ecosystem which is constantly emerging around them influencing their activities and adding value to them (Jordan 2020; Cusumano et al. 2019), creating larger network effects. For that reason, the power of platforms comes from the ecosystem and the effect it creates attracts new stakeholders and shareholders to be part of it. Essentially, what the digital ecosystem consists of is the combination of networked platforms, their practices, activities, values and interrelations. The platform cannot operate dynamically if not part of the ecosystem, as it needs their ecologies to function accordingly. The platform ecologies make up and therefore connect the ecosystem: the users, the infrastructures (i.e. platforms, APIs-intermediaries), legal, economic, motivational aspects and also the human agency aspect. As discussed earlier, the digital economic practices which operate in the context of cognitive capitalism, namely platform capitalism, surveillance capitalism and the attention mechanisms are interdependent and form an assemblage where knowledge is co-produced in the nexus of digital platforms and their infrastructures, users, motivations and related policies in the digital ecosystem.

Although traditional approaches to the ecosystemic perspective focus on the notion of complexity and co-dependency of the ecologies, that is, namely the elements of the ecosystem, new theoretical approaches emphasise the process of "becoming". Taffel Sy (2019) in *Digital Media Ecologies*, discusses "entanglements" to illustrate the dependencies and complexities of the ecosystem. Taffel's thinking has been influenced by Karen Barad,[8] the feminist philosopher of science, as well as by the social anthropologist Tim Ingold (Taffel 2019). In that respect, Taffel (2019) sees and conceives entanglements not merely as isolatable and interconnected individuals of the ecosystem, but rather focuses on the "becoming" and the quality of evolution as a central aspect. My research thinking has been influenced towards that direction, emphasising the process, messiness and complexities of the interconnections and their interdependencies. In that context, it integrates a symbiotic system. Unlike autopoiesis, which refers to the structure and mechanism capable of maintaining itself, a symbiotic ecosystem can be developed, reproduced and sustained online in correlation with the other elements of the system. The symbiotic system concerns both human and non-human actors and attributes agency to both. According to Taffel (2019) "agency is not innate but is an emergent property arising from complex interactions within assemblages which encompass human and nonhuman elements" (p. 34). Beyond the human agency that is most prominent, it is apposite to attribute a certain agency to machines and their algorithms (Hayles 2017; Demetris and Lee 2018).

Global assemblages can "produce" emerging regimes. There are heritage regimes in Europe which dictate how something would be remembered or practised (e.g. the act of commemoration), as well as certain norms and values (Kirshenblatt-Gimblett 2004; Collier and Lakoff 2005). In their seminal work, Collier and Lakoff (2005) propose the concept of the "regimes of living". In this framework, the concept of "regimes of living", outlines moral economies, that is, orders and structures, as emerging from global assemblages. Thus, moral economies can be called "regimes of living" (Collier and Lakoff 2005) emerging from global assemblages. The investigation of the character or quality of the economic practices is at the centre of it. The (ethical) character of these economic relationships is impacting and is being impacted, shaping and being shaped, by the other facets of socio-political elements. For that, it is crucial to investigate the (economic) practices of the current digital economy which dominate and have been characterised as a norm and how this affects the interplay; how (cultural) knowledge is being produced, distributed and ultimately remembered in the digital era.

2.6 Conclusion

In this chapter, I set the scene for the doctoral work that unfolds in the following chapters while highlighting the theoretical perspective of the study. I use assemblage theory as a starting point for my research and at the same time, I use it as a lens through which I observe and assemble the research field

[8] "To be entangled is not simply to be intertwined with another, as in the joining of separate entities, but to lack an independent, self-contained existence. Existence is not an individual affair. Individuals do not pre-exist their interactions" (Barad 2007: ix).

in digital cultural heritage. This work is interdisciplinary at the confluence of cultural heritage, open knowledge and the digital economy. To understand cultural issues, it is vital to study the domains that are intertwined with them, such as social, economic and political (Du Gay and Pryke 2002; Hesmondhalgh and Baker 2011; Piketty 2014), which form a complex net of interrelations and practices in the digital ecosystem. The assemblage concept can be helpful in investigating and studying the interrelations of human and non-human actors in the digital ecosystem and in exploring the interrelations, co-dependencies and complexities of the elements in the digital ecosystem. Moreover, CHIs have been following the open knowledge movement for some time now and a crucial point is the formation of Open Knowledge Foundation, which emerged through that, the open GLAM Working Group advocating for the use of CC licences and the public domain. However, even now, online users are not well acquainted when it comes to (re)using digitised cultural collections, in particular, when it comes to licencing, interface design and data quality (Terras 2015; Valeonti et al. 2020; Wallace 2022). Besides, the prevalence of large-scale commercial platforms has brought canonised forms of making and producing knowledge online, which are linked with cognitive capitalism (Moulier-Boutang 2012) and the knowledge economy (Choong and Leung 2021). In the context of the platform and attention economy (Celis Bueno 2017; Citton 2017), the practices have shifted, establishing the platform to be more than a medium, towards a critical infrastructure as people have become more dependent on them (Kenney et al. 2019). However, large-scale commercial platforms which prevail in the digital ecosystem – including for the production of cultural heritage purposes – implement opaque techniques throughout their value chain which make it almost impossible to be able to realise how the data are used by third-party companies (Zuboff 2015, 2019; Srnicek 2017). Therefore, it is pertinent to focus on the practices that revolve around the digital economy (Jordan 2020). There is a requirement for this issue to be investigated, as there is a growing need for new business and social models to operate in the production of knowledge (Pollock 2018; Koch 2018, 2021; Wallace and Euler 2020) and act in fairer ways to combat large-scale commercial platforms, growing inequalities and to close the participation gap, which my doctoral work seeks to address.

Chapter 3. Research Design

As discussed in the previous chapter, the theoretical lens of my work is assemblage theory, which has directed my research thinking and process. I apply assemblage theory in my work by focusing on the interrelations of the digital ecosystem and their practices. For that reason, the methodology of the project takes into account the fluidity of the emerging ecologies of open knowledge in the digital economy, as resulted from the rapid advancements both in technological developments and at a societal level. The research was designed to reflect this fluidity and implemented multifaceted methods and perspectives to achieve this. The methodology is qualitative, combining expert interviews, observations and GT approaches. It comprises multiple different ways and methods to approach and explore the interdisciplinary in the research project; cultural heritage, open knowledge and digital economy. The methodology includes organising a colloquium on the topic of open knowledge in the cultural heritage sector, visiting relevant conferences to explore and navigate the different domains, conducting expert interviews and organising a formative evaluation of the research results. A pivotal point is the implementation of GT, which is a systematic way of analysing data, while at the same time allowing the researcher to be flexible and use multimodal ways to explore an emerging field through a multisensory lens.

In this chapter, I describe the research design behind the doctoral work and the motivations that led me to choose the specific methods. In addition, I discuss my efforts to assemble the field and therefore construct it, beyond the spatial meanings of the notion "field". I also discuss the different instances of the research process through which I collected research data and the ways I analysed them systematically. Moreover, the research design concludes with the formative evaluation conducted in order to receive feedback and advance the research results in a more complete and holistic way.

Although in the previous chapters, I have thoroughly discussed the research problem, I delve here into the several challenges I had to overcome in an attempt to address the research questions. One of the challenges I encountered which was prominent both when conducting the literature review and while conducting interviews at the intersection of CHIs, open knowledge and digital economy, is exactly the wide and broad knowledge needed for being able to conduct the interviews. In other words, the researcher, in this case me, needs to be well acquainted with the research field, in order to, for example, ask the right questions in the interview process, navigate and be able to follow up on complex issues and comprehend new emerging trends. Of course, while I had predefined questions in the preparatory process, in the interview itself I needed to be able to ask follow-up questions on emerging topics, like digital technologies and its entanglement with legal issues and also be aware of new advances. I approached this issue by studying and researching about these topics as much as possible in order to be able to have an in-depth and fruitful interview with each expert. On top of this, I was studying the experts' work and research experience (i.e. relevant publications and projects) before conducting the interview with them, in an effort to delve as richly as possible into the questions. Another challenge that

I faced was construction of the field itself, or how to assemble it. In the next section I discuss this issue in depth. It was challenging to set the boundaries to an emerging field and select what to study and what to omit. From very early on, October 2018, I started participating in conferences and related events to gain a better understanding of the current status of my research field. During my participation in these events, I continuously wrote memos, which I later coded.

I also organised the colloquium of the Institute of Anthropological Studies in Culture and History of the University of Hamburg in 2019, which, from very early on in the research process, facilitated unfolding the state of the art of the research and attempting to assemble the field. The colloquium was based on the format of a public lecture series and addressed both undergraduate and postgraduate students, as well as the Institute's staff and the interested public. Taking place for two hours once a week, it was entitled "Open knowledge in the heritage sector: Reflecting dissemination, interpretation and accessibility of knowledge". I discuss it more in the respective section later. Moreover, the experimentation of attending multiple related events and taking part in related workshops aided understanding as to what was and was not pertinent to retain. In that process, memos were of great help. Periodically referring back to my research questions and research problem helped me orient myself, while setting boundaries as to what to focus on.

3.1 Assembling the field

To begin with, the research field of this work concerns the emerging field of internet ecologies of open knowledge in the cultural heritage sector in the digital economy. In this case, the field is not located somewhere specific, like it used to be in traditional ethnographic perspectives, where the researcher had to actually *visit* the research field (Gupta and Ferguson 1997) that is, when the researcher would visit a physical place to study the remote culture. The field is not one defined space in this research. It is rather scattered in a sense and needs to be assembled, owing to the fact that it was somehow an amorphous multifaceted complex. The field of open knowledge in the digital economy in the context of CHIs did not have a spatial meaning of the notion field, as discussed earlier. It was considered an amorphous fluid network. New digital media technologies and the entanglements are being unfolded almost every day. Assembling the field was interpreted, therefore, in the sense that I had to search *for* and *in* multiple different other fields, navigating the space(s) and traversing its limits and boundaries. Assembling a field that is constantly moving is challenging. However, from early on I understood that to fully realise and appreciate the field, I would need to construct it, to assemble it.

The research design used qualitative means in an effort to explore the fluidity of that emerging field. When I started designing the research methodology, I explored the possibility of including ethnographic approaches to the thesis. However, I soon realised that studying the ecologies or the digital ecosystem would not mean studying the "ethnos", that is a specific community with its specific cultural, social and other particularities. Studying the digital ecosystem could be seen as an "ethnography of ecologies".

However, due to the fact that I am focusing on studying the practices, as well as taking into the account the relationality of the human and non-human actors of the ecosystem and its relevant processes, I conducted a variant of ethnography; taking a much-needed praxeographic approach (Mol 2002). The human actors in this case are the professionals working in CHIs, volunteers, open GLAM activists, as well as the general public and the audience interacting online or offline with the institution. The non-human actors can be the actual infrastructure of the institution, its digital infrastructure and other platforms that the institute uses to communicate with its audiences, including third party platforms, algorithms and software. Researching emerging sociotechnical assemblages, such as the digital ecosystem, is challenging, however, focusing on the practices is valuable for navigating and assembling a fluid field. I designed and created, therefore, throughout the process instances and spaces where I could gather data in order to construct the field. I have included a few instances within the expert interviews I conducted, the Institute's Colloquium that I organised and observations from related events I attended and in which I participated.

3.1.1 Studying open knowledge in the heritage sector: the Institute's Colloquium

When I started conducting this doctoral research, in October 2018, there was not much that had been explored at the confluence of the domains; digital heritage, open knowledge and digital economy. As discussed in the previous chapter, there was an emergence of the open GLAM movement, however not much had been discussed about the entanglements of the digital economy. The colloquium acted as a first instance for constructing my research field in a way. Therefore, that was the main reason behind my motivation for organising a colloquium exploring these same issues. The colloquium took place in the summer semester 2019, from April to July. It was organised at the Institute of Anthropological Studies in Culture and History at the University of Hamburg as an effort to investigate the status quo and to start assembling the field. I co-ordinated the Institute's Colloquium on "Open knowledge in the heritage sector: Reflecting dissemination, interpretation and accessibility of knowledge", exploring the state of the art in the field of open knowledge in the cultural heritage sector and extending it to future potentialities in investigating the role and impact of digital economy in the cultural heritage sector. Moreover, in order to cover the whole spectrum of the above-mentioned issues, the colloquium was divided into four thematic topics; a) Introduction, b) Opening up the term "open", c) Opening up for creative reuse and d) Future opportunities: new business and social models.

In the Introductory session, consisting of two lectures which I delivered, the focus of the discussions was around the issues of open knowledge in the predigital era and copyrights. The discussion centred on the matter around whether open knowledge is solely a digital age achievement, or if it existed in the predigital era as well. CHIs have always been agents for promoting the openness and sharing of knowledge. The topic of the second block of lectures emphasised the transition from access to accessibility and open data to open knowledge in CHIs, with the title "Opening up the term 'open'". The

next topic, “Opening up for creative reuse”, as its title suggests, discussed ways for reusing and remixing cultural data in creative and meaningful ways. The colloquium concluded with the block of sessions “Future opportunities: new business and social models”, which explored the need for new models to emerge in relation to the cultural heritage platform economy.

The colloquium was the first instance that allowed me to start assembling the field, while at the same time gather research data. During the colloquium I wrote memos from the speakers’ lectures and I also had the opportunity to conduct an interview. The second block, titled “Opening up the term ‘open’”, began with a thought-provoking discussion between Dr Antje Schmidt and Philipp Geisler. Schmidt is the Head of the Digital Cataloguing Department of the Museum für Kunst und Gewerbe Hamburg, with fifteen years of experience within the digital cultural heritage field and expertise on open data and open access policies in CHIs. Geisler is a product developer at aidminutes and member and former LabLead of Code for Hamburg, with expertise on open data and open knowledge practices, previously affiliated with Open Knowledge Foundation Germany. The discussion emphasised the transition from access to accessibility and from open data to open knowledge in the CHI sector, while highlighting the need for the public domain. When organising the colloquium, I realised that such a discussion would be particularly topical for the public, as well as a basis from which I could initiate a fruitful exchange and establish the ground from which to observe the state of the art.

3.1.2 Observing an emerging field: conferences and events

As discussed in the previous section, in order to assemble the field, I had first to navigate the outskirts of other disciplines. In an effort to construct and also understand the field, therefore, I incorporated observations I had made during conferences and related events into the research design. I have included three different events during which I wrote memos extensively which acted as observations. The first event I attended took place during the first month of my doctoral studies on 24 October 2018, titled the “European Data Summit: Common Values for a Single Market” organised by the Konrad Adenauer Stiftung, in Berlin. The primary reason for attending the event was the involvement of Dr Rufus Pollock as a keynote speaker, who would discuss his new book *The Open Revolution: rewriting the rules of the information age*. As discussed in the previous chapter, this book was one of the first to touch on the entanglements of openness in the digital age and its impact on the digital economy and ultimately on society. Another reason for attending the event was its focus on the data package which was drafted by the EU Commission and concentrated on the Digital Single Market. The event was an opportunity for me to be introduced into data sharing practices in the digital economy at a very early stage of my doctoral research work. After the keynote speech, panel discussions followed on the European data infrastructure and data sharing. Attending this event was particularly interesting and important for my research as a starting point in relation to my second research question with regards to the resources required for opening up knowledge in a fair and participatory way in the digital economy.

Furthermore, through the POEM network I was afforded the opportunity of a secondment, in which I visited a partner organisation of the doctorial consortium for a specific duration to receive relevant training for my doctoral work and conduct data collection. I conducted my secondment in OKFI and more specifically within the open GLAM Working Group, which I discuss more in the next section. The Finnish Open GLAM Working Group, with which I had formed connections from late 2018, had suggested I attend the Wikimania 2019 and MyData 2019 conferences as essential starting points to navigate the most up-to-date knowledge and status with regards to openness, its challenges and future opportunities. The Finnish Open GLAM Working Group are concerned with the challenges faced within the open data and open knowledge sphere and are striving to be reflective, address the challenges and be involved in related open data events in order to be as up to date as possible. Wikimania 2019, was the annual conference of Wikimedia Foundation, the mother organisation under which many platforms and projects operate, such as the well-known Wikipedia platform, Wikimedia Commons, Wikibase – the software underlying Wikimedia – and Wikidata, among others. Wikimania 2019 was held in Stockholm 17–19 August 2019. It gave me the opportunity to explore openness from one of the greatest sources that is pioneering "free knowledge", the Wikimedia Foundation and reflect on current projects and their effectiveness in relation to open knowledge, public participation and empowerment through knowledge production. Furthermore, it was a significant opportunity to investigate Wikimedia's newest initiatives, understand their motives and needs, meet and question experts of the field and others passionate about openness, namely the Wikimedians and enjoy fruitful exchanges. Wikimania 2019 had a strong open GLAM presence with sessions dedicated exclusively for CHIs raising awareness of the public domain, amplifying the use of CC licences by the wider public, as well as a workshop on structured cultural data being more accessible and interoperable, conducted by Sandra Fauconnier.

Moreover, Wikimania 2019's theme focused on the connection of the free knowledge movement and Sustainable Development Goals (SDGs), titled "Stronger together: Wikimedia, Free Knowledge and the Sustainable Development Goals". The SDGs were adopted by the United Nations in 2015 "as a universal call to action to end poverty, protect the planet and ensure that by 2030 all people enjoy peace and prosperity" (United Nations Development Programme 2022). The role of the UN is to connect people everywhere to the work and values of the UN. Its goal is to dramatically increase the number of people in the world who directly participate in solving global challenges. Critically, this was one of the instances where my research thinking shifted towards a bottom-up approach to decision- and policy making –from a global to local perspective and vice versa. The shift to a bottom-up approach is an argument which runs through the research data, both in observations and expert interviews. Hence, it was very useful to explore the Wikimedia world through the lens of SDGs, particularly because it aided investigating what kind of impact openness can have on the real challenges that the planet and society at large are facing. This is reflected in, for example, discussions on how open knowledge initiatives support the SDGs and how these partnerships can help reduce inequality and access to knowledge. I also attended workshops and talks as a result of which I was able to delve deeper into the significance of the public domain, as

discussed by experts. During the three-day conference, I wrote memos (five pages) which I later incorporated as observations from the field.

I attended the MyData 2019 conference held in Helsinki, 25–27 September 2019. MyData Global is one of the first non-profit organisations exploring alternative data futures, beyond the current data monetisation model by the large big technological giants. It investigates human-centric approaches to the digital economy, by which people can be empowered to have rights to their own data, make use of them and benefit from them. The Next Generation Internet (NGI) Forum, which fosters an open Internet infrastructure, also took place at the MyData 2019 conference and I took part in a workshop on collective intelligence and data models. MyData 2019 emphasised human-centric approaches to data governance, critically reflecting on the current business models and silos. Indisputably, MyData 2019 was a pivotal step in my research, meaningfully impacting my research thinking and from which I gathered extensive notes. I also took the opportunity to network a great deal, which was particularly useful for conducting the expert interviews, which I discuss later.

One of the challenges that I faced during these first instances of assembling the field was how to navigate through different time–space domains, disciplines and fields and avoid becoming lost. The challenge was largely how to wander and explore but at the same time remain focused on the research and the field I was trying to construct. Another challenge was that I could not find relevant experts or projects related to the precise field of my research. For example, people were essentially working on open GLAM and others on open knowledge in the digital economy, but I struggled to find anyone actually working on the constellation of open GLAM in the digital economy. My attendance at and participation in both the Wikimania and MyData 2019 conferences nevertheless enabled me to lay a solid foundation from which to assemble the emergent research field. By gathering the dispersed domains and fields, that at first glance do not connect, or seemingly do not belong together, I understood that the process of co-constructing the research field had already begun.

3.1.3 Secondment to Open Knowledge Finland

As a MSCA POEM PhD fellow, a core part of my research project was to undertake a secondment, by which I was afforded the opportunity to explore the open knowledge scene from the inside and collect qualitative data. My secondment was set up to be conducted in OKFI, in Helsinki, which is part of the Open Knowledge Foundation. OKFI is active in different disciplines and fields, ranging from Open Government initiatives and healthcare issues, to CHIs and urban matters. The time I spent in OKFI was one of the most important phases of my research as I was able to immerse myself in the open knowledge world. I stayed in OKFI throughout February 2020. The phase of immersion while exploring the field and reflecting on one's own research is critical (Thanem and Knights 2019). I had made solid preparations before conducting my secondment to ensure that I would be able to interview key people. I had specifically chosen to visit OKFI in February 2020 as I had already spent sixteen months working

on related research, attending various events, networking, reading and learning about my field and thus felt primed to speak to the experts. The preparations for the secondment involved the careful selection of research participants and the design and formulation of interview questions. The preparatory process for the secondment was vital and the connections made until that point to the OKFI network at large and the open GLAM Working Group had been significant.

Through the POEM network, I had already formed connections with the open GLAM network in Finland. I had previously met Susanna Ånäs – the CC Global Network Council representative for Finland, Board member of OKFI and the GLAM co-ordinator at Wikimedia Finland, at that point, – as early as in December 2018 during the POEM opening conference organised at the University of Hamburg. I then connected online with Ånäs and other OKFI associates to discuss my involvement, the potential of future collaborations and imminent secondment with their affiliated institution. We met online with Tuomas Nolvi, archivist at YLE at that point, the national broadcasting company of Finland and Teemu Ropponen, General Manager at MyData, all affiliated with OKFI. We conducted three meetings from March 2019 until my secondment in February 2020. During that period, we discussed potential ways and instances in which I could be involved at OKFI. At the same time, I was conducting research on the organisation and their initiatives. They also suggested that I participate in Wikimania 2019 and MyData 2019 which they considered to be vital in the open knowledge movement, discussed earlier.

I was mindful that my OKFI secondment was relatively short and I was concerned whether it would be sufficient to enable me to collect the right amount of research data. I thus thoroughly prepared for it to ensure my involvement in as many discussions as possible within OKFI. In some cases I also met colleagues at weekends because their work commitments could not accommodate me during the week. During my OKFI secondment, I conducted a total of fifteen interviews, which I discuss in the next session. I was also involved in many exchanges and professional meetings in the context of open data such as the Hack4FI preparatory meeting and the Hack4openGLAM event, which I discuss after the expert interviews section. During the data collection, as well as the data analysis phase, I incorporated a reflective practice.

3.1.3.1 Expert interviews

The expert interviews were conducted during different stages of the research although most of them were conducted during the secondment, in February 2020, at OKFI. In total, in-depth interviews were conducted with twenty-three experts, including CHI professionals, social innovators, service designers, open knowledge activists, university professors and researchers on relevant domains. The participants were carefully selected based on their expertise in the intersection of CHIs, digital technologies and opening up knowledge to promote fairer practices in the digital economy. I would like to say that in Helsinki I visited and spoke with multiple experts from different CHIs: two experts from the National Library of Finland and the Finna service (Finna 2022), two experts from the Aalto University Archives,

one expert from YLE, one expert from the Helsinki City Museum and one expert from the Finnish National Gallery. Moreover, I interviewed independent researchers, scholars and activists working with opening up cultural heritage in the Finnish scene. Furthermore, apart from the experts' interdisciplinary focus, the participants had working and/or research experience either in the field of cultural heritage, cultural archives, open knowledge, emerging technologies, digital economy, digital humanities and social sciences. The primary factor that I considered for recruiting experts to become participants in the doctoral study was their involvement and experience within the field of the study. I did not consider ancillary factors such as education or nationality given my primary focus was to assemble and explore the research field as much as possible.

As preparation for the interviews, I meticulously crafted the questions for the experts. The interview questions were sent in advance to them, along with an informational sheet about the research aims and the consent form[9] for them to sign for the use and process of the data for research purposes. In total, ten open-ended questions were posed to the experts. There was also always space for follow-up questions, to elucidate when needed, or to explore and navigate relevant topics that would come up during the interview. The interviews ranged from three-quarters of an hour to two and a quarter hour in length. The interview questions focused on the intersection of open knowledge, CHIs in the digital economy, particularly inquiring into the impact of the current digital ecosystem and its adopted emerging technologies, as well as practices, to future memory making. Moreover, although I was asking the research participants the questions I had prepared, it was common for the questions to be adjusted and adapted to each participant's area of expertise before each interview. This gave me the opportunity to delve into different relevant topics and acquire rich, multifaceted data. In addition to the expert interviews, the conversations I had with open knowledge activists; those lobbying about its importance, the challenges and ground-setting for its realisation really played a vital role in my secondment. The opportunities for these discussions derived primarily through the networking in which I was involved throughout my stay in Helsinki.

Moreover, I had also conducted one expert interview prior to my secondment, at the Institute's Colloquium that I discussed in section 3.1.1. At the third session of the colloquium, I asked the two experts, Dr Antje Schmidt and Philipp Geisler, beforehand, if I could use their discussion as research data for my thesis and gave them the consent form for them to sign. Incorporating a live discussion of the two experts as research data, I treated it as an expert interview. Other instances in which I conducted expert interviews were linked to and derived from the networking opportunities I was afforded during my secondment, such as the Finnish hackathon, Hack4FI, which I discuss in the next section. Throughout the phase of data collection, I was mindful to include a self-reflective perspective in order to avoid establishing predefined notions and concepts. This self-reflection helped to assess the research process. In this phase, the reflective approach focused on the way I questioned the research participants

[9] See Appendix C for the consent form and the information sheet.

during the data collection phase and whether I was potentially guiding their responses and statements. Moreover, reflective memos were a deliberate part of the data collection and analysis phases, reflection having been integrated into the research process, as this is a requirement of GT, which I discuss later in this chapter (Mills et al. 2006; Lempert 2007).

3.1.3.2 Hack4openGLAM – Creative Commons Global Summit

The first round of expert interviews that I conducted, in February 2020, brought to the fore the perspective on the role of Application Programming Interface (API) for opening up digital heritage. The APIs, as intermediary software, "are located at the centre of content diffusion, therefore considered to be "gatekeepers", controlling data dissemination, while affecting future memory making". (Tzouganatou, 2021a). The codes on APIs emerging from six interviews during the coding process were apparent, however it was clear to me that I needed more evidence on that particular aspect, as I will discuss in detail in section 3.2. A great opportunity to reflect upon that need was created through the "Hack4openGLAM" instance, the first online cultural hackathon. However, my involvement with this event had begun long before I had come to this conclusion.

The open GLAM Working Group of OKFI was planning to organise a cultural heritage hackathon, the "Hack4FI", in March 2020. As I was based in Helsinki in February 2020, OFKI invited me to be part of the preparatory meetings. Hackathons are among the first instances that open cultural data started to receive attention from the public, beyond curators and museums experts. It was therefore an opportunity for the wider public to actively participate, collaborate as well as co-create, by reusing and remixing cultural heritage materials. Finland is one of the countries with a long history of cultural hackathons, the first of which was conducted in 2015. Due to their experience and expertise, I therefore considered it important to be part of such meetings. I attended two meetings; one that took place with all the museum representatives of the participating museums and another for its promotion to the press and the wider public. Representatives from the group met interested parties, such as developers and students, present the event's aims and goals and encourage them to engage. I also participated and helped with the organisation at one such promotional meeting, the "Hack4FI meets Aalto University students". This event was open to all, with free entry and took place on Wednesday, 26 February 2020 at the Aalto Learning Centre in Helsinki. It included a one and a half hour presentation on hackathons, followed by another one and a half hours of hands-on work. Apart from the open GLAM Working Group, those who attended were interested students, those interested in learning about developing their own applications, or in some cases, exploring future possibilities for their already-made initiatives and projects. During the meetings and the event itself, I took extensive notes. However, due to the COVID-19 pandemic, the "Hack4FI" was postponed – to be held online later in 2020, in the context of the CC Global Summit 2020. That event marked the first ever online cultural hackathon and it changed its name to "Hack4openGLAM". "Hack4FI" was thus able to change its shape into a global event, owing to the fact that it was held online and thus anyone from anywhere could attend and participate. Ånäs was one of

the two programme committee chairs for CC Global Summit 2020 and she also helped organise the "Hack4openGLAM" event. She had invited me to attend the preparatory meetings to organise this online event in the summer of 2020. At this point, I had analysed some of the data I had already collected and I could see that there were some areas that I needed to follow up and explore more. Hence, I proposed at this point that it would be interesting to organise a session online exploring issues of access and accessibility, focusing on the role of APIs. I started thinking about how I could design such an online event. People from the organising committee asked me whether it would be feasible for me to organise the whole first day of the hackathon, with introductory talks, discussions and workshops. I quickly realised I would need help to organise such a day and thus asked colleagues from the POEM doctoral network. Consequently, I co-organised a session about access to digital heritage and the role of APIs with POEM fellow, Quoc-Tan Tran. I share more insights from this event in Chapter 5. Through the Hack4openGLAM, I was able to recruit more interview participants, as I had realised that I needed to collect more data in the domain of APIs, as discussed earlier, after the first analysis of the data.

3.2 Grounded Theory

I have already discussed the ways I gathered and collected research data. In this section I discuss how I analysed data through GT. GT is a structured and inductive method for performing qualitative research that was introduced in 1967 by the sociologists Glaser and Strauss, who set the foundations of this method (Glaser and Strauss 1967). Applying GT was a pivotal step in my doctoral work, as it aided developing theory grounded in the research data. It derived from the need for an open-ended and emergent method (Charmaz 2008). This was particularly useful for my study, due to the fluidity of the research field, as mentioned also above. Therefore, GT helped as a practice for grasping the fluidity of the research field. The process of GT comprises several different stages, affording the researcher the opportunity to be flexible, although nevertheless in a structured and systematic way, to build the theory through a multisensory lens and multimodal ways. Ultimately, it leads systematically to the construction and development of a theory grounded to the collected research data. The material I coded included the expert interviews conducted and notes taken, which I collected when attending the aforementioned events and during the expert interviews. Once I had conducted the interviews, I transcribed them and then the coding and data analysis stage took place. The interviews transcription phase took a significant amount of time. For both the transcription and the coding phases, I used software for qualitative analysis, MAXQDA (MAXQDA 2021).

During the initial coding phase, I used open coding, which is a line-by-line form of coding. This form of coding amplifies the conceptual aspect of the analysis, as well as focuses on creating emerging categories. I started assigning codes for emerging concepts, as well as categories for concepts of a higher level (Strauss and Corbin 1990). At that stage, I was coding the material exhaustively, contrasting occurrences to the research data. I was also practising the "in vivo codes", which means that at this stage, codes were being derived from the data (Charmaz 2006) to reflect what the research participants

were saying. After the first efforts of open coding, the codes were repetitive and descriptive, which is not unusual for a GT process (Holton 2007) and thus I carried out an initial restructure of codes and categories. During the coding stages, the categories were restructured four times towards "fine coding", reflecting the data and following the GT process. Initially, 180 categories were generated, which were significantly reduced to 52 by the final stage of coding. One of the most significant steps of GT is the note taking. It can be conceived as a way to connect or bridge the raw material to theory (Lempert 2007) while helping the researcher to begin constructing the narrative. A basic rule of GT theory is to interrupt the coding phase with note taking (Glaser and Strauss 1967). Although there are many different rules and methodological approaches on how to take notes, I used at least one code when taking notes. Note taking was intensively practised during the coding phase. I was then able to identify relevant codes and categories that emerged from the collected material. The framework of this study is based on coding from the open knowledge perspective.

Moreover, during the coding phases, the so-called theoretical sampling (Glaser and Strauss 1967) was decisive. While I was coding and restructuring the codes I was able to realise gaps in the categories and I had to incorporate emerging questions and topics and consider a further data collection. This occurred after a few first attempts on restructuring the coded material, when I realised I needed more information and data on some specific domains that were evidently and systematically emerging through the data. The topics emerging and which compelled me to acquire more data, were the role of APIs and also the issue of data governance. In that context, for the first issue, I proposed the organisation of a session related to access, accessibility to cultural data and the role of APIs in the Hack4openGLAM event, part of CC Global Summit, as discussed in the previous section. Thus, at the event I invited experts to present their work on APIs, reflect on the impact on knowledge accessibility of APIs and explore further pitfalls and future opportunities for knowledge production. Through this event, I observed the complexities of APIs and how they have an immense impact. Consequently, I conducted interviews with four experts on the topic of APIs. For the issue of "governance" that had emerged via the analysis of the data, I found I needed more data and evidence and so conducted two further expert interviews.

During the analysis process, I restructured the codes and categories several times until I reached saturation point. By then, I was writing the initial case summaries. The theoretical saturation, which is a crucial phase of GT, refers to the stage when no more new data or information emerges. It undoubtedly was a challenge at the beginning because I was not sure how I would arrive at this point organically. However, while I was doing more research on GT I realised from the literature (Glaser 1978; Glaser 2001; Holton 2007; Charmaz 2008) that trusting the process, namely coding and note taking, eventually leads organically to saturation. Indeed, after making some more explorations and additions by collecting more data, I finally reached saturation and I realised that there was no need for new research data to be collected. One of the challenges during GT was the theoretical sampling and more specifically the recruiting process and the criteria for the experts. While I was looking at the data and the gaps, more questions would emerge, but due to the COVID-19 pandemic, it was impossible to meet people

physically and the recruitment process became somewhat challenging. Those I had identified as particularly relevant to the gaps I had found, were not responsive to my requests for conducting interviews. However, through the "Hack4openGLAM" opportunity and the event I co-organised, I was able to recruit more experts who were working on those issues for which I needed more data. In addition, via the online workshop I participated on "Knowledge Infrastructure and digital governance" organised by the OPERAS (a European research infrastructure for the development of open scholarly communication in the social sciences and humanities) during 7-8 September 2020 I found an expert, who was willing to speak to me about data governance. The expert is Dr Samuel Moore who was affiliated with the COPIM (Community-led Open Publication Infrastructures for Monographs) project and the Centre for Postdigital Cultures, Coventry University, at that point.

Furthermore, I applied GT in a way that allowed the data to speak first, which is particular in the way GT is used, as it creates categories and theories from the collected data (Charmaz 2008). As discussed, the field of opening up cultural knowledge production in the digital economy is still being co-constructed. In this sense, through GT, the researcher learns from the data, which is why I started coding line by line. As discussed above, while coding, I would take a few breaks to interrupt the coding process and I would write up notes. Moreover, I also took a one-month break from the coding process after I had restructured the codes twice. This was a deliberate step to take some distance from the coding process to look at it again later with fresh eyes. It was a very helpful phase because I was able to digest the process and when I came back into the coding, I was more aware of the data and the categories and was able to continue the coding process in a more constructive way.

3.3 Formative evaluation

Shortly after I had finished my secondment and was analysing the collected material, I realised that it was important to include an evaluation step. I was aware that due to time constraints of the doctoral work, I could only implement a formative evaluation and not a summative one, which usually takes place at the end of a project. However, a formative evaluation is conducted when a first prototype, or some preliminary results are gathered, that aids in the further development of the research work. Therefore, a formative evaluation was conducted after completing the first prototype of the model and the concept of the conditions of openness of cultural data. The purpose of the evaluation was to receive preliminary feedback about the prototype in order to formulate the next development stages. The formative evaluation took the shape of a focus group and it was conducted on 1 July 2021 online through the platform Zoom. It took place after the analysis of the collected data as an effort to give back to the community, discuss the results and attempt to develop a formative evaluation of the suggested models, all of which aims to aid the participatory aspect of the models' design. I believe that it is crucial to involve public participation in the design of the new models, offering co-design and co-creation possibilities, which is also well aligned with GT approaches. The perspective of GT is similar, as it "seeks to construct theory about issues of importance in people's lives" (Mills et al. 2006, 2). As

discussed in the previous section on GT, the issues and categories do not emerge from the researcher's predefined ideas, but rather emerge from the participants' responses and statements (Charmaz 2014) and the formative evaluation event would strengthen the results of the research. For that reason, I constructed a focus group sample including the experts I had interviewed, as well as those experts in a relevant discipline whom I did not interview. The aim was to construct a sample of a diverse group, reflecting the interdisciplinary nature of the research project and the results. I initially invited ten research participants to join the evaluation, but only eight participants were able to attend. The focus group was formed by Antje Theise, Director of the Rostock University Library; Susanna Ånäs, expert in open data and affiliated with OKFI and CC; Susanna Eklund, a service designer at Finna; Dr Hanna-Leena Paloposki, Curator at the Finnish National Library; Mikael Seppälä, Project Manager, Innovation Management & Ecosystems at Laurea University of Applied Sciences; Sandra Trostel, independent filmmaker, creative storyteller and researcher; and my two thesis supervisors, Professor Dr Gertraud Koch from the University of Hamburg and Professor Dr Isto Huvila from Uppsala University. The process of the evaluation comprised two steps: the preparation and the actual event. In preparation for the event, I sent preparatory material to the research participants, including a description of the project, the preliminary findings and the visual representation of the model. During the event, I briefly presented the conceptual framework and preliminary results for fifteen minutes; the evaluation itself was an hour in length. In the preparatory material, I had included four main questions that I asked them to reflect upon during the event. The foci of the validation were twofold: validating the concept of the openness of cultural data and validating the principles I had developed at that point for realising open knowledge in CHI's digital ecosystem. The process and results of the formative evaluation are discussed in Chapters 5, 6 and 7– the findings chapters, where I present and analyse the results. The formative evaluation aided the next steps of the results and in particular, of the model itself. It was crucial to receive feedback on anything that might have been omitted, what could be improved or how it could work at an optimum level.

3.4 Conclusion

In this chapter, I discussed the research design implemented, as well as the motivations and challenges behind the doctoral research addressing the original research questions. The research design echoes the interdisciplinary nature of the research and the fluidity of the field. Reflecting on that issue, the emerging interdisciplinary field was assembled, needing to be co-constructed in a sense. Therefore, assembling the field was interpreted as the way in which I had to search *for* and *in* multiple different other fields, navigating the space(s) and traversing its boundaries. Moreover, applying assemblage theory directed my research design in focusing on the relationality of the elements of the digital ecosystem, as well as their practices. This was realised in practice through the multiple aforementioned different navigations and instances, namely, attending various research events, participating in related conferences, conducting expert interviews, organising the colloquium on the interdisciplinary topic, as well as

conducting a formative evaluation of the results. In total, in-depth interviews were conducted with twenty-three experts, comprising CHI professionals, social innovators, service designers, open knowledge activists, university professors and researchers in relevant domains. Finally, the implementation of GT was pivotal as an emergent, systematic and flexible method which allowed the data to speak first and a theory to then be constructed, grounded on them. In Chapters 4, 5, 6 and 7, I present the findings as derived from the analysis of the collected data.

Chapter 4. Opening up Cultural Heritage Institutions

Indisputably, the interest of CHIs towards open access practices has been growing immensely over the last two decades following the open knowledge movement for the democratisation of knowledge accessibility and its production. When I started my doctoral research in 2018, I very soon realised that the body of scholarly literature that existed at that point for exploring issues on the confluence of open knowledge, cultural heritage and the digital economy was rather limited. As discussed in Chapter 2, cultural heritage scholars had been involved in investigating the issues of open access and its significance for CHIs and producing scholarly work with a focus on open data and data documentation. Others had been involved about accessibility and reusability issues in the digital realm, which also led to the development of the FAIR guiding principles (Wilkinson et al. 2016). Most of the academic literature emphasised digitalisation and opening up of CHI collections in a more engaging and participatory way. A lot of discussions on how digital technologies can aid CHIs in attracting and building new audiences had taken place (Kotler and Kotler 2000; Proctor 2010; Kidd 2011; Giaccardi 2012). As a result, the discussion on audience engagement and participation focused on the social and technological aspects most, often overlooking policies and motivations, as well as the role of the digital economy. Moreover, from an early stage of my research, I realised that although at first glance, my doctoral research is focused on the domain of cultural heritage, CHIs and cultural data, I had to look beyond CHIs to address the research question as presented in Chapter 3. As discussed in the previous chapter, I had to dive into different fields and arenas for that, in an effort to assemble the research field. This is primarily because CHIs are somehow quite traditional institutions, where often norms of practice take a long time to adapt to new ones, such as the urgent call for openness in the digital economy in pragmatic ways, which was extensively discussed in Chapter 2.

In Chapter 2, I discussed and reflected on the current state of the ideologies and practices of open data and open knowledge in CHIs situated in the context of the digital economy, to set the scene for the research. In Chapter 3, I discussed the interdisciplinary of the research field and how I proposed to assemble it. Chapter 4 is the first findings chapter in which I start correlating the study results and elucidate on the process on opening up. I share and discuss the research results on the process of how CHIs have opened up their collections. I contribute to the discussion of opening up CHIs and I focus on the processes that lead CHIs to open and what openness means to them as derived from the analysis of the data. From quite early on during the research process, when I attended the event "European Data Summit: Common Values for a Single Market" in Berlin, in October 2018, I recognised the significance of exploring the resources of an organisation. The resources of an institution define its mission, how it operates and why it operates the way it does. Resources in this research are considered to be anything that has utility and adds value to the digital ecosystem. Moreover, the way the resources are implemented and run is also important and basically reflects the organisation's business model. This is particular for open knowledge, as it is based on the premises of sharing rather than keeping or withholding. The latter

can be referred to as closed knowledge, where knowledge is behind closed doors, big private companies, infrastructures and platforms. In this chapter, I navigate openness through OKFI and discuss my findings in relation to how OKFI operates and the impact it has on the wider GLAM scene. I then continue this chapter focusing on how OKFI's open GLAM Working Group acted as a change agent and facilitated real change in the Finnish GLAM scene. I then conclude with an emphasis on open GLAM's impact on openness which calls for a change of mindset and practices.

4.1 Navigating institutional openness

Through my secondment in OKFI, in February 2020, I was able to explore how such an organisation works, as well as meet and interview most of the research participants of this work. I conducted my secondment in OKFI, but I was primarily involved and affiliated with its open GLAM Working Group. More specifically, the open GLAM Working Group acted as a channel for exploring the Finnish open GLAM scene, which was one of the most active open GLAM chapters at that point in Europe. Situated in Helsinki, OKFI is well connected with other Scandinavian countries when it comes to forming synergies, networking, organising related events such as cultural hackathons. It also collaborates with CC the non-profit organisation which is promoting open knowledge through CC licences, as well as the Wikimedia Foundation. Moreover, through the connections I made during my secondment, I was able to meet open GLAM advocates beyond the Finnish scene. Due to the COVID-19 pandemic I met experts and professionals online as well, such as Hack4openGLAM event in the context of the CC Global Summit 2020 which I discuss later.

In Chapter 3, I discussed how I started forming relations with members of OKFI; with Susanna Ånäs, Tuomas Nolvi and Teemu Ropponen, from late 2018 at the POEM opening conference and during spring 2019, online. This was a pivotal moment for the research process, which led me to meet and network with open knowledge activists and open GLAM experts, have fruitful exchanges and learn from them. Also, I made connections with MyData, the Finnish non-profit which is striving for a fair Internet through empowering individuals to self-determine their personal data, as discussed in Chapter 3. The concept of MyData was particularly interesting for me and had influenced my thinking and research process early on. This is because the MyData, at this point, around late 2018, was one of the very first few initiatives that challenged the current platform logic and ownership of the digital big corporations and proposed a new paradigm for a human-centric approach to the digital economy and self-determination of personal data. MyData was emerged and developed through OKFI. I was principally interested in that thinking, as I was also researching new approaches to business and social model(s) for the digital ecosystem.

To begin with, as stated in Chapter 3, one of the two research questions of my doctoral work is to investigate the resources required for opening up knowledge in a fair and participator way in the digital economy. One of the first topics I aimed to investigate at OKFI, which is connected to my research question, was how OKFI actually operates, in the sense of how it is organised and essentially, what its

business model behind the organisation. Therefore, researching how such an organisation is organised and structured, particularly in terms of resources, was timely. The open GLAM Working Group at OKFI, by the time I started my doctoral research in late 2018, was very well connected and active with other open knowledge cultural initiatives and was running related projects and events which I discuss later in this chapter. Researching how OKFI and more specifically, how open GLAM operates, it was a crucial step, as OKFI had an immense impact on the Finnish scene, for example, innovation and openness initiatives. An important aspect that I explored is that people who are affiliated with OKFI mostly work there on a voluntary basis and that is the reason why they are often referred to in the research interviews as "activists". The open GLAM Working Group members, with whom I interacted the most, have their main everyday jobs and are involved in OKFI either voluntarily, or in project-based initiatives. OKFI specifically had no basic funding at the point the research work was conducted. All of its income which supports the activities, comes from projects and specifically the small ones that are developed there. For example, MyData was part of OKFI earlier and then it became an independent association.

In addition, when I visited Helsinki in September 2019 for the MyData conference, I also met Tove Ørsted who is an archivist and has been working in the field for almost fifteen years. Ørsted held the position of a Solution Owner for Records Management at Aalto University Archives at that point. Ånäs, Nolvi and Ørsted were at this time the core team of the Finnish open GLAM. Ropponen was also a part of the core team. However, due to his deep involvement with MyData as its CEO then, his time for involvement with open GLAM was limited. Moreover, what I found fascinating was the way that the open GLAM team was formed – essentially, learning about the motivations behind the synergy. Through the analysis of the interviews, it is evident that the group was formed organically, by following the advances and needs that required to be addressed in the (digital) cultural heritage, that is, advances for the digitisation and open data. Ørsted noted:

> I have been working in the digital archiving for a long time. And I always felt that it's important to share it as openly as possible. So when I just happened to bump into these people who were just starting this GLAM network, there was just like a couple of people. Then I got directly involved because it was just what I was doing and looking for people who would support this same aim. And this was about, yeah, from the beginning when the GLAM movement started. (Ørsted, author interview, 2020)

Ørsted highlights how people who were supporting the same aim organically formed the open GLAM Working Group. Also, I observed that already at the beginning when forming the GLAM network, there were a lot of people who were quite senior in the hierarchical level in CHIs who became involved in the open GLAM network. Thus, the strength was that there were some CHIs eager to be dynamically involved in this new movement. Another particularity here is that Finland is a relatively small country and Helsinki is a small city with regards to its population, as well as that the GLAM circles are small. When I was speaking to GLAM and open knowledge experts, I soon realised that people knew each

other quite well. It could be expected that people working in the same or relevant fields and domains could know one another. However, it was common and natural for them in Helsinki that people working in the GLAM sector would know more or less their colleagues from other organisations. I observed that this was especially helpful and established a fertile ground where the open GLAM group could work successfully.

To begin with, Ånäs was the first person I met in late 2018 and she also helped me tremendously to explore the open GLAM scene and help me make connections with others in the team. During my stay in Helsinki for my secondment, she invited me to participate in OKFI and open GLAM group's Slack channel, which was an optimal way for me to meet experts and follow related news. I knew that she was very active on the open knowledge sphere through social media networks as she is also one of the leading faces of OKFI and specifically the open GLAM working group. She has been very active on open knowledge-related issues and she has also created her own projects like the Wiki Documentaries project. During our interview she explained her own project and how she divides her time for work and volunteering as well. Wiki Documentaries[10] is a website that creates pages from open data. The pages are based on the items that are available in Wiki data.[11] This project was originally based on Wikipedia articles topics and they were all collected to Wiki data. It collects Wikipedia articles and facts about a specific topic, for example, for a specific city, it would show all the mayors, the establishing year, the politics, the history and all the facts that someone can collect.

When I conducted an in-depth interview with Ånäs, I learnt more on how she divides her time in these different roles and the different "hats" she wears as an open knowledge advocate. At the point of the interview, she worked part time for Wikimedia Finland and was on the Board of OKFI as an ordinary member in 2020. She is also global network representative for CC Finland. In our interview, she discussed how the organisation is funded, where she reflected:

> The funding for OKFI has been coming from different places, like the state, private bodies and generally different places. Open knowledge has been very much about doing consultancy for governmental projects. And I think that has been the fertile ground of open knowledge. Then I think, for example, or as I said, Wiki Documentaries is one of the projects that got funding from a private foundation as well as (…) different places. (Ånäs, author interview, 2020)

It is evident from six more interviews that OKFI does not have basic funding, but rather it is more project based. People who are affiliated or doing work at the open GLAM Working Group are actually doing that as a sideline, or as part of their professional tasks or activities. They do have other work engagements, usually related to opening up CHIs, but the open GLAM Working Group does that as activist work. People affiliated with the organisation are experts working on similar and related tasks

[10] For more information on the Wikidocumentaries initiative, see the demo address: https://wikidocumentaries-demo.wmflabs.org/.

[11] For more information on Wiki data, see: https://www.wikidata.org/wiki/Wikidata:Main_Page.

and duties. There are people who, in one way or another, are advocates in the cultural heritage sphere. In total, six research participants who are actively involved in the open GLAM Working Group were dividing their tasks between their jobs and their – voluntary in most cases – work at OKFI. As I already discussed with Ånäs, working at OKFI was primarily voluntary, or project-based work.

Maria Rehbinder's situation is similar. She spoke about how she divided her work tasks and professional interest in opening up knowledge. Rehbinder is a lawyer at Aalto University and she has been working since 1994 as a copyright lawyer and with Intellectual Property legislation. She is a member of the Copyright Council of the Ministry of Education in Finland. She is also part of LIBER, which is the Association of European Research Libraries (LIBER 2022), where she is Vice Chair of the legal matters working group. She has been affiliated with OKFI for many years and she became involved with the "free culture work", as she calls it, through a colleague, Tarmo Toikkanen. Toikkanen was at that point the Executive Director of OKFI and was also very active in CC, where he asked her if she would be interested in translating the CC licences 4.0 licence family. OKFI then applied for funding from the Ministry of Education of Finland and when that was received, two additional lawyers were recruited as well as an official translator. The translation must be approved by an official translator as the licence is then used by the Finnish Government to open public sector information. The team produced the first translation that was approved by CC. Due to documentation purposes and in order to have the translation approved, they had to give a reason for every word translated. At Aalto University there is an interest about how to share data, how to open data, how to share copyright protective materials, how to disseminate them, as Rehbinder highlighted. Aalto University came into existence by the merging of three existing universities to create a research institution that would foster innovation and although all Finnish universities have societal impact in their agenda, for Aalto University societal impact and growth are central aspects. Yet, Aalto University creates societal impact in two ways; they focus on the commercialisation of intellectual property and 50% of university-based start-ups from Finland originate from Aalto University. Through the open mindset they have achieved a start-up ecosystem on campus, for example, the Slush[12] which is one of the biggest initiatives in start-up scenes, initiated by students. Moreover, Rehbinder stated that Aalto University has in many ways been promoting impact creation, both for university research and with their alumni students where they have achieved this impact both with commercialisation and then with different initiatives like Open Science. Rehbinder explained how she divides her time between her working tasks:

> The (work at) Open Knowledge is voluntary at nights, but for the Ministry of Education, I can use my work time. Anything I do for the Ministry of Education and the LIBER I can do during my work, so it's part of my job description to do these different tasks, like get involved in trying to get the voices of the universities heard, preparing legislation, because this is something (…)

[12] https://www.slush.org/aalto-booth/.

> that we should have, interaction with the rest of society, so it's part, it is sort of legitimate work for university issues. (Rehbinder, author interview, 2020)

It is also thus evident from Rehbinder that she is allocating her working time for the Ministry of Education and for the LIBER, but for the OKFI, she donates her free time. Moreover, through my secondment opportunity, I was privileged enough to traverse beyond the Finnish scene thanks to the connections I had established with the open GLAM Working Group. This gave me the possibility to view and explore the GLAM scene and its opening up through a more global lens, as well as through the open GLAM's connections. Although my research is focused in Europe, being able to get a glimpse of how the global scene has been operating for the openness of knowledge has been very beneficial.

4.2 From protecting the digital collections to realising their benefits

The analysis of the research data demonstrated that CHIs can have very hierarchical infrastructures which can intercept their capability to swiftly adapt to the increasing challenges (i.e. digital transformation), while simultaneously being congruous to their fundamental role for societal change. The simile of museums living in an "Ivory Tower" is not a new one. CHIs have been ascribed for many years now with the stereotypic impression of being "exclusive and niche" (Simon 2016). In addition, they have frequently been criticised for not being involved with current societal issues and thus not being able to champion their role for societal change due to their hierarchical structures (Sandell 2002a; Lynch 2011, 2017; Riedler 2017; Lynch et al. 2020; Crooke 2021). They have been portrayed as distant from the so-called "general public" and that they mainly address experts and professionals. CHIs have often been seen to have adopted a more traditional mindset (Hooper-Greenhill 1992, 2000), one as sterile and in some cases very traditional or even outdated in places. Fifteen out of twenty-three interviewees of this study discussed how openness and open knowledge are not aligned with robust monolithic structures and with the hierarchical infrastructures and norms that CHIs have had incorporated throughout the years. Through the interviews, it is evident, as I discuss later in this chapter as well, that a space for a new type of thinking that would align with openness and the open knowledge movement on a larger scale has been developed and simultaneously, with the change that these practices are bringing. There is often a prominent narrative depicting CHIs at large, as traditional and sterile places, where only certain people can visit or become involved with them – as if they are not for everyone, but only for professionals, or those *aficionados*. Nevertheless, as extensively discussed in Chapter 2, CHIs have been vital actors in the open knowledge movement given they were actually built on the premise of open and sharing knowledge. Yet, what I observed in the analysis of the data is that during recent decades, CHIs have been striving to alter that narrative, be socially inclusive and also be relevant to the public and society. Fifteen interviewees discussed in particular the processes that led their own institution to change and the potential stages for future improvement. In addition, they discussed how they, as professionals, were involved professionally in the open data and open knowledge movement.

Indisputably, the opening up of the collections is not an easy step to perform. This challenge was discussed frequently during the interviews and which I noted at the time. All the experts with whom I spoke discussed the significance for opening up, whether it was in terms of the opening up of the collections, namely the collections being freely available under CC licences to users for reuse and remix purposes, or through experimentation with novel technologies. In addition, fifteen experts reflected on openness in terms of extraversion and outreach, denoting the social aspect *in/of* openness. The social aspect is inherently entangled with openness. This is because openness is primarily about sharing and distributing.

The digitalisation or digital transformation of CHIs might be perceived as a necessary action, especially in current turbulent times, when the COVID-19 pandemic is impeding physical visits to CHIs in many cases. However, the digitisation of cultural assets should not be conflated with an easy or straightforward process purely because it is necessary. This is because CHIs can have hierarchical structures and therefore communication, workflows and organisation issues can take a lot of time to change in order to bring about openness. It is essentially about the logic and the mindset under which an organisation is operating and organising the data and workflows. CHIs are often seen as reserved, or even hesitant, to open their collections freely online (Baltussen et al. 2013; Sanderhoff 2013), for example, under CC licences. The first reason for this hesitancy refers to the hierarchical – at times monolithic – structure of the organisation. They operate in traditional modes and it often takes time to make alterations and adapt to new workflows. This could include having to convince the decision makers of a CHI about the benefits of opening up the collections online. As CHIs usually operate under well-established organisational and complex modes (Macdonald 2012; Tan 2013; Lynch et al. 2020; Crooke 2021), this means that news policies and/or workflows cannot be implemented immediately, until the Board of Trustees, or senior management, namely the decision makers, have approved them first. In this case, the decision-making takes a lot of time and the process is slower. Owing to the fact that CHIs hold the "responsibility" for the preservation and conservation of cultural heritage and for retaining our collective memory, they operate in well-established modes. It is evident from my fieldwork that such an institutionalised approach requires a lot of time to convince the right people that loosening control of cultural data is urgent and that it would also be beneficial for the institution in the long term – to open up their collections free of copyrights, advocate for the public domain, where possible in legal terms, of course.

As discussed earlier, the notions of protecting and preserving cultural heritage have been at the centre of the CHI mission. However, from very early on during my doctoral studies I realised that this alone is not enough for a meaningful engagement and participation. This was an important realisation in the light of the need for CHIs to open up their collections, make bridges with the public and build a reciprocal relationship on the foundations of participation and collaboration, rather than have their collections locked away in physical or digital warehouses to protect and preserve them. Drawing from CHIs' role as actors of social change, the dissemination, reuse and remix of cultural assets are pivotal steps to bring

about such change. Bringing cultural assets into the present, making the collections relevant to the public, enhancing their engagement and meaningful participation is pivotal. Cultural heritage needs to be protected unscathed for future generations (Sanderhoff 2014), as well as shared in the present so that future generations can envision inclusive societies through collective memory making, which is a central aim in the context of the POEM project. Moreover, cultural heritage has a social dimension and this is why it aligns with openness, the sharing of knowledge and its exchange. An extensive body of literature highlights the sociality in cultural heritage contexts (Heath and Vom Lehn 2008; Jafari et al. 2013; Katifori et al. 2020) as heritage is a social practice (Smith 2006; Byrne 2008) and the social context shapes a crucial role in visitors' experience (Falk and Dierking 1992). As cultural heritage assets are considered to be assets for the people as argued in Chapter 2, in this section I discuss the findings related to the first steps for opening up the collections online. The process of opening up the collections through digital means is a complex issue, one that requires a lot of different steps. It is also not the final stage. In other words, it is not a destination, but requires constant negotiations (Kidd 2018) derived from the data analysis. As Kidd (2018, 204) states: "There is a tendency to see the digital as a way of opening up access, democratising heritage and broadening its scope, but these things are never inevitable and need to be subject to honest and repeated appraisal." Still, in order to perform the opening up of the collections, it is crucial to discuss what those stages are, or even the events that have taken place before the actual launch of the opening. From my fieldwork and data analysis, I have observed that such events denote the most crucial stage. This is because this stage is considered to be tremendously decisive, owing to the fact that it leads to a change – (towards) openness. It also means that the collections before that stage were somehow *closed*. Hence, discussing the "hows?" and "whys?" behind a CHI's digital transformation towards openness evolved organically as a result of discussions with the experts interviewed. The interviewees particularly emphasised these prior stages and how they set the ground for the next steps.

4.2.1 Open GLAM Working Group as a change agent

When I was analysing the data collected during my secondment to the Finnish Open GLAM Working Group, it was apparent that there was a common reference point which was crucial to how the GLAM experts became involved with open data in a professional setting. The common reference point was the involvement of the open GLAM Working Group of OKFI and more specifically Dr Sanna Marttila and Susanna Ånäs. Marttila had given presentations and seminar lectures about open cultural data and best practices, as well as viable strategies for their implementation. At this point she was affiliated with OKFI and the open GLAM Working Group. During that period, Marttila was conducting her PhD at Aalto University titled "Infrastructuring for Cultural Commons" (Marttila 2018) and she was studying and investigating topics relevant to open cultural data for her own dissertation. Moreover, GLAM experts' own professional engagement was pivotal, owing to the fact that this engagement acted then as a snowball effect, influencing others in their organisation and then ultimately the whole GLAM itself,

which led towards the opening up of museums. Seven interviewees explicitly describe how Marttila's work has been extremely influential and particularly beneficial in the early steps of forming the open GLAM vision in Helsinki and establishing ways of promoting openness in the context of CHIs in Finland. Marttila was one of the leading faces of the Finnish Open GLAM Working Group, where they established cultural hackathons and lobbying about openness in the cultural heritage sector. Furthermore, Marttila's influence was significant in the Finnish GLAM scene. During the expert interviews that I conducted, seven research participants have been referring to her as "the face of open GLAM in Helsinki" or "the activist", denoting the crucial impact she has in somehow helping to transform the GLAM scene in Helsinki. One of these examples, where Marttila's influence was prominent comes from the Helsinki City Museum that I discuss here, to explore the transition and process towards openness. In an interview I conducted with Aki Pohjankyrö, Curator at the Helsinki City Museum at the Picture Collections, he shared extensively how the museum had the vision to open their collections digitally and how it began, as well as its development. In 2010, the Helsinki City Museum developed their first related project. The project, was called "Online Shop",[13] and as its name suggests, it was a project to sell digital images online. At that point, the museum's practice was that they should open the collections online and offer the public the opportunity to buy images easily while at the same time, generating revenue for the museum. In most Finnish CHIs however, even when the digital asset is out of copyright, there was or still is a digitisation fee to be paid in order to acquire the file. This means that the museum can only give freely a preview image of the asset, a low resolution image, or even a digitised asset with watermarks. Pohjankyrö stated that this model is based on the work they do when they give away the file. That was also the model under which the Helsinki City Museum used to operate, when they also sold files. However, then, the open GLAM Working Group and particularly Marttilla's work and expertise was crucial to alter their mindset and practice. Pohjankyrö elaborated on that note:

> I think that the open GLAM Working Group and especially Sanna Marttila's work, because she was the activist in Finland, visiting museums and memory organisations and organising and telling about, 'Hey, you can open data and it's a good thing. It's better to be open than to have it closed and guarded.' But it's been a big change. (Pohjankyrö, author interview 2020)

Here Pohjankyrö makes an important point that was also stated by other experts, one which shows how people can act as change agents, in this case Marttila's influence. He highlighted in particular how Marttila, in the context of the open GLAM Working Group within OKFI, helped to alter the museum's mindset from operating as a controlled process to understanding how openness is capable of transforming the museum's work and able to benefit from it as a result. During our interview, Pohjankyrö specifically described Martilla's influence on the museum setting, adding that it was amplified by her visiting museums as well. Pohjankyrö was also one of the seven experts who explicitly

[13] In Finnish: *verkkokauppa*.

discussed that on a professional level he became involved in open knowledge initiatives after Marttila's seminar about museums and open cultural data. Therefore, after the open GLAM Working Group's impact, in 2014 the Helsinki City Museum opened their first digital collections on a big scale on the Finna (Finna 2022) service. Finna was developed by the National Library of Finland and acts as the National Aggregator for Finland. It was evident that over the last ten years the logic has changed in the Finnish GLAM scene a lot, from protecting the digital collections to actually realising the benefits of opening the data.

Furthermore, Dr Hanna-Leena Paloposki, Senior Researcher at the Finnish National Gallery who is also affiliated with the Finnish open GLAM Working Group and has been actively participating in related initiatives (e.g. she would play an active role in the "Hack4FI" cultural hackathon[14] in March 2020 hosted by the Finnish National Gallery), shares similar opinions with Pohjankyrö. The Finnish National Gallery was one of the first CHIs in Finland that had their own collections website. It was not open data at that point, but it was one of the first in Finland that had put their collections online around 2007. The first open data project was realised in 2012 and was about a digitisation project of an old collection of glass negatives which belongs to the archives collection of a famous photographer, Daniel Nyblin, who photographed contemporary art of his time at the end of the nineteenth and beginning of the twentieth centuries. Paloposki, during our interview, discussed how the open GLAM Working Group influenced her own thinking and simultaneously acted as a change agent for the mindset and practices of the Finnish National Gallery:

> I was contacted by open GLAM activists, it was actually Susanna Ånäs, who was saying if we had any material that we could /would publish as open data. And we were like 'what is all this about?', because I didn't know anything about it. But, that was how it started. (Paloposki, author interview, 2020)

By this, Paloposki is actually highlighting the strong impact of the open GLAM Working Group on the process of making her and the National Gallery realise actually just how to tap into the potential of open data.

4.2.2 Towards changing the mindset and practices of cultural heritage institutions

However, indisputably, as derived from the analysis of the data, there is an issue of control that is emerging through practices of opening up cultural data online and via CHIs. Fifteen experts discuss this emerging topic, which is also intrinsically related to why the process in many CHIs took so long to be realised and in some cases, continues to be negotiated. The Finnish National Gallery had started to be profoundly influenced by the open GLAM Working Group. They then published some collections, with

[14] As discussed in the previous chapter, the "Hack4FI" was postponed due to the COVID-19 pandemic and took place in the context of the Creative Commons Global Summit 2020, with the name "Hack4openGLAM" online.

different kinds of CC licences, because for the first time when they published the Nyblin collection with CC-0 licence, it "just seemed to be too much for all of us" Paloposki highlighted. Then the big opening took place with the copyright-free art works, which was over 12,000 artworks, with CC-0 licence in 2018. They had also conducted some smaller steps before, for example, there were some smaller collections that were opened up before that. The Finnish National Gallery still had at that time their former website, which was "tool old" according to some research participants. However and although they were planning to have a new website, they still decided to open up this huge number of artworks rather than wait for the new collections website. At this point Paloposki was conducting her work exchange internship at the Europeana Foundation in the Hague, as she discussed during our in-depth interview:

> We also wanted to update our datasets there and then everything was ready. Also, when we then opened up the collections, so we could change the licences at the same time, so we had it both on our own website and at the Europeana. That was the last big opening up, but now we have changed (...) we have a new collections online website which is the first time that we have all of our collections at the same website because we also have big archive collections. (Paloposki, author interview, 2020)

Thus, they have combined both art collections and archive collections in the same website because they now have a new collections management system which hosts both collections. Paloposki elaborated extensively on the "whys" of the opening up process which has been rather sluggish and why CHIs often hesitate to open up. She also discussed making a "leap of faith" for opening up collections with open licences where possible. She reflected on how the process took a lot of time for them to realise, for example, which licence was the most appropriate for each case. Moreover, she explained why the process took time due to the nature of CHIs' traditional structure and because part of their mission is to control and curate the assets:

> For example, this first dataset of Nyblin, it was licensed under CC-BY-SA and because then we thought, 'oh you can just put them with that licence' but after all these years and different sets, we have realised that anyway you can't control, even if you have it like that, you can't control if somebody is actually following these licences. So we thought 'ok', because we can't control what is the use coming in them in that way. (Paloposki, author interview, 2020)

Traditionally, CHIs had ultimate control over cultural assets, how they were interpreted, showcased, presented and so on and so forth. However, it is evident that the process of opening up requires a transition: from having the data, information or knowledge guarded and being the only body (i.e. CHI) responsible for their preservation and consequently interpretation, to moving towards a more distributed form of caring about that knowledge and being responsible for its distribution, towards a bottom-up mindset and practice:

> Museums usually – their means of opening their collections, have been exhibitions and books or exhibition catalogues. And it has been really controlled: the museum can control everything, how they look, what kind of text they present connected to the collections. And it has been really like a controlled process. And the opening is the opposite. (Pohjankyrö, author interview, 2020)

Thus, traditionally, as Pohjankyrö and Paloposki discussed earlier, it was the CHI who had control over cultural assets. The CHI was responsible for the curation, interpretation, conservation and preservation of cultural heritage. With the digital advances and the wider digitisation of cultural assets online, the CHI considered that they still needed to have control over the digital assets. It was hard for CHIs to change their roles in the digital age and that is why the transition takes a lot of time. Nevertheless, currently, there are CHIs that have stricter policies on related issues yet are still the copyright holders. Undoubtedly, this has not been a quick and easy step, but rather it has been a slow process for Finnish CHIs to realise the benefits of opening up – still operating as custodian of the collections but selling the digital images at the same time. The social aspect and dimension of open cultural data is immense. Thus, controlling the assets as Pohjankyrö stated is not aligned with openness, as "openness is the opposite". Controlling digital assets and not letting them tap into their full potential can actually be considered a hindrance for users. Pohjankyrö, together with other experts, identified this as a significant problem. Furthermore, Pohjankyrö elaborated that he believes there is also another issue related to controlling. He compared the way in which the internal CHI system used to work and connected it with the issue of "controlling" –CHIs deliver accurate information and they are often seen as the distributors of true and right knowledge. He highlighted that there is a "mental obstacle" which is rooted in CHIs in the way in which the data has been entered into the databases; the mindset that it is purely an internal tool – only for the museum personnel to use:

> They (the CHIs personnel) can also always interpret the data and fix it if needed, before they go to the customers or the users. So the museum has always been in there like a mediator between the raw data and user. So it has always been a curator or a museum person who has checked the data and the picture. That was the old model. And the new model, when you open the raw database, you'll get it. You put it online and people can look at it with all its mistakes and all the … it's not perfect. Yeah. And I think that's one of the big mental obstacles that the museum has to overcome to kind of realise, or just accept that the data is not perfect. (Pohjankyrö, author interview, 2020)

What Pohjankyrö expressed here is essentially why openness is opposed to controlling. People believe CHIs are trustworthy places and bodies and that is the reason why they feel obligated to "speak the truth" and their data cannot have any imperfections. The main "mental obstacle" is derived from the interview with Pohjankyrö in which he highlights:

> I think the mental obstacle has been because there's this issue of trust and kind of a really, really edited and high-quality data that the museum puts out that has been fact checked. (Pohjankyrö, author interview, 2020)

However, imperfect data cannot be perfect and maybe people can help make them better. From the analysis of the data, I observed that there were also two other experts that expressed that the issue of control stems from the fact the CHIs have been considered to be trustworthy organisations. However, Pohjankyrö made the important point that "even opening the incorrect data (…) there are benefits from that. You just have to tell the users, that they don't regard it as truth." CHIs are sceptical in giving the control over cultural data to the public due to the fact that the metadata have been curated very well by the research staff.

Related to the issue of "controlling", I use the example of Hanna-Leena Paloposki that I had briefly discussed (Tzouganatou 2021), which she shared with me during our interview. She stated that when a CHI attributes to an asset a CC0 licence, it is rather like giving carte blanche to people, that is, they can do whatever they choose to do with it, without actually citing which asset it is, for example, the artist or what the painting they have created depicts. She mentioned that traditionally the museum's work encompasses the notion that information would, or even should, accompany the cultural asset. This is part of the museum's work that as discussed, traditionally aims to preserve and curate the assets they have acquired. Museum curators have been trained to do exactly that; curate the museum's assets. They curate the context in which the asset is set and verify the details. That is why CHIs are considered to be the source of the "right" information, producing true knowledge. CHIs are not challenged for the knowledge they produce and depict because it is understood that there is scientific reasoning at its foundation and it is precisely here where the control issue emerges. When a CHI digitises an asset and attributes to it a CC licence, then the users can take that (e.g. artwork) and use it in any way they choose. However, CHIs then have to waive their responsibility to a certain extent in the knowledge that the artwork could be presented without any contextual information, namely metadata and that is exactly the problem of controlling. It has been challenging for CHIs to envision that someone could procure an asset without knowing who the artist is, what the asset depicts, along with any other information related to it. Thus, the issue derives from the asset being without any context, although curators have been striving to curate cultural heritage assets to avoid this issue. This is linked with the issue of not being able to control how the asset can be used. As CHIs are considered to be the bodies of preserving cultural assets, concerns have been raised as to how assets might be reused, or possibly misused and what the user could produce from them. The issue of misuse has been significant in terms of CHIs being sceptical in making a "leap of faith".

Although I have been focusing to CHIs in this work as a whole, I have elaborated earlier principally on galleries and museums, namely the Finnish National Gallery and the Helsinki City Museum. I now turn to discussing archives. Traditionally, archives have been more distant than museums in the sense that

museums are more accessible; people can walk in and see the artefacts and exhibitions. Museums have always been pedagogical for everyone. However, currently, the difference between archives and museums is perhaps more obscure and museums might not be seen as very open anymore. I observed that museums used to be perceived as being more open than archives, in the sense that their doors are open to the public as they can visit to view the artefacts on display. Ørsted who was working at the Aalto University Archives brings an archivist perspective to the table. She discussed in detail how archives have in the past not been so accessible but how digitisation and the concept of openness have been tapping into their potential. She highlighted during our interview how archives are not considered to be as open as museums:

> There's been a shift because archives used to be locked. They used to be open only for researchers who already know the archive and know what they are looking for. And there was an archivist who helps them. And it's very slow and it's really behind locked doors. And a museum – they have been the open part, kind of. (…) Usually the archives are still in cellars and behind locked doors and they have to be because they have to be in a certain environment so they will be kept preserved well. (Ørsted, author interview, 2020)

In general, archives, in contrast to museums, are often not visited by the general public and this is because of the nature of the institution as well, which is linked to the conditions in which the assets are being held, for example, Ørsted highlighted the particular environment that is needed for preservation purposes. The archive, therefore, needs to be more "closed" or even "locked" and is more targeted to experts and researchers than the general public. This also equates to the topic of control which Ørsted discussed:

> Well, within the GLAM network, we struggled a bit with the licences – which licence would be the best suited? And there's still kind of a dispute between the public domain mark and the Creative Commons BY. Many institutions want to have the Creative Commons BY licence because the worried archivist who does not want things to fly away on their own. So they want to force people to have the source included. I do not think it's going to work. And it's not right to have a Creative Commons BY licence if it's an old piece of work. So it's a kind of desperate try for an archivist to have some control, which they are not going to have anyway. But it's understandable. I understand where it comes from and they feel like that, well, at least we forced them to give the source. (Ørsted, author interview, 2020)

Here Ørsted shared her perspective as an archivist and elaborated on how the "worried archivist" tries to maintain some kind of control by attributing the CC BY licence to the asset. However, although they were trying to find ways to retain some kind of control, they know that this is not quite possible, or even feasible. People usually forget to assign the source, or it could be that the first person who uses an asset

from a database cites the source in their work but the next person to use the asset, taking it from the first's work, omits to cite the source and then the link to the archive is lost anyway.

Another expert who discussed the issue of control by CHIs and connects it to how openness needs a new mindset and practice is Jolan Wuyts. Wuyts works at Europeana currently as a collections editor and a project manager in the collections engagement team. The background of Wuyts is in history; he received a master's in digital humanities at the University of Leuven. He was able to work as an intern at Europeana for his thesis internship assignment. After the internship, he wrote his thesis on the API documentation of Europeana and then when he completed his studies in 2017, he continued to work at Europeana. When I conducted the interview with him in late 2020, he had been working with Europeana for three years, in the collections engagement team. He stated that working in such a team requires an understanding of how to engage the audience through the collections in a scientific way. As he discussed, the goal of the team is to "share the great stories and narratives that are hidden in our database of digital cultural heritage with as many people as we can". Therefore, the team's work focuses on "digging" into those databases that store cultural heritage assets from all over Europe. They are trying to highlight the stories they think are interesting, or could potentially be of interest to some people. Being part of the team involves working on creating blogs, digital galleries and digital exhibitions. Wuyts also mentioned how over the past three years he has leaned more towards becoming the translator or mediator between his team (which is a very non-technical team, consisting of mostly historians, linguists and those who like writing stories such as editors and bloggers) and the technical teams at Europeana because they work a lot with online platforms. He articulates the needs and requirements of the creative writers to the technical teams. Thus, he makes sure that Europeana's developers know what is needed, what is not working and/or what can be improved. He is working daily with developer teams working on platforms about digital cultural heritage. He stated:

> It's a big challenge to convince all of these museums and other cultural heritage institutions to open up because it really necessitates a change of mindset. Especially in museums, I've experienced that there are a lot of older people in high positions that are very used to their museum being a very high standing important academic place for high art, let's say. The mindset there is often that they are the keepers of this knowledge – of this art and they have written all of this metadata about it (…) and it's in their best interest to protect it as much as possible. So, offering that and making it accessible online for everyone is such a kind of shock to their mindset that it's very hard to change it. (Wuyts, author interview, 2020)

Wuyts, here, holds the same views as the other interviewee experts, namely, that because CHIs are considered to be "keepers of this knowledge" and have prepared all the metadata and related material for the data to be released they are trying to protect it as much as possible and that is why it is taking so long to change towards openness. This relates quite well to how the openness of data is more about how a lot of CHIs are often reluctant to surrender control of the data. In addition, Wuyts discussed another

issue related to control: the ideology that CHI experts often fear putting a large part of their collection online. Wuyts stated that CHI curators believe that if they put all their collections online, the public "won't come to our exhibitions anymore". He reflected on the ideology of some experts where they claim that:

> There will be no reason for them (general public) to step through the CHI door if they can find everything online and use it themselves. (Wuyts, author interview, 2020)

There continues to be a feeling of wanting to retain control over the data that these institutions create. In order to address this issue, Wuyts, stated:

> In this case I have observed that what really works is to point out other cultural heritage institutions that have done this, that have achieved really good results with it, that have been very successful. (Wuyts, author interview, 2020)

Essentially, he is referring to other institutions showcasing best practices. The results are reflected in, for example, data i.e. the number of visitors. Analysing the data always works because of CHIs' fear that people will not visit their actual exhibitions anymore. The data actually shows that the more widespread a CHI is online, the more people are interested in it, as Wuyts stated during our interview. If people see a beautiful painting online, they might want to visit the institution so that they can appreciate the authentic one in person. Wuyts expressed his view:

> Even if you publish all of that online, if you publish all of your audio guides and all of your catalogues online, even that generates more interest. So, it's often the opposite of what curators or exhibitors think. And, yeah, one of the best ways I've seen to force them to see [the benefit] is by just saying, "look at what this data shows you". (Wuyts, author interview, 2020)

Wuyts stated the importance of communicating best practice to senior management in order to be able to convince them of the benefits of opening up the collections online and that there is no data evidence to suggest that when a CHI digitises its artefacts and uploads them online, they will have fewer visitors. Rather, it is quite the reverse. All the large CHIs, for example, the MET or the Smithsonian Institution, are still the most visited and most important institutions in their field. Ørsted refers to her own archival experience, where she stated precisely the same, namely, that the public is intrigued when they see a digital asset online and as a result, they may want to see the authentic version at the institution in person:

> We have noticed that the more we put on online and digitise it, the more we have people asking to see the real thing and people longing to be able to, you know, feel the paper and look at the materials that have been used. So, after we made a really nice picture, high resolution everything, we packaged them in, like, silk paper and put them away in like a box and far away in the deepest end of the archive because now we have the digital copy, we don't need to open

> these anymore. Yeah, but then this happens that people are looking, like, "Oh, this is so beautiful. I would love to see this in real life". So, then we have to open it. (Ørsted, author interview, 2020)

Ørsted stressed that the digitised assets are not replacing or acting as a substitute of the physical asset. Rather, she stated that usually the digitised material acts as a motivation and incentive to the users to visit the CHI to see the assets. The research participants highlighted the need for a new mindset and practices. Moreover, Mikael Seppälä, stated the "new type of thinking", while fostering openness, would be able to integrate the growing complexity. He connected the new type of thinking that is required as being a way to be able to comprehend the growing complexities that stem from the digital ecosystem. During our interview he said that in order to grasp this new type of thinking, we should start creating new ways to operate in "decentralised manners" (Tzouganatou 2021). Indicative of this is the statement of Pohjankyrö. Pohjankyrö specifically discussed the challenges and how this process has been a paradigm change:

> Yes. I think it's a paradigm change. When museums come down from the "Ivory Tower", let's say and can admit that, hey, actually, the users might know more about the subjects than the museum itself because the museum can't be experts in everything. I think it is actually a healthy change because now there's discussion and there's a dialogue. When you open the data, I think it has actually changed the mindset of the museum professionals so that you have to engage with the audiences and admit that sometimes, especially when you're talking about these niche groups of, like, hobbyists for trams or boats or planes they have these expert groups that they don't do it professionally, but they know a lot. Actually, usually those groups know more about the niche subjects than the museum professionals can ever know. (Pohjankyrö, author interview 2020)

Pohjankyrö embraces a bottom-up approach, stating that the museum can also learn from the public and be engaged in an actual reciprocal relationship. The new type of mindset that has been discussed by the research participants has created and allowed a space for participation from the audience, as Pohjankyrö expressed. Undoubtedly, CHIs need to start opening up to maintain relevancy but this requires challenging pre-existing structures, norms and ideas, which can include hierarchical structures and pre-conceptions regarding authorship and control as well (Macdonald 2012; Tan 2013; Lynch et al. 2020; Crooke 2021). This process necessitates a change of thinking, mindset and practices.

4.3 Conclusion

Having taken all the above into consideration, a significant issue that was emerged during the analysis of the data is that CHIs are still reserved in some cases when it comes to opening up their collections online, considering the risks associated by losing control over data. It is evident that the Finnish open

GLAM Working Group acted as facilitators and change agents, impacting the way CHIs practise collection development and foster them to open up their collections online. Indeed, CHIs are reserved when it comes to loosening the control over cultural data, for example, metadata that are very well curated by the research staff, as it is in their best interest to protect them as much as possible. Moreover, there have been fears over the years by CHI experts in the light of the digitisation process of the cultural assets, that fewer people might visit their exhibitions and cultural institutions. This has been a prominent debate among the kind of traditional museum work, thinking and mindset and on the other hand, openness. These are some of the crucial issues why CHIs seem to be hesitant when it comes to opening up their collections online, under, for example, CC licences. As evidenced in the chapter, this hesitancy is linked to the hierarchical – at times monolithic – structure of the organisation. CHIs operate in traditional modes and it often takes time to adapt to new workflows. This could include convincing the decision makers of a CHI of the benefits of opening up the collections online. CHIs are usually operating under well-established organisational and complex modes as they hold the "responsibility" for the preservation and conservation of cultural heritage and for retaining our collective memory. This is due to issues related to preconceptions regarding authorship, ownership and control of cultural data (Tan 2013; Crooke 2021; Macdonald 2012; Lynch et al. 2020), which are connected to the nature of their mission and considered to be "keepers of knowledge". Digitisation strategies and the open knowledge movement have played a key role in nudging museums to shift their perspective from "absolute authority", to embrace decentralised practices of the control over cultural data. Accomplishing this requires a shift, as shown and a change in their mindset and practices. The new mindset of CHIs can have the potential to unleash and tap into co-creation and co-producing knowledge practices that are much needed – collaborating *with* the public. In the next chapter, I reflect on the notions of access and accessibility in knowledge production and discuss ways by which open access can lead to open knowledge, by making the assets accessible.

Chapter 5. From Open Access to Open Knowledge

In this chapter, I shed light on the shift from open access to open knowledge, which plays a significant role in establishing practices for enabling a participatory culture, as the interview record showed. In my work, "open access" refers to the notions, policies and practices that CHIs implement for opening up their collections online and not to the "Open Access (OA)" publishing term. When CHIs initiated digitisation projects, the focus was on user access to the collections and experimentation with novel technologies as well as social media networks while building and attracting new audiences. However, the engagement, as discussed in Chapter 2, was rather superficial, as it can happen through social media networks and their functionalities of "like" and "post". This is translated perhaps as a minimum or superficial engagement and it is more like an attention seeker function in the context of the attention mechanisms operating in the digital economy (Citton 2017; Celis Bueno 2017), than a meaningful engagement, let alone participation. It often does not delve into more detail or deeper to a meaningful engagement. Data, information or knowledge that have inundated the Internet, a portal or simply a CHI's website is not particularly open knowledge. To address this, there are several issues that needed to be investigated such as with regards to their metadata and/or the documentation process of the digital asset. If the asset is online with no – or limited – contextual information, then it most likely is information, or data, but it is not knowledge. There are different elements that could be taken into account for transitioning from open access to open knowledge. I delve into these aspects in the next two sections.

5.1 Opening up the term "open"

As discussed already in Chapter 2, open knowledge is what open data becomes when it is useful, usable and used. All the twenty-three experts shared the perspective that open knowledge is useful when it can be reused and remixed. "Open means anyone can freely access, use, modify and share for any purpose (subject, at most, to requirements that preserve provenance and openness)." (Open Knowledge Foundation 2021a). Indicative of these notions that I discussed with cultural heritage experts is Andrew Paterson's statement on what "open" is. Paterson is affiliated with Pixelache and was a Doctor of Arts candidate at Aalto University ARTS Dept of Media at the time I conducted the interview. Paterson reflected on the views of openness:

> Openness for me, one quality is that is malleable, it is possible to change (…) that it is transparent, that you can see through things. (Paterson, author interview, 2020)

Paterson here gives the perspective of openness being malleable, namely having the possibility to change. In total, ten experts on the open GLAM domain shared similar views on the malleability and transparency issue. However, CHIs that want to open up their collections online have adopted the terminology "open access" to refer to open policies that have been implemented by CHIs. Still, the terminology of "open access" can be confusing with regards to what it actually means. In this coming section I explore and discuss the concept of access and extend it to accessibility in relation to openness.

5.1.1 From access to accessibility

In the rapid digital transformation, CHIs have increasingly started to provide and extend access to their cultural assets by digitising their collections, making them available online and launching open access initiatives. However, there is, at the time of writing, a lack of consensus from CHIs on what (open) access actually means (Wallace 2022). According to Effie Kapsalis, Senior Program Officer for Digital Strategy at the Smithsonian Institution, "open access is defined as making public domain materials open for use without any restrictions and making copyrighted materials available under the provisions of fair use (non-commercial, educational)" (Kapsalis 2016). In my doctoral work, the notion of accessibility, goes beyond the access part, towards making it actually useful and (re)usable (Terras 2015a). Access and accessibility are not interchangeable terms, yet the question still remains; how to move from (open) access to accessibility and consequently to open knowledge. This is one reason why, in spring 2019, I initiated the Institute's Colloquium on open knowledge at the University of Hamburg, as stated in Chapter 3; to explore and investigate more about open access, accessibility and openness issues and initiate a dialogue and learn from open GLAM experts.

In order to cover the whole spectrum of these issues, the colloquium was divided into four thematic topics, as discussed in previous chapters; a) introduction, b) opening up the term "open", c) opening up for creative reuse and d) future opportunities: new business and social models. In the Introductory session, comprised of two lectures which I gave, the focus of the discussions was around the issues of open knowledge in the predigital era, as well as copyrights. CHIs have been agents for transmitting open knowledge ideas, which is something that was thoroughly discussed in Chapter 2. Following the introductory topic of the colloquium, the theme session "Opening up the term open" followed with a thought-provoking discussion between Dr Antje Schmidt, Head of the Digital Cataloguing Department of the Museum für Kunst und Gewerbe Hamburg and Philipp Geisler, product developer at aidminutes and also a member and former Lab Lead of Code for Hamburg, as stated in Chapter 3. The discussion began with a TEDx talk video[15] at the University of Heidelberg titled "Open Data to Open Knowledge" by Eileen Wagner, previously affiliated with the Open Knowledge Foundation. I led the discussion between Schmidt and Geisler. The emphasis was on the transition from access to accessibility and from open data to open knowledge in the CHI sector, while the need for public domain was highlighted. Geisler stated that:

> Code for Germany and the Open Knowledge Foundation itself were basically invented to address the issue of accessibility. (Geisler, author interview, 2019)

Moreover, in her TED talk Wagner discusses providing examples on how to use this data for the common good. As Geisler stated during our discussion, it was this similar idea of creatively reusing

[15] The video is available through the YouTube platform: https://www.youtube.com/watch?v=lM0U0i2TNkQ Last date accessed 15.10.2021.

cultural data that was taken or transported over to the cultural data with the Coding Da Vinci Hackathon format. During these hackathons to which the general public is invited, alongside programmers, developers and anyone interested in history or art and culture the aim is to work together to come up with creative ideas of "What can you do with the data?". The question that came up many times during the interview was: "How can one make use of all this digitised history and art and come up with creative ideas for reuse?" Geisler stated:

> What I think is interesting and an important part of accessibility is how to reach the right people. And because as Eileen (Wagner) said that as well – just to have the data open is relatively unimportant, it's a basic necessity. But as long as nobody knows it's there and nobody knows how to use it, it could as well just not be accessible at all. That doesn't matter. And so we need to reach people who may be interested in working with the data and tell them that it's available and that they could do something with it. (Geisler, author interview, 2019)

How to reach the right people is a question that has been discussed more and more around CHIs and the cultural heritage sector. Experts are talking a great deal more often about user-centred techniques and methods that can help the assets to be findable and accessible by their target audience. If a digital asset is out there on the Internet, but no one can actually find it, is it even there? Is it even accessible? There is a significant difference between access and accessibility and Schmidt reflected on that:

> I think for cultural collections, access doesn't even mean that it's open. It just means it exists online or this is how it could be understood by some people. And what I always try to explain is: what is the difference between access and open? And so actually, I was asking myself, why is access not enough? And this is not an accessibility problem, but it's also the open definition issue. And all the initiatives that we are seeing now in the digital cultural heritage – this sphere – is that we all talk about open access policies, but it's actually not open access policy. So the open policies and not open access because open access is not enough for this. Reuse is the important part. (Schmidt, author interview, 2019)

Here, Schmidt makes a significant point, that open access – notions or policies – do not hold the same validity if the materials cannot actually be reused. That issue was extensively discussed as well among eight other interviewees who are experts and activists on the open GLAM domain. Ånäs during our interview highlighted:

> In terms of renewing the open GLAM principles, that's happening this year, I'm also starting to use certain terminology. And I'm using open access to knowledge and cultural knowledge. Open access is the term that the open GLAM community want to bring forward as in Open Science and open educational resources. There's a lot of controversy about that because it sort of undermines maybe the reuse aspect. The game is supposed to be in the, you know, the recognition of the term. And also, it's been very well adopted. (Ånäs, author interview, 2020)

Ånäs discussed how the term "access" is not actually reflecting the essence of open, in the larger landscape, which is that of reuse, as it was also highlighted by Geisler and Schmidt. However, she stated that the term "open access" has been incorporated and used in the open GLAM scene. Indeed, the terminology "open access" has been adopted by the open GLAM initiative where "Open GLAM is a space to help co-ordinate efforts to aggregate, advertise, connect and support open access to cultural heritage initiatives and projects" (openGLAM 2022). In addition, Ånäs later in our discussion stated that the open access definition has been widely accepted and that this is also reflected by well-established CHIs that have opened their collections online and are actually using that terminology: open access. CHIs such as the Metropolitan, the Smithsonian Institution, the Cleveland, for example, are developing their open access policies, so the open access policies have been adopted by the big organisations. Additionally, this terminology goes through the open GLAM publications through the Medium platform as well. Thus, it seems in a way, that this is the terminology that has been chosen. Yet, the question whether the terminology reflects the message that CHIs want to convey, still remains.

One of the CHIs that has adopted the term "open access" policies is one of the largest museums and research organisations, the Smithsonian Institution. In February 2020, the Smithsonian Institution released through their Open Access Initiative around three million high resolution 2D and 3D images via the Smithsonian Open Access portal and through an API. As stated earlier, I was involved in the organisation of the Hack4openGLAM introductory event as part of the CC Global Summit 2020, through my affiliation with the Finnish open GLAM Working Group. During the preparatory meetings in summer 2020 we met with the organisational team and also other related parties to brainstorm and discuss potential topics that could be included at the introductory event and even beyond. As a result, I met online with Ryan King the Program Manager for the Smithsonian Open Access initiative. Later I also invited him to take part in the event I was co-organising "Accessing cultural heritage: approaches from high to low" to share the Smithsonian Institution's Open Access Initiative. Moreover, later in 2020 I requested an interview with Ryan King to learn more about the Institution's strategy and to explore some particularities with their API. In addition, I was privileged enough to also be joined by Effie Kapsalis at the interview, who is the Senior Digital Program Officer for the Smithsonian American Women's History Initiative. She is actually the visionary of the Smithsonian Open Access initiative and had been conducting related research for more than twelve years by that time. In our joint interview both Kapsalis and King discussed and reflected on access aspects and how the Smithsonian Institution is striving for accessibility through various ways and means. Both experts reflected on the meaning and role of access. King stated that open access for the Smithsonian Institution actually means the licencing in terms of how to use an asset: it does not just focus on the connotation of "accessing":

> In the Smithsonian Open Access [initiative], we really are referring to the licencing itself and terms of its usage, which I think is something I'd like to make clear, but behind the scenes, we do try to, I think, embrace a kind of a culture generally of the broader concept of openness and

> as Effie (Kapsalis) mentioned, like everything, even in terms of the way that we organise ourselves and our working groups within the Smithsonian and the discussions that we have, we try to openly communicate and make available as transparently as possible that decision making process when we are working with outside community groups, etc. (King, author interview, 2020)

King is making explicit how the Smithsonian Institution perceives open access terminology by focusing on the licencing aspect. Also, he highlights that transparency in terms of communication and documentation are cardinal elements of openness. The opening of the data is not enough if a CHI makes them available online, or if they develop and link them with an API. The important aspect is documentation and clear communication. It is very important for users to find and know how to use it. Pohjankyrö spoke about this issue as well during our interview:

> If there's no documentation, if you can't find the data, if you can't use it, if you don't understand it, I think it's not really open because we have found that you need to communicate. You have to promote the data. You have to talk about it to people and find potential user groups. And, when the data is used and found, I think then you're actually getting the impact from that – from the opening. If you just put it there and move on, there's no point to it. I'm talking more about open data because, of course, it leads to open knowledge. (Pohjankyrö, author interview, 2020)

Pohjankyrö discussed the significance of documentation in "finding" and "understanding" the data and connecting it with the data being "used". Based on the analysis of the interview record, I have conceptualised the notion of access as a way to approach or enter, like entering through a gateway. It does not entail more. Therefore, access articulates that the user is able to enter a net of information and data. Access does not indicate what or how the accessed information can be used, reused and remixed. From my fieldwork, it was evident, that opening up knowledge is not merely to provide access, that is only one part of the process. Using the word "process", I want to emphasise the continuity and fluidity aspect; that opening up knowledge online is not a static manoeuvre, it is not the end goal and final outcome. It requires a holistic approach, constant negotiations and strategies for its successful sustainability. It is a process to maintain, sustain and meaningfully engage the public and make it useful for them. Giving access is perhaps a step. Yet, observing from the analysis of the data, it is not enough for a meaningful engagement and users' participation. This is actually the point where access differs from accessibility. The analysis of the data showed that the issue of accessibility of the data and its reuse, is not necessarily reflected in the open access terminology. The most crucial part stems from the data analysis and to make the data accessible and therefore used. This is what I discuss in the next section: how to tackle the access issue and move towards accessibility, by discussing the main aspects that affect and hinder accessibility as they were derived from the analysis of the data.

5.2 Making digital assets accessible

Giving access to digital assets might be one step as stated earlier, however, actually making them accessible is the crucial step. Ten interviewees who are experts on opening up CHIs discussed that there is a direct link between the connection of openness and data being accessible. One of the experts who discussed this issue was Pohjankyrö from the Helsinki City Museum. He shared his experience from the Helsinki Photographs (in Finnish: Helsinkikuvia.fi[16]) project. This project aimed to make an easier user system so that it would be more accessible to the users. Yet, at the time of the interview, Pohjankyrö stated that they were still trying to improve it and that there was potential within the project to do so. He then discussed how this project has made it easier for elderly people to acquire and use old images from Helsinki. He shared that this is helping people who are working with elderly people by enabling them to print the images for themselves without the need to pay or even contact the museum. They can actually reuse the used images for their work and that also other groups can use the images for other purposes, for example, teachers for education purposes, too. He stated:

> Thinking of how to communicate the heritage to people who are not able to use it, for example, they don't have the knowledge or they don't even know that the data exists – yeah, I think it's a really big, big discussion. To put it briefly, I think open has to mean accessible (Pohjankyrö, author interview, 2020)

Making the assets accessible for the user means that the user can actually find the assets and reuse them. The research data dictated that this would be successfully accomplished by addressing the following elements: IPRs, standards, interoperability, involving people for meaningful public engagement and the role of API. I discuss this in the next section and present relevant material from the interview record.

5.2.1 Intellectual Property Rights

As discussed in Chapter 4, CHIs' earlier practice was (and in some cases it still is) expecting to include copyright fees for the users if they wanted to access a digital asset. However, indisputably, there are still CHIs that are monetising access to cultural data and have incorporated copyright as part of their business model to make revenue, as was also discussed in Chapter 4. Along those lines, Ørsted reflected on that point:

> They (CHIs) at least think that monetising access to data through copyright fees is somehow a source of income that they do not want to let go. (Ørsted, author interview, 2020)

This practice was prominent in the CHI scene during the past two decades, however, this mindset and practice has been shifted during recent years through the open knowledge movement as mentioned in

[16] https://www.helsinkikuvia.fi/. A project with photographs from Helsinki city.

Chapter 4. In Finland, public CHIs receive money from the state every year. They conduct an evaluation and collect data on an annual basis of what they have done during the year. The Ministry uses the collected data to inform decisions on how to fund each cultural organisation in the future and has also given irregular project funding (on certain occasions) to CHIs for digitisation. Tax funding of CHIs is based on a shared understanding of their societal importance. This is why the state has been funding these bodies, so that they can make their collections more open. Hence, for this reason, fifteen interviewees who are professionals in opening up CHIs stressed that because CHIs have already been receiving taxpayer money, they should provide the copies of digital assets free of charge and not be receiving and collecting money via copyright fees. Moreover, Ørsted continued explaining how the licencing aids in multiple ways, notwithstanding the reusability aspect of the asset, but also it saves time and resources with regards to the workflow. She expressed this view as follows:

> They (CHIs) want to sell their photographs; they do not want to open up, licence them and put them freely out there. However, as it was tried within the open GLAM (movement), it was proved that you gain much more by letting it go freely. For example, administrative work – it is actually cheaper to let things go free for people to download by themselves. (Ørsted, author interview, 2020)

Fifteen interviewees opposed to paying copyright fees for receiving an asset highlighted that, on top of what Ørsted discussed, people pay a lot of taxes for CHIs so they expect that the digital assets can be distributed "for free" to the users. They put forward the following question: "So why would they charge you twice to get the materials they have?" This issue is about intellectual property legislation. I would like to state at this point, although I am not a lawyer myself, through extensive research that I conducted over the past three and a half years during which I was working on my doctoral thesis, I acquired expertise on certain aspects that involve intellectual property legislation with regards to (digital) cultural heritage, open data and open licences. To understand how licences are used and applied for intellectual property, I conducted research and interviewed key figures who had worked with licencing CHI materials. One of these experts is Maria Rehbinder, who is a lawyer at Aalto University in Finland. As also discussed in Chapter 4, Rehbinder has been working since 1994 as a copyright lawyer and with Intellectual Property legislation. With her work in OKFI, she is interested in how to advise legislative bodies on developing legislation to ensure the possibility for free flow of information. Additionally and in parallel, Rehbinder discussed legal issues related to copyrights and licences. She stated that for CHIs, there is still much to be done for older materials that are free of copyright and every year new material comes into the public domain. As a lawyer with a lot of experience in these issues she explicitly highlighted the importance of licences, interoperability and proprietary content. Legal issues, for example, copyright issues that affect the reuse of the data, are usually considered a hindrance if used by the public. When an asset is in the public domain, it can indisputably be used freely by anyone. However, when copyright issues are involved, then restrictions are usually imposed. Rehbinder also discussed how intellectual property legislation and more specifically the copyright is used. She stated, "copyright

doesn't really protect information, it protects the form of the work". She explained that it is actually against the copyright legislation basic principles:

> that you would have the actual information protected by copyright, because copyright is always thought of as protecting the artistic form and if you just extract information from the work, that is not supposed to be relevant from the copyright side. (Rehbinder, author interview, 2020)

Moreover, the impact of the licencing policy was explored in depth, in contrast to the copyright restriction policies. In total, fifteen interviewees stressed the great impact a CHI has when their digital assets are openly licensed and available for creative reuse. When a CHI has their collections open under licences, it is considered to have a precedence, or a so-called "head start", in relation to other CHIs that do not have their collections openly licensed. Thus, a CHI that licences their assets gains a stronger and greater impact than those that do not. To illustrate, Ørsted cited one example:

> Because if we, as an archive, have the nicest [collections] (…) and most available photos, then of course, they're going to come to us. Even though there is another archive that might have better or more pictures, but if they are locked away or have some stamp on them or you have to pay something, or even if you have to wait for, you know, for something before you get the image, people are so impatient they're going to go to somewhere where they get the best they can get right away for free. (Ørsted, author interview, 2020)

In particular, CHIs are institutions that by their very nature, have the duty to disseminate and foster culture. Therefore, by licencing digital cultural assets, making them more available and potentially visible for creative reuse, they fulfil that duty. Moreover, Pohjankyrö discussed another crucial issue that was also brought up during our interview that is bound to IPRs aspect. This is the issue of re-copyrighting reproduction of art. He expressed that this is a prominent conversation that was going on in the Finnish CHI landscape at the time of the interview:

> In Finland, in particular in art museums, they tried to recopyright old works by giving the photographer copyright to the image that they have taken from the public domain artwork. And that's a discussion that's been going on because of the new European Union legislation; it clearly states that when you take a photo of a public domain work or if you do a reproduction of a public domain work, it doesn't create a new copyright. And that's something that that has been discussed in Finland because some of the art museums have this kind of old way of thinking. (Pohjankyrö, author interview, 2020)

However, following this logic, the question that emerges is, namely, why not include the name of those that would use the scanner, or why not include the name of the person who edited the photo via a program, such as, for example, Photoshop. As Pohjankyrö stated, this discussion was prominent at that point in Finland. Here essentially the takeaway lesson is to ensure that the legislation is being followed to the maximum and that no extra or unnecessary restrictions are imposed in accessing and reusing

cultural heritage assets, such as new copyright. On the other hand, Rehbinder expressed the view that copyrights are not actually restricting CHIs to such a great extent, because the material they have is much older, out of copyright and could be licensed. She focused more on the resources issue, as a CHI restriction, rather than the copyright itself:

> I don't think the museums are actually constricted by copyrights so much with the older material; they could open more, but of course they would need a lot of resources and digitalisation needs money for that. (…). Copyright legislation doesn't restrict them, they can do that. (Rehbinder, author interview, 2020)

Undoubtedly, resources are a key point for CHIs to open up their collections. This is because of the different resources that are needed for the successful digital transformation process. They also need interdisciplinary skills, for example, to cope with the digitalisation aspects, so they need technical expertise to build and maintain the infrastructure, as well as staff who have interdisciplinary knowledge to address the IPRs and licencing issues. Moreover, for this, certain training could be needed so that the staff further develop their digital media literacy skills and stay up to date with the current digital transformation imperatives of CHIs. As Rehbinder discussed, the copyrights, therefore, are not the biggest obstacle for CHIs opening up their collections to the public, but the resources play a significant role to bring this about. This will be discussed later.

5.2.2 Standards and interoperability

As I discussed earlier, Section 5.1.1, when I was designing the Institute's Colloquium, I realised that open knowledge is not merely, or is not equal to, providing access to knowledge through digitisation. Cultural materials are to be used, reused and remixed. The analysis of the data showed the need for standards and interoperability in order to be able to make the data compatible in a way – be able to "speak", be reused and thus, in essence, be useful. The main standards that derived from the analysis of the data are those of the FAIR principles guiding principles and the CC licences. Interoperability came up a lot during the interviews and could also be seen as a standard, as it is part of the FAIR principles. From the interview record, it is evident that standards and interoperability are central elements for shifting in practice from access to accessible digital cultural assets. In total, seven experts on open knowledge, cultural heritage and open GLAMs stated explicitly that standards and interoperability are important elements so that anyone can use and reuse the assets – universally. Interoperability is extremely important and it allows the systems to interact and speak to one another. Rehbinder, as an expert in legal aspects and with many years of experience stated:

> I think interoperability is really important, as standards are really important and so I think we have to develop more and more standards - when we don't have standards. We have like e.g. Creative Commons is now a standard and when the open licences movement started every

> government in Europe had their own open licence, so many had like Open Government licence in every country and now they are not interoperable. (Rehbinder, author interview, 2020)

From the analysis of the data, it is evident that CC licences are a basic building block of open knowledge. Ånäs also reflected on the CC licences as standards:

> The CC licences have been very well adopted in governments, even in the European Union as a recommended licencing model. And I think, well, one way is to promote and to continue promoting their use. (Ånäs, author interview, 2020)

On the other hand and although CC licences have aid this process, CHIs still cannot completely waive the copyrights of their assets and adopt licences instead. A key reason for that is that, at least, for example, at the university archives, there are many materials that supposedly, the original creators would be willing to open up, but at the time when they were collected, CHIs did not collect licences for their use. This is substantiated by two interviewees, Maria Rehbinder and Susanna Kokkinen. Kokkinen, is the Head of Aalto University Records Management with extensive experience in archives. Rehbinder also highlighted:

> It's a problem that now we can collect licences from new materials but there are decades and centuries' worth of older material where at the time they were archived, the necessary copyright licences were not collected so there is a kind of historical problem with that, with cultural heritage. It's difficult to solve it and actually have an answer to that; at least museums are releasing material that is out of copyright, 70 years after the death of artist so I think that's very good and actually, that already encompasses quite a lot of art in Europe. (…) Also, in Finland we have this public sector reuse recommendation, that we recommend it, that organisations release their public sector information with Creative Commons, CC BY licence, or CC zero. (Rehbinder, author interview, 2020)

Every year, thousands of digital assets enter the public domain. A digital asset can receive the public domain mark if 70 years have passed after the artist's death. The next year, they can open it up. Rehbinder discussed extensively during our interview how interoperability and standards are crucial and critical to maintain the openness. She also stated:

> You need interoperability, so I think it is very important that the data is FAIR, so that data is Findable, Accessible, Interoperable and Reusable and if you have everybody in the world using Word documents, then all the documents are interoperable and that is a great benefit to all. (Rehbinder, author interview, 2020)

The FAIR guiding principles have helped extensively in the accessibility of the data. As extensively discussed in Chapter 2, the FAIR principles stemmed from the need in amplifying the accessibility and

usability of the data. The principles encompass these elements that are essential for giving the potential for the data to be useful. Initially the FAIR guiding principles were implemented in the research context so that research data can be easily findable, accessible, interoperable and reusable by other researchers or interested parties. In total, ten interviewees, experts and activists on the open knowledge domain highlighted the topic of accessibility and how to make it as easy as possible for people to find the digitised items through standards such as CC licences and the implementation of the FAIR guiding principles. One way of having the data easily findable is using open licencing and services, such as, Finna (Finna 2022), for example, that the audience might already be aware of. The first instance I encountered the significance of the FAIR data was when I was conducting research on the state of the art for my doctoral work. Then when designing the Institute's Colloquium I invited a scholar with expertise in research data management, Dr Ingrid Dillo to speak on the issue of FAIRness. Dillo, Deputy Director at DANS (Data Archiving and Networked Services), kindly accepted my invitation to the colloquium and she joined us online for a discussion on: "FAIR data: from FAIRytale to FAIR enough", a codex of data use. Dillo is one of the authors of the FAIR guiding principles (Wilkinson et al. 2016). Since 2005, she has been working at DANS, the Institute of Dutch Academy and Research Funding Organisation (KNAW & NWO). Their mission is to promote and provide permanent access to digital research resources.[17] The particularity of the FAIR guiding principles is that they refer both to the data and the metadata of the assets. Also, they do not only involve open data as Dillo highlighted: "You can work in a FAIR manner with data that is not intended for public availability." (Dillo 2019). The FAIR data are required for research funding and it is a European Commission Research Data policy. The important aspect here is that standards, such as the FAIR guiding principles, can strengthen the reusability of the data. Therefore, standards are creating the potential for the data to be used and useful. Furthermore, with regards to the significance of interoperable infrastructures, another seven experts reflected upon the same issue. On the interoperability aspect, Kokkinen stated:

> The best possible guarantee for openness and for material to actually be found means that it has to be in some sort of a national or even international system in a place where everybody knows where to go. (Kokkinen, author interview, 2020)

However, Kokkinen and other three interviewees, stated that the general public does not know about specific CHIs and their repositories. She also argued that putting assets in repositories that people are not aware of, or are difficult to find, is a hindrance. She reflected on the issue of the limited resources that CHIs and universities have:

> I don't think we ever have enough resources to promote Aalto University's specific materials. (Kokkinen, author interview, 2020)

[17] https://dans.knaw.nl.

The resources aspect resurfaces, unfolding the struggles of CHIs, to achieve openness. To address that issue, Kokkinen concluded that for the digital assets to be able to be open and findable "they have to be somewhere where everybody knows where to go and find them". Thus, Kokkinen and other six other CHI interviewee experts expressed the view that openness is also about providing connections and making the assets actually usable. She advised:

> Gather materials in systems that have the best possible interfaces that we can build, sort of interfaces to other systems and open shared platforms where people actually go and use the materials. That's openness to me. (Kokkinen, author interview, 2020)

Openness provides the potential for making connections, fostering collaboration by using "open shared platforms" as Kokkinen stated earlier. This could also facilitate the opening up of smaller CHIs that lack resources (i.e. specialised staff and technical infrastructure) and could make their collections interoperable, accessible and reusable.

5.2.3 Involving the public: towards participatory initiatives

A fourth aspect, besides rights, standards and interoperability that was prominent during the data analysis for making the data accessible, was the involvement of the public, that is those people who are not experts of the assets such as the CHI professionals, such as the curators and researchers. I discussed in Chapter 4 how the public might think of CHIs as an elitist place, an "Ivory Tower", where the public has no relevance with the CHIs. Either in the digital or physical space, cultural heritage assets are to be explored, not locked away only for research or conservation purposes. For these reasons, CHIs have launched initiatives for the meaningful participation of the public. Furthermore, Effie Kapsalis highlighted the mission and values of the Smithsonian Institution in terms of participatory projects. She reflected as well on the terminology of open access and how the Smithsonian have been striving to create a bidirectional relationship between the Institution and the public:

> I don't think open access goes far enough in facilitating that two-way dialogue around culture, so we are used to giving over a lot of information in a one-way fashion and we have some areas where we are more in a give-and-take relationship with people. One area would be our Smithsonian transcription centre, where we ask people to create transcriptions of primary source documents. But we also capture notes that people have along the way and they make useful connections to other repositories and you send the data into other open ecosystems like wiki data and things like that. So that's a very participatory space for us. And the same could be said with some of the Wikipedia work that we do with the American Women's History Initiative and other areas of the Smithsonian do this. (…) I think that's kind of the key for us – how we can engage in more of a two-way exchange so we can show multiple perspectives and also enhance our data because we do learn things from the public. (Kapsalis, author interview, 2020)

Kapsalis here makes a very significant point about the relationship to open access and the participatory aspect of the CHIs. Its focal point emphasises the bidirectional relationship that CHIs are striving to develop with their audiences. This point was also made by five other CHI interviewee experts. The end goal for a CHI is not only to digitise their collections and put them available online. Digitisation and open access are just the first steps. The essence is how people are going to actually *use* the material online. This is the reason behind the issue that the experts have been critically reflecting upon with regard to the notion of open access. The emphasis is being put on the access point and in a sense the reuse aspect is somehow being underestimated.

Six interview participants discussed how CHIs have implemented the use of social media in their digital communication strategy. This has been a way for CHIs to communicate with the public as well as engage with them about their collections. It was said that they have been using social media to try to involve the audience in the museums or archive. Ørsted stated that in the Aalto University Archives they have been using social media in such a way so that people can meaningfully participate in helping with the origins of the assets by helping to co-curate the collections in a way:

> [the public is] helping the archive with metadata; recognising people or places from the photographs or something else that makes them get involved. (Ørsted, author interview, 2020)

In such a way the CHI and public may start forming a two-way communication, leaving behind obsolete top-down practices, in the light of allowing more space for openness, participation and participatory methods. From analysis of the research data, it is evident that there is no CHI anywhere in the world that is able to digitise everything. Yet, I also observed that there is no evidence that everything should be digitised. The interviewees suggested, too, that for small CHIs, digitising as much as possible is a real struggle. This is particularly relevant because it is likely that there might be a very small team working in such a CHI, lacking resources. It is really important for these small CHIs in particular to digitise at least the most interesting assets and make them available online under licences. Ørsted reflected on that:

> So when we digitise the interesting parts or the most exciting parts or something that we know that people would experience a "wow factor" about, then they would probably be curious to find some more. Then they would come and knock on the door at the archives and an archivist would welcome them and, you know, show them the rest. So the first step would be to be seen, at least with some parts of the archives; to show the people that we have this really interesting thing here in the archives and we're signed up to be able to show you everything, but please come to us and see the rest. (Ørsted, author interview, 2020)

This citation from Ørsted strengthens the notions that not everything in a CHI collection needs to be digitised. Also, put it in a visible place, a trustworthy, interoperable repository where people are going

to be searching on the Internet, with the ultimate goal perhaps, of visiting the CHI in person. Also, as seen in Section 5.2.2, collaborations and "extroversion" make connections and add value with regards to the visibility, outreach and accessibility of the digital assets. I observed that one such occasion, where new connections can emerge and the public can get involved, explore and experiment with data, is hackathons. Ørsted, who is also part of the organisation team at the Hack4openGLAM hackathon stated:

> We collaborate with everyone who is interested in collaborating with us and, for example, being part of hackathons. Yeah, like the upcoming one. And these are all places where you can promote things that you've just done. (Ørsted, author interview, 2020)

The public's involvement and collaboration play a cardinal role in cultural knowledge production and ultimately in the reuse of data. However, the focus of my doctoral work is not studying the creative reuse of digital cultural heritage assets per se, but rather, what the resources are – the aspects enabling or hindering a fair reuse of data. For that reason, I share in summary some lessons learnt from the Institute's Colloquium on open knowledge regarding the creative reuse of cultural data. The common point, as discussed above, in making the data accessible, is essentially making it visible in a way that the general public and the user knows how to use it. The public's involvement is crucial in that step and can be achieved through many ways and modes. One of the most common is crowdsourcing. During the colloquium on open knowledge, there were two sessions dedicated to creative reuse. The session was titled "Opening up for creative reuse" and was inaugurated by Douglas McCarthy, Collections Manager at Europeana Foundation at that point, with his talk "Open: Enabling Creative Reuse in GLAM". Drawing on three examples of creative reuse at Europeana, Visions of War, A Season of Women in Culture and Technology & GIF it up, McCarthy stressed how openness and reuse enable public participation in cultural heritage projects. This was followed by Antje Theise (at the time of the colloquium she was a Rare Book Librarian at the Hamburg State and University Library (Stabi) and by the time of this writing, Library Director at the University Library Rostock). She supported the topic with her talk "Open cultural data initiatives for creative reuse at the Stabi." Inferring from the Stabi's initiatives and collaborations, such as Coding da Vinci hackathons, KollekTOURmat & Chronoscope Hamburg,[18] facilitating the cultivation of the notion of creative reuse, she argued that there is a need for a shift to take place in the open GLAM sector. This is the transition from "If it is not online, it does not exist" to "If it is not open for free use and reuse, it does not really exist", highlighting the importance of reuse as an instrument of meaningful engagement and innovation, while enabling participation.

5.2.4 Application programming interface

The platformisation of the Web (Helmond 2015) profoundly changed how knowledge is produced, distributed and therefore reused, as reflected in Chapter 2. It is the way data and information are

[18] https://mprove.de/chronoscope/index.html.

distributed online and therefore new knowledge is created. In that respect, the platforms' API, play a central role. APIs are sociotechnical structures enabling software elements to interact with one another and share content, acting as "the underlying technological glue of the social Web" (Helmond 2015, 4). They are located at the centre of content diffusion, therefore considered to be "gatekeepers", controlling data dissemination (Tzouganatou 2021). In the digital economy, APIs connect the digital ecosystem and so they facilitate new ways of sharing and ways to access data, also allowing ways for companies, like social media networks, to dominate the market and move towards new regimes of sharing (Bodle 2011). By using social media platforms, we are using their APIs.

At Wikimania 2019, I properly took notice of the vitality of APIs in opening up knowledge in the data ecosystem. I had the chance to delve into the challenges of the current data ecosystem, namely, that it is very complex, cumbersome, somehow old fashioned and therefore slow. What was also crucial at that stage for my doctoral research was to map the different initiatives that were emerging at that point, while at the same time, grasp the potential challenges and likely future endeavours by being part of the open GLAM and Wikimedia community. Moreover, during data collection and thereafter in the analysis of the data I realised that APIs are a prominent way for data exchange and opening up knowledge and so I set up a second round of interviews to collect more data on that topic. This process led me to write a paper on the topic and present it at the International Conference on Human-Computer Interaction in the Computing and Culture session, as part of the panel "Digital Memory Modalities – Inquiring the Role of HCI for Participatory Memory Practices" organised by my thesis supervisor, Professor Dr Gertraud Koch. My paper titled "On Complexity of CHIs' Digital Ecosystem: APIs as Change Makers for Opening up Knowledge" (Tzouganatou 2021) reflects on the significance of APIs for opening up cultural data and discusses possibilities for inclusive future memory making and a participatory API ecosystem. In the paper, I discuss how APIs can be change makers for the dissemination and sharing of knowledge. In addition, as derived from the analysis of data, I reflect on the significance of good documentation for using an API to be able to be accessible as an interface to people with limited digital and relevant coding skills. I also discuss the vitality of collaborations within the digital ecosystems for potentially using a shared API as an effort to cope with limited resources, since some institutions struggle with this issue of resources. A future opportunity for APIs is to embed reciprocity, as an aspect, in order to get to know their users. As discussed in the paper, there are efforts from CHIs to get to know the API users that develop a social model as well through that.

5.3 The conditions of openness of cultural data

In order to achieve the shift from open access to open knowledge, I have developed the concept of the openness of cultural data so that the data can be accessible, usable and useful. This concept is derived from the analysis of this chapter's data as well as that from Chapter 4. Compiling the findings of this chapter and that of Chapter 4, I am able to answer the first research question of my doctoral work, which is about the conditions of openness of cultural data. The conditions are considered as the elements that

ultimately determine the openness of cultural data that is their usability and usefulness. As extensively discussed in Chapter 5, in the section 5.1.1, the openness of cultural data does not only mean making cultural assets available online. As demonstrated by the analysis of the expert interviews, being open means that a cultural asset has the capability of being reused and remixed as a central notion, such that a given asset can then produce open knowledge. In that respect, when the data is open, there is the potential for producing open knowledge. However, open data does not automatically make things more open. There is a lot of open data that is not used. Open data does not necessarily make things more open, in the sense of "usefulness". Nevertheless, there is the possibility of course. Furthermore, from the analysis of the collected data, it was evident that opening up knowledge is not merely to provide access but rather, there is a lot more to it than that.

The analysis of the data based on this chapter and Chapter 4, suggests that there are specific elements of CHIs' digital ecosystem either hindering or encouraging the openness of cultural data. Through the analysis of the research material, I derived that these are the conditions of openness of cultural data. Firstly, from the analysis, it is evident that CHI structures are a central premise of the openness. In Chapter 4, it was demonstrated that currently CHI structures could be quite hierarchical as shown by the expert interviews. It was shown that hierarchical structures can intercept CHIs capability to swiftly adapt to the increasing challenges (i.e. digital transformation), while simultaneously remaining steadfast to their fundamental role for societal change. This aspect has been extensively discussed by a growing body of literature, which suggests that CHI hierarchical structures impede their role for societal change (Sandell 2002a; Lynch 2011, 2017; Riedler 2017; Crooke 2021; Lynch et al. 2020). Fifteen interviewees of this research study stated that openness and open knowledge are not aligned with monolithic structures and with the hierarchical infrastructures and norms that CHIs have had incorporated over the years. The practice of controlling cultural assets, as was demonstrated by the analysis of the interviews, is not aligned with openness. As Pohjankyrö stated, "openness is the opposite". Moreover, it was evidenced in Chapter 4 from the interview analysis that CHIs might have to consider waiving the business model that is bound to receive copyright fees from a cultural asset, as this practice is considered a hindrance for the users and is not aligned with openness. Also, the literature shows that CHIs which have incorporated a copyright fee into their business model were rarely actually profiting from it by generating new income (Tanner 2004; Kelly 2013; Wallace 2022). Furthermore, the analysis suggests that the accessibility aspect of the data is a basis for the data to actually be open in the sense of being used. This is evident in the section 5.2, in making digital assets accessible. To achieve accessibility, there are several steps and stages to be go through, as demonstrated by the interview record. The conditions of openness of cultural data could be taken into account to bring about this transition. As demonstrated, the first condition is CHI structures; the second is legal aspects, in particular IPRs and copyrights where interviewees were opposed to monetising access to the collections, or recopyright reproductions. It was rather suggested that a good practice to cope with this is to make use of CC licences. Sixteen interviewees stated that CHIs have a great impact when their digital assets are licensed

and available for creative reuse. A third condition is considered the business model of the organisation (revenue from copyright fees, insufficient resources, long-term funding needed, partnerships). A fourth condition that the analysis puts forward is the central position of standards, such as CC licences and the FAIR guiding principles for the openness of data, as demonstrated in this chapter, Section 5.2.2. As discussed by the interviewees, in order for the data to be accessible, they have to be findable, (easy) discoverable and visible. For these reasons, a fifth aspect is the technical infrastructures, whether open and interoperable. Interoperability both in an infrastructural and data level has been assessed as critical for achieving openness, as shown by the analysis, where infrastructures could "speak" to one another. Thus, interoperability can be considered to be a standard as well for achieving the openness of cultural data. Moreover, a sixth aspect is a CHI's mindset, practices and motivational aspects towards achieving the openness of cultural data. This is demonstrated by the analysis of the interview record in Chapter 4, where in order to achieve openness, CHIs would have to transition from the practice of protecting the digital collections to understanding their benefits by changing their practices in relation to the control of cultural data. It is evident from the analysis of the interviews that the process of opening up requires such a transition – from having the data controlled and guarded by a CHI to a more open and distributed practice of caring; towards a bottom-up mindset and practice. Using the theoretical lens of assemblage theory here, it can facilitate in achieving the relationality and interdependencies of the conditions for enabling or hindering knowledge co-production, as described in Section 2.5. The dynamic relationship of these elements can dictate how someone can access or (re)use a cultural asset and ultimately this process can have an impact on their future memory making. From the analysis of the research material, I therefore concluded that these different modes of accessing and (re)using the assets can indicate the relationality of memory modalities; modes and processes that can affect how something would be remembered within the complexity of the digital ecosystem. The openness of cultural data, is not "a given", but rather, it is a process. It is a process that requires a deep understanding and consideration of the values interwoven and embedded in the process in order to envision inclusive memory making. The openness of cultural data suggests a concept for participatory knowledge production in the cultural heritage sector. This cannot be achieved in isolation, but must be considered together with the other elements of the ecosystem, for example, it is intrinsically linked with infrastructural aspects. As discussed in this chapter, Section 5.2.2, for example, open infrastructures cannot really be open if they are not interoperable as it would mean they are actually not usable.

5.3.4 Formative evaluation

The formative evaluation of the research results took place on 1 July 2021, in the context of POEM Knowledge Hub 7. As discussed in Chapter 3, the event took the format of a focus group and conducted online via the platform Zoom. The aim of the evaluation was to receive feedback from the research participants based on the process and development of my work to enable me to incorporate that feedback into the final results. The event focused on two topics: the first was to evaluate the concept of the

conditions of openness of cultural data and the second was the overall model and the principles on how to achieve open knowledge in the CHI's digital ecosystem, which I discuss in Chapter 8. To begin with, I had shared the materials and questions for discussion with the research participants prior to the event. During the event, I briefly presented the conceptual framework and preliminary results, the evaluation was one hour in length. The key results from the evaluation concept of the openness of cultural data is the need for incorporating ethics and ethical issues; the know-how mindset; sustainability of resources (related to long-term funding) and more work on metadata. All the research participants agreed on the need for highlighting and amplifying ethics. In my research thinking, ethics came under the legal factors. However, after the formative evaluation of the results, I realised that there is an imminent need to have a separate factor for ethics. The participants shared their concerns with regards to ethical aspects that arise when opening up collections online. For example, Eklund shared that it is not acceptable to open up data without asking the user (e.g. indigenous communities), even though the approach might be right from a legal perspective. Ethics should be included, therefore, as a separate aspect. Along the same lines, Theise stated that in the University Library at Rostock, where she was a director, there are many materials related to the colonial past, many of which are copyright-free. She stated that they have many photos of people not yet identified. But the staff have no way of identifying those in the photographs and thus cannot ask permission to use them. Theise explicitly stated that the ethical aspect is more than the legal aspect and needs to be a separate factor. In addition, the "know-how" was pointed out as being another factor that could be added to the framework. The "know-how" is considered to be the skills, practical knowledge and/or expertise. As CHIs can have hierarchical structures, so do staffing structures. Thus, the research participants stated that sharing the "know-how" about collaborating with others could be a challenge (which could also be linked with ethics, as they stated). Another participant reflected that finding the balance between not making things too complicated and keeping everything open in an ethical and sustainable way is required, but it can also be challenging. Also, two research participants pointed out that metadata work and metadata production must also be included. They stated that metadata should be published open and include new information about data, as metadata is material itself.

In addition, three research participants stated that the technical infrastructure aspect that I presented could be enriched. They claimed that in order to make it useful for the user, intelligent tools are required. For that, one participant recommended the adoption of a full circle of openness and training data – a holistic approach. The lack of resources was discussed as a critical sustainability issue. The research participants stated that long-term funding is critical and the more funding institutions receive, the more valuable it is for society at large. Finally, one research participant stated that prioritisation has impact on what CHIs have online. The results of this evaluation are included in a conceptual level in the discussion section in Chapter 8.

5.4 Conclusion

This chapter has reflected upon the notion of open access and explored ways towards making digital assets accessible. The term and notion "open access", although widely adopted by CHIs, as well as by the open GLAM community, has been regarded as limited in the analysis of the data. This is because of the terminology "access" denoting the means or ways to approach or enter, rather like entering a gateway. "Access" means, therefore, that the user is able to enter a net of information and data. However, on the other side, "access" does not indicate what or how the accessed information can be used, reused and remixed. From the analysis of the results, it is evident that opening up knowledge is not merely to provide access, but that (open) access is just one part of the process. Being open is more than (just) providing access to an asset. Making the digital assets accessible and usable for and by the public is also crucial. Thus, I examined and discussed how to tackle the access issue and move towards accessibility. It has been evident through the analysis of the data that the accessibility leads to reuse, which emerged as the most significant element for achieving openness to fifteen interview participants. The accessibility of the digitised assets is bound to legal aspects and legislation: not every digital asset can be reused in the same way, due to copyright and other legal and/or ethical restrictions. In this chapter, I mapped several instances that affect and hinder accessibility as I concluded from the analysis of the data; IPRs, standards and interoperability, public involvement, as well as the crucial role of APIs. Building on the research results of this chapter and those of Chapter 4, I therefore answered the first research question, which focused on investigating the conditions of openness of cultural data. Therefore, the conditions of openness of cultural data, incorporating the results of the evaluation are; the structures of CHIs, legal aspects, business models, standards, technical infrastructures, mindsets, practices and motivational aspects, as well as the know-how and ethical aspects. I also presented results from the formative evaluation of the concept. These results have been integrated in the final framework which I present in Chapter 8. In the next chapter, Chapter, 6, I discuss the issues arising from the practices implemented by large-scale commercial platforms in relation to cultural participation.

Chapter 6. Open Knowledge in the Digital Economy: Investigating the Pitfalls of Big Techs in Cultural Participation

A few days after its release in 2020, I watched the film *The Hater*[19], directed by Jan Komasa, on the popular platform Netflix. The plot focuses on an expelled student from Warsaw, who tries to manipulate public opinion through social media, causing widespread hatred and violence. The thriller shows how misinformation can be spread through social media networks and what a huge and terrible impact this practice can have in terms of socio-political consequences and even beyond that. It demonstrates how social media networks can be manipulative and exploitative, leading to the spread of fake news, distortion of reality and warp how history will ultimately be remembered. As social media networks are driven primarily by corporate and market interests, they serve and facilitate market wills, fabricating a Web where the democratic vision and values can potentially be underpinned by scheming practices. Of course, this is not always the case, as frequently these media are used for positive reasons as well, broadcasting the good. However, this is a complex issue to navigate, illustrated by the fact that these commercial platforms have implemented opaque practices to operate, which are being used by other third-party companies (i.e. marketing companies) to achieve their goals and aspirations. Of course, it did not surprise me to watch *The Hater* dispensing misinformation and fake news practices, as these are known for quite some time now and have been adopted by more traditional media as well (i.e. television, radio, newspapers). The film tackles contemporary issues that need to be investigated, for securing the democratisation of knowledge production online, in an effort to envision inclusive memory making. In this findings chapter, I critically reflect upon the power asymmetries of the digital economy, where large-scale commercial platforms acting as monopolies exploiting, manipulating, distorting and ultimately affecting how people and society at large remember today's present, tomorrow. As extensively discussed in Chapter 2, CHIs have incorporated large-scale commercial platforms into their digital communication strategy for audience engagement purposes. For that reason, this chapter is going to navigate how commercial platforms work and how they impact cultural heritage knowledge production through their different mechanisms that have implemented, reflecting on cultural participation. Like it was captured and depicted in the film *The Hater* and although this was only a film, such manipulative and exploitative tactics have taken place several times before. We remember, for example, the Cambridge Analytica scandal and other related, even less widely publicised scandals. The Cambridge Analytica scandal refers to the event when the political consulting firm harvested and used inappropriately user data given by Facebook to build voter profiles for the 2016 presidential campaign of Donald Trump, with allegations accusing the firm of interfering in the Brexit referendum too, (Confessore 2018).

[19] Original title of the movie: *Sala samobójców. Hejter*.

6.1 Opacity in the digital ecosystem: monopolising knowledge production

The fact that the Internet has ultimately become dominated by market and business interests driven by the accumulation of capital in various forms (i.e. information and knowledge), while creating power asymmetries, is a significant issue that many scholars have written about during recent years (Zuboff 2019; van Dijck 2020b; Lingel 2021; Srnicek 2017; van Dijck 2020a). As demonstrated in Chapter 2, large-scale commercial platforms have dominated the digital economy, however, little has been explored about what the impact is of these platforms in knowledge production, cultural participation and ultimately future memory making. In this section, I aim to discuss the dominance of large-scale commercial platforms in relation to these issues. How digital platforms hinder or threaten knowledge production and participation is topical to investigate, particularly now, as platform's logic promised to democratise knowledge sharing and access, but, sadly, we see that the profiting model has prevailed.

6.1.1 Obfuscate business model

From the analysis of the data, it was evident that all twenty-three interviewees are concerned with the obfuscate practices with which commercial platforms operate, such as their non-transparent business models and their algorithms which operate through opacity. Also, all interviewees shared their concern about how the future might look like if society relies too much on commercial platforms and does not act accordingly to what we, as users, are forced to merely follow. As discussed in Chapters 4 and 5, CHIs long ago established collaborations with commercial platforms, for audience engagement, due to lack of resources and owing to the fact that users are already engaged with these commercial platforms for socialising purposes. The impact of opaque and obfuscate practices in knowledge production is immense and takes place on a daily basis, as people use commercial platforms more and more for their day-to-day-activities. Moreover, through my empirical research, I became involved in discussions that raised concerns about how actually open commercial platforms are. CHIs have based their communication strategies heavily on commercial platforms for audience engagement as seen in Chapter 5, but these are the same platforms whose business model is difficult, or even impossible to decode and understand what lies behind the opacity. Professor Dr Ingrid Schneider is Professor of Political Science at the University of Hamburg. I met her during the MyData 2019 conference in Helsinki, Finland, where she was participating in the session "Who Governs the Data Economy?" with her own presentation titled "Models for the governance of data economics". After observing her pertinent and important research as well as her work experience, I kindly requested an interview with her to explore in-depth issues around governance of data in the digital ecosystem. Schneider accepted my request. She was one of the interviewees who expressed their concerns about the opacity of data economy. She stated:

> All these (platforms) Instagram, Facebook, Google – their business model really relies on people spending a long time on their platforms. So there are some seductive mechanisms making you click more, making you spend more time by already having the next video in place and

> sometimes also relying on even more extreme political positions. They very much rely on emotions, strong emotions like outrage, because this is what binds people to the platform and binds people's time and also other forms of resources. So in that respect, I think in terms of democracy, this is very dangerous and very threatening – these business models. (Schneider, author interview, 2020)

Here, Schneider alludes to business models threatening democracy, as their structure and operation are opposed to democratic values. The business model of the commercial platform is opaque and is operating through obfuscate practices and as Schneider stated, platforms have applied some kind of "seductive mechanisms" to keep the users engaged and spend more and more of their time there. As extensively discussed in Chapter 2, this is connected with the phenomenon of surveillance capitalism (Zuboff 2019, 2015), also linked with the attention economy (Celis Bueno 2017) and the network effects that are created by commercial platforms acquiring more and more users (Srnicek 2017). It is quite well known that platforms have applied "seductive mechanisms" aiming to increase profit, for example, the "like" function and the emoji (Gerlitz and Helmond 2013). Discussions on the pressing matter of how to respond to surveillance capitalism tactics was something I was always particularly curious about, but I started to be particularly pragmatic when I began teaching related topics at the University of Hamburg. During the winter semester 2020/2021 I taught the seminar "Critical approaches to digital culture: towards open and fair ecologies". The course emphasised the impact of platform economy and the monopolies on society and heated discussions took place about surveillance capitalism and its relation to (the scarcity of) human attention. Students were particularly engaged with the topic and debates took place about how to raise awareness and cope with this – somehow – new reality of linking behavioural predictions to the market. There are many initiatives that have been striving to reflect these non-transparent practices and demonstrate how surveillance mechanisms have been deployed; that they dominate people's lives and are more in favour of the market. The narrative that smart machines can hear us and that this is how they track our behaviour is an old one. Notwithstanding, smart machines have deployed numerous ways to track people through emerging technologies, blurring the limits of the digital and physical realm as well. Firstly, it was discussed that commercial platforms track user likes, comments, posts, time spent online and so they create a (digital) user profile of us. They are able to track people in the offline world too. This is evidenced when, for example, we allow access to our physical location to applications and platforms. This can happen when we enable access to location while we are using applications and also when we compile a post and share the location alongside it. Another way that our data and particularly the location are being tracked, is through purchases with cards. Our digital footprints are floating around as we move, go shopping, socialise, like a moving cloud surrounding us, as we go about our daily lives.

In the light of investigating how to address and tackle these non-transparent and at times controlling tactics, I found this engrossing initiative reflecting on surveillance titled "The New Organs project"[20] which is a project to gather and archive stories under surveillance capitalism, while also investigating the theories and realities of it (The New organs 2021). Like most projects that reflect on surveillance, it seemed dystopic for the future, as it depicts everyday life through the eyes of constant digital surveillance and controlling tactics. Going over the digital archive of The New Organs, it appears as if smart machines can actually read people's minds, or guess their thoughts and desires. Notwithstanding, who has not thought that smartphones can listen to what we say and that this is why we receive corresponding advertisements? However, behavioural predictions are the answer. The eerie and uncanny part is that most of the time advertisements are so appropriate. Being mindful of how the digital aspect is now inextricably linked to our everyday lives is crucial.

6.1.2 Algorithmic opacity

The thriving business model of commercial platforms is based on the monetisation of user data, their behaviours and in that constellation AI and particularly algorithms, play a crucial role. The way commercial platforms' algorithms, such as Google's, work was discussed by fifteen interviewees. One of the research participants, Susanna Kokkinen, is the Head of Aalto University Records Management, in Helsinki, as stated in Chapter 5. She discussed how the "Big Techs" affect knowledge production through opaque algorithms filtering the content and results pointing out:

> So basically, because it [Google] has commercial content and also, again, it sort of checks your search habits and tries to give you content that it thinks you need, even though it's not necessarily what you are actually after when you search Google. So the fact that people don't realise this is it, it's a massive problem, but it's in a way, it's all this talk about openness and, within cultural organisation, it's useless unless people actually – if they don't realise that there is a massive amount of noise they will never find it unless they use search engines other than Google. (Kokkinen, author interview, 2020)

Essentially, Kokkinen refers to the fact that commercial platforms' practice in filtering their results, showing their users content that is mainly curated and tailored, for example, to their previous searches, means that users will never really be able to find what they are actually looking for unless Google wants to show them. Non-transparency in this respect can be translated in two ways. Kokkinen discussed that commercial platforms operating through surveillance tactics and mechanisms filter the results they show to their users in an effort to tailor to their appetite, namely what their search and click habits are, as derived from the surveillance practices imposed. Hence, the information, or content, that the user receives, is curated by (non-intelligible) algorithms, filtering and controlling information and knowledge

[20] https://neworgans.net/

dissemination, through non-transparent practices. There is an overabundance of information floating around the net, but unless someone is aware of how to search, it is impossible to find what is actually out there, rather they will find only what the commercial platforms want them to find. Often people believe that commercial platforms like Google are acting as if they are omniscient. Although it is true that these platforms hold a lot of content, their results will not show *all* the information that there is online. For example, when a user wishes to search for a digital copy of little-known artwork online and does so online through commercial platforms, they might not find it, or they might find a poor quality resolution of the image. Although Google might not be the best place to search for cultural data and not as appropriate as a data repository would be, it is still used more frequently by users to perform searches, rather than aggregators, or CHI portals, as I observed in the field.

Non-transparent practices and how platform's algorithms work, was extensively discussed during the Cambridge Analytica scandal's exposure and the extent of third-party company involvement, similarly with what played out in the aforementioned film *The Hater*. Opacity in terms of either the technology used, or the way the business model operates, dictates enclosure tactics and prescribes that commercial platforms are not open, although they are portrayed to be free of charge to use. More than half of the interviewees were concerned about commercial platforms' strategies and practices when it comes to the value of openness and open knowledge in the larger context. Kokkinen also reflected on the commercial platforms' algorithm, stating:

> So in that sense Google is not very open because it does not actually always do what you are trying to make it do. So that's a problem. (Kokkinen, author interview, 2020)

Non-transparent practices leads us to perceive and think of platforms as opaque entities, black boxes. As such, they are not open, actually not intelligible by the users who cannot alter them. At the core of openness, as discussed in Chapter 5, lies malleability, namely the ability for change. Notwithstanding, in order to change something, it should, ultimately, be understandable enough. Another quality is that it should be translucent, so that light can be shed. Through the analysis of the research data, it is evident that commercial platforms are not actually aligned with the values of openness and transparency and therefore, are not open in the sense defined in this thesis. However, they surely provide certain forms of access, post content and edit it, for their users. Yet, their strategies and mechanisms of having such a closed centralised obfuscate model implies monopolistic tendencies and are not compatible with the premises of openness and democratic values on which the Internet was initially based. Indisputably, this is also linked with fake and false news dissemination practices, which are inherently interwoven with all that is taking place at the present time and how it is being shaped on a socioeconomic and political level, while simultaneously also impacting future memory making.

Furthermore, non-transparent practices are inherently linked with ethical issues. As Kokkinen stated, the fact that people are not really aware of how commercial platforms' algorithms work, but still use them quite frequently, even for everyday tasks, is indeed a critical issue. From the analysis of the data,

it is evident that there is a connection between the opaque practices that the digital ecosystem exercises and ethical considerations that arise on the other hand. These links derive primarily from the fact that platforms operate under an obfuscate business model, monetising user data and that the technologies that are used, namely their algorithms, are opaque. As Dennis (2020) wrote, "The use of a digital tool that cannot be understood by the user, or a digital method whose analytic processes cannot be explained by the user, is an inherently unethical choice" (Dennis 2020, 215).

Even though the opacity of these specific tactics might be known to some of us, it cannot be expected that society as a whole should be able to identify issues and practices that are not transparent. For example, when a user sees an advertisement for something that they have already searched for, it could be that they find it pleasing and might not reflect immediately on the "whys?" and "hows?" that the advertisement is being presented to them. Moreover, when I was teaching at the colloquium on open knowledge at the University of Hamburg, few of my students argued that some of the advertisements they saw online on commercial platforms were useful and appropriate for them, given that they were similar to their tastes and lifestyle, helped them to explore new products and domains, so they could easily follow up on what to buy. This problem is part of the obfuscate practices that the platform economy imposes to mislead and hoodwink its users, by exploiting their data and their (digital) social relations to maximise its profits (Langley and Leyshon 2017) by providing services which give a (sense of) benefit and added value to their customers. Digital platforms were portrayed to have been formed to expand and strengthen open knowledge by the democratisation and access to knowledge for all, as discussed in Section 2.4. However, as seen in Chapter 2, the profiting model prevailed. Since then, commercial platforms have been operating through a business model of obfuscation; this means that it is not clear how their algorithms work, or how they capture user data and use them for marketing and monetisation purposes. In the name of using their services *free of charge*, they are actually profiting themselves free of charge. The systematic capturing of user data leads to monetising user data – actions, preferences, emotions transforming them into "tradable commodities" (van Dijck et al. 2018b; Jordan 2020), for surveillance purposes (Zuboff 2019).

6.2 Big technological giants are profiting for free

As also discussed previously in Section 2.4.6, power asymmetries are inherently linked to the current digital economy and its incentives, interests and driving forces are the "for profit" purposes (Pollock 2018; Fuchs 2020b). In recent decades, this has become very problematic, with technological monopolies thriving under that specific mindset and logic. The big players, like GAFAM are thriving through the ideology of "open" and making huge amounts of money out of it. Schneider discussed that issue:

> People are using these platforms because they are very convenient, because they are pleasant and they don't realise very often that it's also an expropriation process or a form of getting

> access to people's data and [the users] like to do this, because [to them] it seems to be for free, but they have to pay with their data. (Schneider, author interview, 2020)

The commercial platform model is based on the logic of open being free of charge, namely the service/platform can be used by the user with no extra visible cost or money. Thus, although the user receives the impression that the service is offered free of charge, as Schneider highlighted, "it seems to be for free", the actual fact is that the user is paying with their own data, also the time spent on the platform, as well as clicks and behaviour. Indeed, a lot of people might be aware of that practice and in the light of easiness and convenience might overlook it, yet it is indisputably a non-transparent practice and the service should not expect their users to be aware of such a practice, which has based its logic on some kind of fallacy for the users. What is central in this debate is what Schneider described as an "expropriation process". Moreover, the large-scale platforms which are essentially big corporations, are taking advantage and exploiting user data for their own benefit. The issue that Schneider put forward, the "expropriation process", or "a form of getting access to data from people" is a vital aspect. It concerns the rights or management of the data which their business model has established. Additionally, the big data giants do not open their data sources for anybody to look at and this is another reason why this paper does not consider these platforms to actually be "open".

Furthermore, during recent decades, the corporate capitalism's use of openness ideology, or profiting from openness (Lund and Zukerfeld 2020, 7) ideology has been thriving. On the one hand, there is the profit from openness business model, which is a very characteristic feature of cognitive capitalism, exploiting free labour and user attention. The value is created by its users, contributors and producers, whereas some are getting paid, others not (Lund and Zukerfeld 2020). The main revenue comes from advertisements. Based on Lund and Zukerfeld's work on profit from openness versus profiting from the enclosures model, I demonstrate a simple contrast between the two models. The enclosure model, for example, Microsoft Office, Netflix, needs to be paid for access and receives revenue from output prices. The model operates by means of paid labour (wages), meaning, namely, a higher output price. On the other hand, the open model, for example, Facebook and Google, promote that they provide free access to users but their revenue derives from data monetisation and advertising practices (Lund and Zukerfeld 2020). It implements free (leisure) labour, leading to lower input prices. Both address the challenge with zero costs of copying. Nevertheless, the profiting from openness ideology has shown that this kind openness is not as open it claims to be. Indisputably, the "open economy" is feeding capitalism and it exploits the open (data) movement, as also demonstrated in Chapter 2.

In addition, a related issue that derived from the analysis of the research data is whether "free" and "open" are interchangeable terms. Platforms claim to be free of charge, but as discussed, this is not actually the case. Eleven out of twenty-three interviewees raised their concerns that open and free are not synonyms and when a service is open and accessible to all, it does not mean it should be free of charge. Schneider stated:

> I think very often there is a misunderstanding between free in terms of free speech or free opinion, free issuing of your opinion and free in terms of being free of charge. So, I think the Internet should be free in the respect of giving your opinion freely without censorship – but I don't think that everything should be free of charge. Because I think, of course, there should be some revenues for artists, well, for other people putting a lot of work into what they produce in terms of cultural products. (Schneider, author interview, 2020)

The aspect Schneider discusses here is a crucial one. However, it is often neglected or even goes unnoticed and particularly in the times in which we live, where for the sake of convenience people overlook it. Schneider is making a division here between, on the one hand, the Internet as a free speech medium and "space", which had been developed to serve the democratic values and also empower people to participate in knowledge production and on the other hand, the "for free" aspect – which becomes a contested issue. This is because (commercial) platforms are exploiting the ideology of open knowledge and open data and build their business model on the idea of the "profit for free" (Lund and Zukerfeld 2020). Does free mean open? Should open be free of charge? At a first glance these might seem interchangeable terms, but they are not. The commodification and monetisation of data do not infer that logic. Conversely, there are initiatives and platforms like Wikipedia, where people voluntarily contribute to it free of charge. However, this cannot be done for every sector. By looking at the cultural sector for example, a cultural event needs a lot of different resources. Hence, although the Internet was built in the light of free speech, in order to be able to maintain it, the business model needs to be rethought and more transparent.

6.3 (Anti-)Competitive practices and digital monopolies

It is widely known that the current digital economy operates and blossoms through neoliberal practices, which encourage the free market and specifically competitiveness as a key method and strategy to succeed (Scholz 2016; Cusumano et al. 2019; Fuchs 2022). To date, neoliberalism's ideology welcomes competition which is intrinsically linked and portrayed as a productive way and medium, as well, to thrive, while arguing that there is nothing wrong with "for profit" and that competition fosters and empowers the market and the economy in general terms. However, openness is first about sharing. In the open knowledge context, the aspect of sharing is at the core, but there are challenges in how it can actually co-exist with competitiveness in a free market. In this section, I discuss the relationship between competitive practices and open knowledge and shed light as well on anti-competitive practices, which have been receiving negative criticism, in the emerging setting of monopolies. The extremely competitive practice of determining which company or platform will ultimately prevail and which platform will capture people's attention for the most time, is not aligned with the values of openness and sharing as fundamental principles of the Internet. I would like to differentiate at this point between the (good) competition on the one hand that is fuelling the market and makes it sustainable and stronger for (almost) everyone and on the other hand, the unfair competition, also known as anti-competitive

practices. Big corporations (usually) implement anti-competitive practices to cut smaller, or even emerging, players out of the digital economy, with the aim of overpowering and in a sense taming the ecosystem to their own ends. Anti-trust laws protect healthy competition. However, it is widely known that digital monopolies have violated anti-trust laws in order to acquire other smaller or soon-to-be bigger-than-them companies, to break competition and be the only "big player" in the digital economy game. Moreover, with such a competitive mindset, concerns have arisen as to how open knowledge will ultimately thrive, as at the core of open knowledge are the notions of collaboration and sharing, rather than competitiveness and "closure" concepts. Giants and commercial platforms, are operating with a closed mindset, not actually letting more players or competitors develop enough or thrive. Discussing these concepts during my fieldwork, the research participants expressed concerns as to how the mindset could potentially shift in favour of openness and collaboration. Through networking opportunities during my secondment in OKFI, I had the opportunity to be introduced to Mikael Seppälä. His expertise lies in Systems Change and Systems Thinking, innovation management and ecosystems. During the interview he stated:

> So open knowledge is part of the broader culture in which you understand that you are not actually competing against others, for how you make society, how you generate information, but actually building the situation in which you are actually collaborating with others. So, for example, in software development, if everyone was competing against each other, they wouldn't share, I mean open source code." (Seppälä, interview by author, 2020)

Bringing back the value of collaboration, as opposed to (merely) competitiveness, could be a way of envisioning open knowledge on the Internet. In that respect, this is closely linked to the open source movement, which is one aspect. Developers tend to share their codes online, in an effort to move forward, evolve and grow. Open source coding could be perceived as fostering collaboration through fair competition, where the openness mindset embraces sharing a solution to build upon already established knowledge. So the concept of openness here is based on collaboration through sharing and reuse of the material, so that developers can share the same ideas and the same infrastructures and then by building on the pre-existing work, they then can build and develop the new code, tailored to the new needs and desires. To that end, the open source movement, with their mindset focused on collaboration, sharing and reusing available resources, has brought a lot of advantages to society. To mention just a few, the sustainability of data flows through the creative reuse of available resources, which has also aided a focus on future research and innovation, allowing applications to be developed on pre-existing research and work. Seppälä reflected on that and the ways in which society is organised:

> But if you have a way of organising the society [in] which you are competing you don't have the incentive for sharing then – so you are like, yes, we have this idea, we want to keep all of this software for us because we have developed it over time, we have been competing against others, this elitist thing. (…) So, basically if you start thinking of organising society through

> openness, it really starts shifting your thinking and your doing and that's the reason why I talk about paradigm shift. I used to work with Open Knowledge Finland, which is embodying some of this thinking, now I am working Systems Change, I see that if we were competing against each other and not collaborating, it wouldn't be able to do the shifts (Seppälä, interview by author, 2020)

So, how society is organised is vital and nine more interviewees spoke about this issue as well. A balance between organising society on the premises of sharing and giving (more) incentives for sharing, while also fostering healthy competition, for competitive innovation actions to take place is a complex but essential process. In addition, these few large-scale platforms in particular acting with monopolistic practices, dictate the competitive mindset that prevails across the current digital ecosystem. For example, platforms of the GAFAM ecosystem are basically operating under similar practices (i.e. surveillance capitalism), but each of them is working intensively inside their own ecosystem, while competing with one another. The bigger a platform is, the bigger its ecosystem (Srnicek 2017). In that sense, it gets more power and can achieve more goals on its own. Therefore, it does not actually collaborate with other platforms, but rather, it competes with them and ultimately acquires them. The latter could be illustrated with the following example: the case where Facebook bought and acquired Instagram and thereafter WhatsApp as well, to eliminate them from being competitors. It is crucial to mention that both platforms, Instagram and WhatsApp, were incredibly successful before their acquisition by Facebook. For that instance, Facebook had been sued for violating anti-trust laws for acquiring WhatsApp and Instagram (McLaughlin 2021). Moreover, Facebook, in 2021, was also accused by a whistleblower, Frances Haugen, a former Facebook employee. In her testimony, she spoke about how Facebook prioritises profit for hate speech and fake news. A few days later, the MIT Professor Sinan Aral, Director of the MIT Initiative on Digital Economy, called "for transparency and access to Facebook algorithms and data to determine how much the company tries to keep users safe" (MIT, Initiative on the digital economy 2021). Moreover, these monopolies, are not allowing smaller enterprises to grow. Seppälä stated:

> At that scale we are able to compete against other weak-scale organisations, so Microsoft, Google are competing against each other because they are the only ones who are able to collaborate on that scale. (Seppälä, interview by author, 2020)

Consequently, it is evident that the current digital ecosystem is somehow exclusive as it does not (easily) allow others to participate on equal terms. As discussed in Chapter 2, a few digital platforms and their intermediaries have "taken over the world", dominating the digital ecosystem, while not allowing space for new opportunities to flourish. Ten interviewees expressed concerns about the power relationships and asymmetries that have taken over the digital world due to the certain economic practices that are linked to network effects. One research participant, expert in the digital economy, called this practice "the first mover advantage", which is a marketing tactic. Three other interview participants, experts in the digital economy and digital ecosystem, explicitly stated that it is a term called "winner-take-all

economy" and raised their concerns that from this mindset stem the prominent power inequalities. This is deeply problematic, concerning its impact on society at large, including knowledge accessibility and knowledge production, while having political implications as well (Srnicek 2017). Moreover, this practice goes against several anti-monopolistic regulations. Also, more anti-monopolistic regulations have recently been formed to tackle this issue, where Big Tech companies had to pay a lot of fees to resolve this issue. Anti-competitive practices are unfair and illegal in most countries, although they have been adopted by Facebook and other Big Tech giants in recent years. Indisputably, anti-competitive practices should be prohibited as they are a dead end for the economy, leading to monopolies and the potential manipulation of knowledge production. They cannot co-exist with openness and open knowledge. This extreme competition has influenced people and society at large towards individualism (Davies 2015) and the ideology of (super) competition, pushing individuals and companies to be more successful than others and ultimately putting them out of the game. However, on the altar of competitiveness the values of openness, fairness and co-creation have been sacrificed. What is actually needed are plurality and diversity rather than a few monopolies; many different ways of thinking and acting, which by itself requires more openness. This mindset requires more "integrated than restricted thinking", which is as Seppälä highlighted:

> A really huge shift in terms of how we organise ourselves because we are used to this context and mentality [of competition], you know, (…), but the point isn't who has the best answers or who has the best solutions or who has the best ecosystems, but rather, how you bring this together and how you solve the bigger problems that we should be solving. (Seppälä, interview by author, 2020)

Therefore, rather than trying to be the best competitors and striving hard to win in an atomic, individual, or corporate level, we could put emphasis on collectiveness and turn our efforts into collaboration, co-creation and equity in an effort to achieve inclusivity. The point is to envision and design regulations for an economy that would be capable to work for everyone and not just for the few. Also, what is required is that there would be a plurality and diversity of initiatives strengthening the multifaceted society; a bottom-up approach, where also women and those from minority groups feel able to contribute.

In addition, through exploring the field, even quite early on at the Institute's Colloquium I had organised, I realised that the centralised approaches and infrastructures are linked with the (more) concentration of power. I had been involved in many different discussions, groups and settings where I was immersed in exploring fairer and equitable practices in the digital economy. Such an instance was the workshop during MyData 2019 about collective intelligence and decentralised approaches to knowledge management and sharing. MyData 2019 was a source of inspiration for emerging modes of knowledge management and also a source of networking and meeting people, experts, researchers, activists, professors, who share the same goals, aims and aspirations. In such an instance I met a scholar who after

I shared my doctoral research topic with them, advised me that I should speak with Dr Minna Ruckenstein, Professor at the Centre for Consumer Society Research at the University of Helsinki, where she had been working on related issues with the digital ecosystem, algorithms and the datafied society. Unfortunately, I did not manage to meet her during the MyData 2019 conference, but I did just a couple of months later during my secondment period, in February 2020. Indeed, during my secondment in Helsinki, I conducted an interview with her. She also emphasised how monopolies that have implemented anti-competitive practices have taken over the Internet. She discussed, along eleven other research participants, that currently, exploring fairer ways in the digital economy is essential for an open Internet that does not monopolise knowledge production, but rather co-creates it with the users. Ruckenstein explained more why it is difficult for people to imagine alternatives:

> We have been trying to kind of raise the idea of, oh, where are the alternatives? It's like currently it's very difficult to think about them. It's very difficult to take alternative paths because it looks like they are not there. It requires kind of a broad effort. So if we want to have other kinds of possibilities to share things other than the usual Facebook, Instagram, we just have to start building them. (Ruckenstein, author interview, 2020)

Usually, it is not easy for people to envision alternatives for the future. Some people do not believe in alternatives for many various reasons. From the empirical material it is evident that this might be connected with the fact that people usually cannot easily imagine more than the status quo because capitalism is so ingrained in the culture and it is so difficult imagining economic practices beyond capitalism (Fisher 2009). Part of this problem is linked to what was also discussed with Dr Tuukka Lehtiniemi, is a social scientist currently a post-doctoral researcher at the Centre for Consumer Society Research at the University of Helsinki, Finland. Lehtiniemi conducted his thesis on the data economy and participation in the data markets. He comprehensively discussed why it is so hard for alternatives to thrive (while) trying to compete against data giants. He stated that one crucial issue that impedes their scale is placing their initiative outside of the current economy:

> They kind of position themselves outside of the system, outside of the data economy, completely [outside] and proposed a really alternative [option]. (…). They are proposing an alternative that is not connected to what there is somehow. (Lehtiniemi, interview by author, 2020)

Lehtiniemi links the fact that new enterprises cannot grow enough with the predetermined notions that people have for how the data economy should work:

> We are so used to certain kinds of ideas of using data by now so that the alternatives that we can imagine are either really alternatives, or then they are really within this data market in many ways. So this idea about people participating in the data markets with their data is really well aligned with the economic ideas about how the data economy should work. (Lehtiniemi, interview by author, 2020)

Lehtiniemi stated that his doctoral thesis was exploring similar issues and particularly those about how to find a balance in the current ecosystem; either positioning the initiative somewhere really out there of the ecosystem, or then being so aligned with the existing data economy, that is not really an alternative, but is somehow supporting the same system. He stated that in order for an enterprise to be able to compete in the current digital ecosystem and possibly thrive, it needs to resonate really well with the existing data ideas about the markets (Lehtiniemi 2020). It is evident from my empirical material that there are a lot of possibilities and other "kinds of logic", rather than the "giant data logic", as Ruckenstein discussed by Big Techs that are shaping how history will be remembered. The way we use technology is critical in this narrative. Do we use it to serve humanity and for good reasons, or merely serve the market place? Conversely, someone might argue that even using technology for good might end up being used to society's detriment, as history has shown. As Madianou (2021) discussed, emerging technologies, such as AI, could be used for social good but at the same time, they could be harmful. Hence, it is clear that the point is not about technology – it was never actually just about technology per se. Opening up in fair and equitable ways is about the policies, logic/mindset, practices governance and people's motivation. Investigating other kinds of logic where platform capitalism will be transformed into incorporating a social dimension and not as it is operating today with the "for profit" mindset is the significant part. Angela Merkel, the former Chancellor of Germany, explicitly stated in January 2018 at Davos, where the Word Economic Forum holds its annual meeting that: "We need a social market economy, 4.0, not just an industry 4.0." A new story about openness, co-creation and sharing should be written since these non-transparent practices are not aligned with the vision of an open and democratic Internet.

Moreover, the debates on "alternatives" for commercial platforms have long been discussed in recent years due to scandals that have emerged, but the debate has recently become heated, particularly after Facebook's outage on 4 October 2021. Facebook owns Facebook Messenger, WhatsApp and Instagram and thus, all the sister companies failed as well. The outage lasted approximately six hours. The users had never experienced anything like that before and as they were accustomed to convenience, immediacy and ease of communication with online platforms, they were shocked that they could not communicate via those platforms during that time. Users were gathering on Twitter, which was functioning as normal, in order to keep abreast with the news about the Facebook outage. Many on Twitter discussed the general public's dependencies on corporate platforms affecting almost every aspect of people's lives; from an individual level – chatting with their loved ones, to a corporate or institutional level, where the organisation has embedded their products into their logic (e.g. forming WhatsApp groups to communicate for work purposes). As a result, people started discussing the alternatives to commercial social media platforms which did not track users and whose business model did not rely on advertisements. At the heart of this debate is governance; how "things" are governed, what the policies are permeating the infrastructure, who imposes the rules. One of the central aims and discussions I had during my fieldwork with the experts was to investigate and understand what the ways

and resources to move towards fairer digital futures. All the experts highlighted that the monopolistic tactics of the current digital economy needed further regulations – national, international, EU level – in aspects concerning legislation, economics and ethics. Among the people who highlighted the significance of "breaking the monopolies" was Lehtiniemi:

> So openness for me, at least, there's always somehow the need to intermediate for it to be actually all open in the sense that it breaks the monopolies instead of creating new ones (Lehtiniemi, interview by author, 2020)

Breaking the established platform monopolies, or precisely like regimes of knowledge is a shift that openness is capable of achieving, if applied successfully, on a holistic level. As discussed in Section 6.1, open knowledge is opposed to commercial platforms logic and it is opposed to the prevalent GAFAM platform's model of a vertical hierarchical power structure. As thoroughly discussed in Chapter 2, although platforms seem to be quite flat in their hierarchies, they are actually very hierarchical infrastructures in terms of who imposes the rules, who is involved in the decision-making, who owns the data and so on. All the experts suggested a resistance against the monopolistic tactics that do not allow the space or even the opportunities for new possibilities to emerge, which correlates with the anti-competitive practices discussed in Section 6.3. The current digital ecosystem is in favour of the market and the exploitation of a data mindset is at the heart of this logic. Rufus Pollock (2018) highlighted, "Today, in a digital age, who owns information controls the future and we face a fundamental choice between Open and Closed" (p. 7), where he was explicit about the vitality of ownership in the digital age. With the emergence of platform monopolies, operating under corporate interests, data management is at risk. This is discussed extensively in Chapters 7 and 8, expanding the idea of intermediaries breaking current monopolies rather than creating new ones, as Lehtiniemi discussed.

6.4 Formative evaluation: from an ego-system to an ecosystem

After the analysis of the research results, one central principle of the initial prototype of the socioeconomic model that my doctoral work had drafted, was a human-centred approach to the digital ecosystem, as opposed to monopolistic tactics of Big Techs. In particular, a preliminary prototype of "How to open up knowledge in an equitable way" was presented during the formative evaluation on 1 July 2021 with the respective expert focus group. However, during the formative evaluation, such a principle was assessed as being "limited". The focus group demonstrated that the approach is limited in the sense that a human-centred approach to the ecosystem resembles an ego-system rather than an ecosystem (Scharmer and Kaufer 2014), which is the central aim of this doctoral work. The notion that technology should be human-centred has endured for decades. Mike Cooley (1989) coined the term "human-centred" systems setting the foundations of human-centred innovation. Cooley was one of the earliest to put people first in the design and development of intelligent systems. Also, his work had focused on issues pertaining to the limitations of intelligent machines and automation in general (Cooley

2018). There is no doubt that technology should be serving human needs by enhancing human skills instead of exploiting or undermining them (Cooley 1989, 2018; Gill 2016). Nevertheless, currently, human-centred technology does not seem to be adequate enough to grasp the emerging complexities of the digital ecosystem. From the evaluation event it was evident that human centredness can be interpreted in many ways. For example, for human agency we cannot assume that it is only good; we have to consider, too, that there are also harmful agencies. Focusing on the evaluation results and the theoretical lens, that is assemblage theory, I diverged from the human-centred ecosystem and embraced a holistic perspective. Due to time constraints, I did not fully integrate this approach into the final model and frameworks that I present in Chapter 8. I do, however, discuss this perspective in Chapter 9, the Conclusion, which can be considered for future research work.

6.5 Conclusion

In this chapter, I examined how commercial platforms are monopolising cultural knowledge production through obfuscate practices and their impact on cultural participation. These opaque practices have a huge impact on how knowledge is being assembled and disseminated in the context of cultural knowledge production. The consequences of these practices affect how we envision a collective future memory making where democratic values would thrive. Currently, cultural knowledge production is organised (primarily) and circulated by large commercial platforms and their business-driven values and interests. Also, these practices impede the participation of people in being active in the process of knowledge production due to opacity, for example, intelligible algorithms or by implementing anti-competitive strategies that prevent other enterprises flourishing. CHIs are striving to retain audience engagement through social media platforms and be digitally present. However, simultaneously, due to the fact that CHIs are losing their voice as the main actors and factors in producing cultural knowledge(s), they are being sidelined by commercial interests. This can be illustrated in the way that knowledge is being assembled, generated, articulated, presented, distributed and ultimately reused online. Notwithstanding, this also has a direct impact on people themselves; who the platform users are. From the analysis of the data and the research results presented in this chapter, the complexities of the digital ecosystem in the light of the platformisation of the Web are evident, alongside the immense power asymmetries which have emerged. Undoubtedly, the current ecosystem is not sustainable and new rules are needed for the digital economy (Pollock 2018). The digital ecosystem needs fair and transparent practices as a response, or even practices opposed to the market-dominant landscape (Tzouganatou and Krueckeberg 2021), to champion the public good. In Chapter 7, I discuss fair practices and distributed modes for knowledge production in the digital realm beyond the current GAFAM ecosystem. In the digital economy, data is being used for monetisation purposes (e.g. behavioural predictions/surveillance capitalism). The public should try to protect its privacy on an individual level at first. Indisputably, opacity in the digital economy in terms of practices, policies and governance, is opposed to openness and open knowledge, as presented in Chapter 5. The (value) chain of the digital

ecosystem is so opaque, in particular due to the fact that it is hard to know how and what exactly the role of third-party companies is in relation to how they use user data and what they do with it (Zuboff 2019; van Dijck 2020b). Having control over our data – data that have been created by and for us – is crucial. Rethinking the way we create and use data is critical. At the core of my research lies the potential for users (either individually or collectively) to have control over their data and make use of them, beyond their current management by the giants, to envision positive futures rather than fear the loss of our collective memory. Tapping into the potential of data sovereignty, either in individual or collective terms, could be a path towards fairer practices. This step would also need to include decisions and actions for the larger ecosystem, in terms of the ecosystem's design, infrastructures and ethics. Distributed governance practices could facilitate control over our data. I discuss this topic in Chapter 7 as a response to the urgent issue of emerging data logics which stem from the analysis of the research results.

Chapter 7. Independence and Sovereignty: Leveraging Openness for a Fair Digital Ecosystem

One of the main aims and objectives of this thesis addresses the growing power asymmetries in the digital economy, which derived via the practices imposed by large-scale commercial platforms. This is particularly with regards to the public's accessibility and participation in digital cultural heritage. How can accessibility be equitable when CHIs have integrated the very same large-scale social media platforms in their digital strategy that were discussed in Chapter 6? Digital capitalism plays a vital role which is linked to the digital monopolies leading to digital colonisation tactics on the Internet by the Big Tech giants. For that reason, this thesis takes a macro-ecosystemic approach. The analysis of research data in Chapters 4 and 5 showed that it is important to examine the modalities of controlling access to disseminating, sharing and reusing cultural data on a macro level and so that is why the assemblage lens is useful in understanding the relationality between the elements of the ecosystem. Chapter 6 explored and discussed these very same issues that digital capitalism has brought in relation to participation, openness and social inclusion and essentially pointed to these problems. It was evident in Chapter 6 that large-scale commercial platforms acting as monopolies are in fact controlling cultural knowledge production while raising ethical issues as well. At the Europeana 2021 conference that took place online 10–12 November 2021, titled "Recover, Rebuild, Grow", Professor Pier Luigi Sacco, the keynote speaker, who is Professor of Cultural Economics, at IULM University Milan, Senior Researcher, metaLAB (at) Harvard and visiting scholar at Harvard University, reflected on the role of digital technologies in his talk "Cultural participation, digital technologies and transformational social change". He discussed the imminent issue that this work deals with by highlighting, "If we do not create a truly inclusive bottom-up way of creation and participation soon, we will end up in a dystopian system with a huge participation gap where attention is monetised and concentrated." In Chapter 5 it was evident from the interview record that in order for the data to be open, data need to be accessible, used and useful. In this last analysis chapter, I further discuss the uses of data and the potential of independence and sovereignty as a way to address monopolistic tactics, as extensively analysed in Chapter 6. In particular, I discuss data uses and the level of openness, as well as consider privacy issues. Essentially, the monopolies that have been formed act as digital colonial powers and thus investigating digital de-colonial practices, namely digital sovereignty and independence when it comes to data practices, could be a way to move forward. Digital sovereignty is connected to the practice of empowering people through their data, prescribing views for the empowerment of people to use for their own benefit, their (personal) data. In addition, there is also technological sovereignty on an infrastructural level, as opposed to the digital colonialism practices.

7.1 Digital and data sovereignty

Digital sovereignty was derived through the doctoral research data as a way to retain the European values to the fast-paced digital transformation. The first time I encountered the perspectives of digital

sovereignty was at the MyData 2019 conference in Helsinki. Data sovereignty has also derived from the analysis of the interview record and although it is linked to digital sovereignty, it is also differentiated from it. Data sovereignty was emerging as a way to tackle the critical and imminent issue of surveillance capitalism, as discussed in Chapter 6, through human-centric data governance approaches. In that sense, one crucial aspect of my work was to conduct research into ownership issues and investigate future possibilities. What is evident from the analysis of data is that although the current digital economy is not fair in the sense of equity, due to monopolistic tactics and practices that were described in Chapter 6, this is not a data ownership issue per se. Seven interview experts in the field of data economy and related data practices highlighted that the question "who owns the data?" is not a particularly beneficial one. Discussions around the ownership of the data had taken place with the interview participants, due to the fact that in the current digital ecosystem, user data is owned by the Big Tech monopolies – GAFAM and the like. However, the experts argued that the crucial aspect that should be researched is not about data ownership per se, but it is what the user can do with the data, that is, rights of the data, which is also linked back to the notions of being sovereign of their data. The discourse for digital sovereignty has dominated the field of digital economy during the last couple of years (Floridi 2020). During these times, the digital ecosystem has been dominated by monopolies which operate under tactics resembling digital colonialism, as well as fake and false news that are creating power asymmetries while enlarging the participation gap (Poderi 2019; Kidd 2018; Zuboff 2019; Fuchs 2020b). Data sovereignty refers to the notion that data should be subjected to the law in the nation where that data are being collected. Moreover, there is another idea bound to this concept. The idea that people should be able to determine how they use/what they are going to do with their own digital data, so that they can become 'sovereign' of their own data. Sovereignty as a notion was first mentioned, to the best of my knowledge, in the "The peace of Westphalia of 1648" (Croxton 1999) connoting territorial aspects in the means of sovereignty. In the next section, I discuss the need to further explore the uses of data – or the rights of data –and not the data ownership as concept per se.

7.1.1 Shifting from data ownership to controlling the rights and uses of the data

Seven research participants who are experts on the data economy and related issues, expressed the argument and position that data ownership as a concept is not a panacea. One of these experts is Dr Tuukka Lehtiniemi. He has been conducting related research to data and digital economy in his doctoral research and beyond, as discussed in the previous chapter. On data ownership, he said:

> So, ownership I think we probably shouldn't talk about that at all. Because, (…) it's an immaterial thing – data – and you know, you can copy it and you can multiply it and you can share it in different ways. Not even thinking about the legal implications of ownership, but it starts wrong, kind of, it takes your thoughts into a direction that I don't think is really beneficial when thinking about data. (Lehtiniemi, author interview, 2020)

Lehtiniemi and other six experts, make a distinction here between material and immaterial assets, while categorising data as an immaterial asset and differentiates it from materials, such as concrete items, such as a physical object. During our interview he talked about the notions of ownership with regards to data. He stated that there have been discussions in which people stated that "you can't own your data, no one can own the data". I observed that this is due to the fact that legally it is not the same situation or same conditions as with tangible property, or objects that you can own. He stated that the concept of data ownership might not even be appropriate due to the fact that it envisages and also portrays data as merely a resource:

> It takes your idea to this thinking of data as somehow a resource only, for that can be somehow economically exploited. But I think (…) it should be something else as well. (Lehtiniemi, author interview, 2020)

Later in our interview, he stated that the concept of ownership is only helpful in the sense of a "shorthand". For example, the political economy of data is linked with the idea of owning one's own data. However, using this concept just as a shorthand, although it can be handy and useful in a way, it does not actually help or reflect the reality. There is the notion that a user owns their data because they are about them. Indeed, it is evident from the analysis of the data that it is such a really simple way of saying "ownership", conveying the idea that the user should be able to make decisions about them. However, in reality, this concept cannot really be applied well in the current digital economy. The seven interviewees claimed that often data about one person are interlinked and interrelated with another's data, as well. Lehtiniemi stated that data about "me" are often data about "someone else" too. So who owns that? Should I own data about me, even if it is also data about another person? It is difficult to distinguish therefore what data belong to whom and many issues arise from this problem. Lehtiniemi claimed:

> The ownership piece, it takes you towards the idea that it's mine, but then it's almost always not only mine in that sense, so it's someone else's as well. (Lehtiniemi, author interview, 2020)

Hence, data ownership is deemed not to be the appropriate concept as it also evokes more challenges like the privacy issue that Lehtiniemi and four other experts discussed. In the digital age, data that a user produces, do not only contain information purely about them. Indisputably, data have been co-created and they are co-dependant with the infrastructure, system or within the ecosystem that has been co-developed and therefore produced. As Lehtiniemi expressed during our interview, data that one user produces includes information and thereafter data, about other people and users, for example, when chatting with other users, when making online transactions. Therefore, how can someone own their data, when at the same time that data are not only just "their" data, but also others' data too? For these reasons, Lehtiniemi does not support that data ownership as a concept could be useful, or even propose solutions in a fruitful and productive way. Along these lines, six more data economy experts whom I interviewed,

expressed similar positions. Professor Minna Ruckenstein, also explored the data ownership problem as a concept:

> I think that ownership is not very useful in the sense that I own or I don't own data, because it's such an interesting resource that it should actually not be owned as a data resource, but it should somehow be – the uses of it should be owned somehow. So who gets to use it? Who pays for it? (…) The intellectual property rights might be much more useful to think about instead of straightforward ownership. (Ruckenstein, author interview, 2020)

Here, Ruckenstein makes some crucial points with regards to ownership. She also expresses the view that data ownership as a concept is not useful and she is also pointing towards the direction of uses of data and rights rather than "straightforward ownership". Along the same lines, Professor Dr Ingrid Schneider shared similar views. Schneider has been involved and worked with intellectual property issues, especially on patents, for a long time, as well as on copyrights and other forms such as trademarks. She did her habilitation[21] thesis on the governance of the European patent system, focusing on the relation of data in the context of cultural knowledge. She talked about this same issue of ownership and rights:

> There is a lot of discussion also whether [cultural] data should be propertised, whether there should be a property right on data, which I think is not a very good idea. But there is a lot of discussion on how to empower people when it comes to their personal data or when it comes to civil society organisations or institutions. (Schneider, author interview, 2020)

Schneider suggested that rather than focusing on property rights on data or discussing the concept of data ownership, it is possibly more beneficial and topical to move forward by exploring opportunities as to how to empower people to use their data. Hence, as is evident by the analysis of the research data, the concept of data ownership does not actually address the needs to achieve in practice what and how the data can be used and reused beneficially for/by the public. Possibly, one critical issue and misconception is that data has often been portrayed and characterised as the "new oil" of the digital age. However, data, unlike oil, is not a natural resource; it cannot be found in "nature" (Couldry and Mejias 2018) and also as mentioned above, the connotation of "resource" can be misleading towards its economic exploitation. It is more beneficial to be exploring and asking how to empower people through their data and as Ruckenstein claimed during our interview, the question on which we should be focusing is: How do you pull the resources together? The notion of empowering people for using their data for beneficial reasons is inextricably linked with the idea of sovereignty, so that they can become sovereign of their own (digital) life. Data are the footprints that the users leave behind or carry with them, while surfing online. Furthermore, the empowerment of people when it comes to using their (personal) data is

[21] In Germany, habilitation is the highest university degree, earned after obtained a research doctorate.

at the core of emerging initiatives that are striving for a fairer digital future opposing Big Tech giants and monopolies such as mentioned by the MyData initiative, which has particularly impacted my research thinking. After conducting related research at OKFI, I explored that the MyData initiative had derived organically through the open knowledge movement and more specifically OKFI, as I discussed very briefly in Chapter 4. While I conducted my secondment in OKFI, I had the opportunity to learn more about MyData, as I conducted an in-depth interview with Teemu Ropponen, the general manager of My Data Global, at that point. MyData is an international non-profit organisation headquartered in Helsinki, founded in October 2018. MyData had previously been a working group of open knowledge and basically the MyData and open data concepts are related. Ropponen stated that there is an inextricable link between these two and discussed how MyData was organically developed through the open knowledge movement and OKFI. The history of MyData goes back to many of the MyData active people, being members of OKFI and working with open data. In Chapter 5, I discussed the basic principles of open data. The basic principles include having access to data in a structured format, having the right to get that data free of charge and the right to reuse and repurpose that. This should be the right for all public data. However, the MyData movement's initiatives were pioneering in the context of personal data. Ropponen explained how they came about:

> Can those same open data principles be applied somehow? In fact, that's what MyData is very much about. (Ropponen, author interview, 2020)

The idea and concept of MyData is nested exactly in that area and arena. On the one hand, open data and open knowledge supporters advocate for the use, distribution and reuse of data (Kitchin 2014), whereas MyData has brought this concept and idea to the personal data context. In the MyData initiative, they ask, "how can we increase the use of personal data – with the individual's consent?" Thus, they are striving for personal data in structured formats to be available through APIs – not just PDFs or paper. The privacy aspect is discussed later in this chapter where the framework for the level of openness is presented. MyData is concerned about who can access the data. Ropponen stated:

> We want people get access to the personal data for free, typically, which again, is a right under the GDPR. So there is a lot of commonality in the kind of open data thinking and the MyData thinking. (…) The principles in open data are that everybody should have a right to get access to that data and so on in MyData that I have a right to my data. You have a right to your data. And of course, I have a right to share that data if I want. But anyway, it's in my control. So the human is in control. (Ropponen, author interview, 2020)

The determination and control of one's data rights is at the centre of the MyData initiative. This aspect is included in the General Data Protection Regulation (GDPR) developed by the EU, as a data portability right. The data portability defined in the GDPR is, "The data subject shall have the right to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured,

commonly used and machine-readable format and have the right to transmit those data to another controller without hindrance from the controller to which the personal data have been provided (EU Commission 2016).” Following the regulations and directives is an aspect that was very prominent in the analysis of the data.

Furthermore, from the research data it is evidenced that digital sovereignty is needed indeed on so many levels, in addition to data sovereignty. It is needed at the grassroots level as well as on the highest political level. As digital sovereignty is linked with the idea of “being in control”, there is also a need for technological sovereignty on an infrastructural level, as the Internet is currently being governed by large-scale platforms acting with monopolistic tactics and market interests. The EU data strategy calls for some regulation, like standards and governance mechanisms. Ropponen said:

> There is a political will and a call for the data sovereignty and/or technological sovereignty. So to have kind of European solutions and to have this diverse ecosystem. And the EU has said that it will put funding into this, so funding infrastructure, funding into the skills building etc. I mean, that was a huge gap identified (…) the number of digital professionals is supposed to double in just a few years. (Ropponen, author interview, 2020)

Hence, in this context, the EU is striving to act in a systemic way, by providing funding and related governance mechanisms. Apart from the MyData, there have also been increasingly more initiatives empowering their users through data and have included the sovereignty notions such as research projects like the DECODE project[22] and also start-up companies.[23]

7.1.2 Fair-sharing benefit

Besides the discussion on the control of the uses and rights of data by individuals, there have been critical reflections within the MyData and open knowledge community, on a somehow individualistic approach that the former initiative encompasses, for an individual use of personal data, leaning towards a market-oriented approach. During our interview, Lehtiniemi highlighted this. Moreover, as a reference, the article “The social imaginaries of data activism” which he wrote with Ruckenstein, he discussed the “our data” branch, which derived from the MyData initiative. At the MyData 2017 conference they initiated discussions about “our data”, to explore more possibilities (Lehtiniemi and Ruckenstein 2019). Lehtiniemi said:

[22] https://decodeproject.eu/.

[23] https://bitsabout.me/en/.

> That was something that we picked up from the MyData community. It wasn't our idea only that there is this "our data" –it was also existing within the community. (Lehtiniemi, author interview, 2020)

This group then organised the sessions called "our data", as Lehtiniemi explained during out interview. In this context, there was resonance within this community of the idea of "our data" and not purely "my data". Lehtiniemi highlighted how, "it was something we picked up from there and kind of tried to enhance a bit and see what happens". Through the research data and analysis, I observed that data can be used for public good and enhance the collective value as well (Lehtiniemi and Ruckenstein 2019; Lehtiniemi 2020). Lehtiniemi highlighted that:

> We need some collective kind of agency towards our data. (…) So people would then collectively somehow govern the uses of these data. And also, perhaps some kind of agency, not only in the sense of making choices on the market, but agency in some other sense, towards their data agency in the sense of a citizenship or rights, for example. (Lehtiniemi, author interview, 2020).

This approach stems from the notion that it is not only about "my data" but takes a collective dimension, towards "our data". Therefore, Lehtiniemi and Ruckenstein (2019) proposed data commons and collective data governance ideas as some kind of an idea that could use these ideas about the individual controlling their data, but still in a somehow collective sense; creating "some kind of a data commons that are then collectively governed". The concept of commons as introduced by Elinor Ostrom (1990) illustrated a way to manage collectively certain kinds of resources. Although it is evident that data are not merely a resource that can be economically exploited, here I refer to the commons and keep the idea of governing collectively, as this was evident at the data analysis. The idea of commons by Ostrom is related to her many decades of work and research on communities (Ostrom 1990). Her work is linked with communities and the ways communities organise themselves. For instance, how to preserve a forest or referring to village communities who have access to water, but at the same time the water resources are very restricted. Thus, her work focused on the development of rules for these communities and not rules which are developed by the market or by the state, but by the community itself to make sure that the resources are not overused (Ostrom 1990; Hess and Ostrom 2007). Recently, there have been initiatives discussing and bringing to light the idea of "data commons" (Hamilton et al. 2020) or "digital commons". However, data are being differentiated from actual physical assets in diverse ways. Five research participants with expertise on the digital economy discussed that particular notion. Schneider, in particular, stated:

> I think in a certain way, data cannot be overused because they are non-rivalrous or they can be copied and can be used by many people at the same time without being exploited or without being wasted in a certain way, or depleted. (Schneider, interview by author, 2020)

Therefore, data are not and cannot be restricted in this sense, as other tangible assets. In theory, everyone can use the data, at the same time, without them being depleted. That is why Schneider attributed the term "non-rivalrous" to data. The idea of rivalry on goods was introduced in 1977 (Ostrom and Ostrom 1977). In economics when an asset, a resource or a good is called "non-rivalrous", it means that it can be consumed by more than one person at the same time and not be wasted or depleted. Schneider said:

> I think it can be good if the data is declared as a public good because the state can also enforce certain rights of individuals or communities, vis-à-vis large platforms. So that's the good idea about these morals of idea – of data as a public good (Schneider, author interview, 2020)

The discussion with Schneider and other six interview participants – Tuukka Lehtiniemi, Minna Ruckenstein, Samuel Moore andrea Botero, Susanna Ånäs and Tove Ørsted, showed that the idea of data commons in the digital age is pertinent. In the context of cultural (and/or personal) data in the digital economy, since data is not restricted, data commons is bringing the notion of collective governing and that the resource is not owned by one person, or by a digital giant, or by an archive. Ørsted commented on that point:

> Especially as an archive or a museum, I feel that there's also a duty too, – especially in a country like in the Nordic countries, where democracy and the thought of everyone being equal, our culture should for sure be included. Our common culture can't be owned by, you know, a person or an archive. In that sense, it's our legacy – is our legacy together. (Ørsted, author interview, 2020)

Essentially Ørsted here is sharing her views on the possibility to collectively govern "our culture", through bottom-up approaches. Moreover, the research data showed that a way to achieve this is through independence and sovereignty. Namely, independence and sovereignty from big data colonial powers and giants, towards open-minded practices. Ørsted's words "our common culture cannot be owned by a person or an archive (…) it's our legacy together", sum up the particularities of digital cultural heritage and leans towards a "digital cultural commons" approach. It is not about ownership, owing to the fact that this is "our legacy" – it is our culture, no one can own it and on the other hand all all together we can own it at the same time. Hence, again, the issue of data ownership is not so pertinent here, but rather the data uses and rights are.

Accordingly, through the analysis of the interview records, I observed that people who have similar interests when it comes to their preferences about how to use their data, or what should be done with the data, could unite and form unions like co-operatives. In the digital age, data co-operatives are formed and they then have a collective interest, which can be represented by that community concerning data platforms. Co-operatives have long existed in many different formats such as, for example, housing co-operatives. In the digital realm, the movement of "Platform co-operativism" was initiated as a response to the growing monopolies in the sharing economy. Platform co-operativism is first and foremost about

"democratic ownership models for the Internet" (Scholz 2016). Here, the notions of ownership are bound to collectiveness when it comes to a co-operative, that is collectively owned platforms. Here the notion of ownership does not immediately refer to the ownership of data, but rather, it refers to ownership about the "stakes" and equity of the co-operation itself. Dr Samuel Moore was one of five research participants who discussed co-operative models and data commons. Moore has an academic background in philosophy and cultural studies. He has a PhD from King's College, London, in Digital Humanities. He has co-organised the Open Access Collective,[24] and is interested in new forms of publishing, particularly in Open Access publishing. His scientific interests include how open access might be able to initiate more awareness and change within academic publishing, not just based on freely accessible research, but also allowing researchers to reassess how they publish and the kind of publishing practices they use. Moore stated:

> So, you have, like, co-operative models, platform co-operatives (…) where if you were a participant in any form, then you have a stake in the actual design of the infrastructure or the ways in which the models are kind of rolled out" (Moore, author interview, 2020)

Co-operatives and the co-operativism movement have been formed, in the digital age, as a response to platform capitalism and its pervasive implementation of their business models (Srnicek 2017; Langley and Leyshon 2017). Co-operatives' focus is on transparency, solidarity, collectiveness and equity (Scholz 2016). A crucial aspect of co-operatives is their structure and emphasis on collective work, co-creation (Sanders and Stappers 2008; Fuster Morell and Senabre Hidalgo 2020) and solidarity. On the topical issue of co-operatives Dr Andrea Botero also shared her views. She is an academy research Fellow at Aalto University, Department of Design, in Helsinki, with a broad experience in co-creative and participatory structures. She reflected on that:

> A co-operative is a recognised way that states and handles the business relationships between certain people, so they are not stakeholders, they are members in a co-operative and decisions are made in a particularly democratic way. (Botero, author interview, 2020)

At a co-operative they have non-hierarchical structures and as Botero stated they take decisions in a democratic way. A co-operative considers a more democratic ownership model, so that it follows such values, as opposed to the current digital economy which favours and benefits the few (Scholz 2016). The co-operativism model strives for "structural change, a change of ownership" (Scholz 2016, 14). This does not (necessarily) reflect on data ownership, but it refers more to ownership aspects – on who has a stake in the actual entity as Moore stated earlier, who takes decisions, who manages the entity and so on. Moreover, there are differences in platform and data co-operatives. There have been claims that platform co-operatives have the business model as their starting point, whereas data co-operatives focus on data storage (Calzada 2020). Platform co-operatives can be built on the commons, relying on

[24] https://radicaloa.disruptivemedia.org.uk/about/.

participatory design and open software practices. The analysis of the research data showed that distributed practices stem from democratic governance issues. In total, ten interviewees discussed the importance of digital governance in general and also forms of "good governance" and "collective governance". Good and collective governance are terms related to those involved or those who are part of the mode of production. Moore reflected on this issue: "the reason we do good governance is to bring more people into the kind of the mode of production". What Moore and the other five experts discussed concerns these emerging forms of governance and that they are essentially a way of being more open and participatory. At the time of the interview, Moore was affiliated with a research project, Community-led Open Publication Infrastructures for Monographs (COPIM),[25] in which they had been exploring and researching fairer ways for the online production and distribution of scholarly publishing. During our interview he discussed good governance and how it is connected with the fact that currently, the Internet is ruled by the free market. However, this is not actually sustainable. He stated:

> At the moment, we can say, like, bad governance is, in a scholarly publishing sense, it's publishing things for a market return. So it's not like the kind of infrastructures or the forms of publishing that are being governed by anyone in particular in that regard, they're being governed by a kind of profit-seeking shareholders. So if you get away from that and if you introduce community governance or good governance, then what you're doing is saying "there needs to be certain values that we can kind of account for within the thing that's being produced". And so, good governance then becomes kind of situated in the thing that exists in a particular place and it's designed by particular people. (Moore, author interview, 2020)

Rather than the digital infrastructures being governed and solely ruled by the market and "profit-seeking shareholders", the analysis of the interview material showed the introduction of collective, or community governance, which might possibly be a way to envision fairer digital futures. The aspect of the free market was also discussed in Chapter 6. In further discussion with Moore concerning good governance issues, he expressed the notion that there is a "size issue". Three research participants with expertise in the commons stated that there is no such thing as "global commons", for example. It is not possible to manage something on a global level; it should be situated, for example in a more specific context. Even though some people discuss how to manage the Internet as a global commons or space, that term is just not helpful because there cannot be good governance on such a massive scale. This is because there are diverse needs and necessities for different people, users, organisations and so on. Indisputably, people have different ideas, notions and even experiences of how things should work. The bigger the project, or the work environment, the more difficult it is for people to reach a consensus. However, Moore stated that although good governance does not resolve that, it does address it: "So good

[25] COPIM (Community-led Open Publication Infrastructures for Monographs) is an international partnership of researchers, universities, librarians, open access book publishers and infrastructure providers. It is building community-owned, open systems and infrastructures to enable open access book publishing to flourish. https://www.copim.ac.uk/.

governance does account for that. And that doesn't mean it's easy". In total six experts on the digital economy discussed the significance of involving people in the governance of data, namely, towards some kind of collective governance. Lehtiniemi stated:

> So you work in a collective sense and somehow govern in a collective sense. But you use this idea of individuals controlling and managing their data to produce that collective possibility. (Lehtiniemi, author interview, 2020)

The collective practices and mechanisms were highlighted by six interviewees. The idea for people to be able to control their data is one research finding. The empowerment of people through the control of their (personal) data individually was present in the analysis of the data mostly through the MyData initiative. However, the collective approaches leading to collective governance or community governance was more prominent. It is connected with participatory and co-creative approaches potentially leading to fairness in the digital economy. However, during the formative evaluation, another aspect that came up from one participant was that participatory governance holds some challenges, namely, that it "tries to put everyone around the same table which does not always scale well". Instead, the participant proposed the polycentric governance that Vincent and Elinor Ostrom had introduced (Ostrom 2009). As the participant discussed, polycentric governance is linked to the idea of the commons where governance is carried out in a distributed but connected and coherent manner. Polycentricity "connotes a complex form of governance with multiple centres of decision-making, each of which operates with some degree of autonomy" (Carlisle and Gruby 2017). After the evaluation event, I went back to my research data. One research participant, Samuel Moore, had touched upon polycentric models in our interview:

> Polycentric would be what Ostrom talks about in terms of governance, where rather than thinking about it as purely decentralised or distributed, in a sort of a larger common space you have different areas, where each sort of small project takes kind of ownership of its own area. But then it kind of contributes back to the broader commons, if that makes sense. And so polycentric, it's sort of about how individual projects can operate with other ones. And so it's an interesting way of thinking about if you're thinking about sort of democratic governance, you can imagine like one or two representatives of each of these smaller projects contributing to a slightly larger one. (Moore, author interview, 2020)

Although polycentricity seems an interesting approach, due to time constraints I did not further analyse it and thus embedded the final conceptual model and frameworks that I present in Chapter 8. However, it could be included for future research. Another research finding that is linked with the ideas of empowerment and openness, is that of (data) intermediaries. Four experts on data practices on the digital economy, discussed this during our interview and proposed the idea of adding and developing the notion of establishing an intermediary to delegate and facilitate the process of figuring out how a fairer

governance could work. Lehtiniemi elaborated more on his idea that intermediaries could help, which was first introduced in Chapter 6:

> If there is an intermediary then people (can) somehow govern the ways in which it can intermediate their data or the ways in which people can use it to intermediate their data. So that's somehow also a form of collective governance. But it doesn't have to do with data commons. (Lehtiniemi, author interview, 2020)

Lehtiniemi proposed an intermediary to aid augmenting the uses of data; governing somehow the ways that those data can be used, even if they remain personal data. He also stated that not everyone has the digital skills or expertise to know how to use the "open resources". This is also evidenced and documented by the results of the formative evaluation that I conducted, where the research participants explicitly expressed that the know-how – practical knowledge and related skills – is significant, as discussed in Chapter 5. Lehtiniemi stated:

> Also advocating some sort of intermediaries that act between that open resource and the public. So make it available for the public, too, because not everyone and not all actors have the same kinds of capabilities to make use of those open resources. I guess that's at least the theme that is really often encountered in research that has to do with open data. (Lehtiniemi, author interview, 2020)

Lehtiniemi was one of the research participants who mentioned that establishing intermediaries could be beneficial to users, in the sense that their development might aid and help people with the uses of data, namely, what to do with their data and how. Schneider along the same lines touched upon that issue as well, where she suggests that the Fiduciary Trust model could work in that case, by establishing an intermediary:

> I think this idea is that there should be an intermediary instance where people could delegate certain decisions to them, on how their data should be used and they could also delineate positive uses, but also restrict uses people might find intrusive or negative when it comes to the common good. (Schneider, author interview, 2020)

An intermediary can act as a facilitator, collaborating and empowering the users, while overseeing the process. The idea of an intermediary was first explicitly stated as such in Chapter 6 (Section 6.3) by Lehtiniemi. Lehtiniemi highlighted the link of openness with the need to intermediate in order to tackle the existing monopolies in the digital economy. He stated, "So openness for me, at least, there's always somehow the need to intermediate for it to be actually all open in the sense that it breaks the monopolies instead of creating new ones." In addition, drawing from the research findings in Chapter 4 (Section 4.2.1), where the open GLAM Working Group acted as change agents in the CHI scene of Helsinki, the open GLAM Working Group could also be seen as intermediary as they facilitated change towards

openness. Drawing from the analysis of the research results in Chapter 8, the notion of an intermediary is discussed in more depth.

7.2 Regulating the level of openness

Investigating fair approaches to the digital ecosystem and drawing from the analysis of the research data, I observed that there are different levels of openness with regards to digital cultural data. The concept for the level of openness is linked with the idea of sovereignty, so that one can be in control of their data, either open them or not, in varying degrees. This is pertinent for following the regulation of country in which the data are produced – for instance the European Union has published the GDPR (EU Commission 2016) where it petitions for the protection of personal data. Not everything should or can be open. Digital cultural assets are diverse, versatile and have different needs, depending on legal restrictions, that is, copyright issues, or privacy and ethics.

7.2.1 Is openness (only) for good?

Twenty interview participants, experts of digital cultural heritage, open data and the digital economy, argued that not everything should be online and accessible by all. They stated that not everything should be at the same level of openness. Maria Rehbinder discussed that openness has helped her in boosting connections and public relations. Due to the fact that she has put a lot of her material online, people contact her frequently and ask her to conduct lectures during her free time. For her, opening up her professional material, is somehow part of her job, or extended professional development. She suggested that openness cannot be forced for everyone in certain cases:

> Openness is something that is open voluntarily, like – I like to open my materials and I am in a privileged position because I have my monthly salary, so I can open my materials, so openness is a voluntary action (…), I think open should be voluntary for companies and private people, but the public sector should open what is made by tax payer money, that should be open as much as possible. (Rehbinder, interview by author, 2020)

From her example, we can learn that there are some positive conditions but also some limitations when it comes to openness. As for the public sector and fields that must be documented for transparency, then openness is considered a positive use. One the other hand, openness should not be forced for private people as privacy and personal data can be at stake. Rehbinder here makes a distinction with regards to what should be open. She stated that openness should not be forced for the private sector; namely, private companies and private people. However, she claims that, on the contrary, the public sector should have their data open as much as possible. She highlighted that there is a kind of duty from the state – or any organisation that is made by tax payer money to open up – as much as possible. Alongside the open source code movement, most private companies use open source software and develop some of their

software based on Linux or some other open software, so if it is profitable for companies, then companies use the tools provided by open data thinking as they have learnt. Rehbinder pointed out that:

> Because all the companies were in the beginning against open source software, it was sort of like a rebel movement in the beginning but now all the big companies are using open source software. (Rehbinder, interview by author, 2020)

During our interview, Rehbinder drew a graph-pyramid (Fig. 1) on a white board in an effort to explain further this complex issue. She explained how it works:

> There is the open source that one can get from an open source library, open source code and then this part that is being developed on top of that, this is the company, it is the proprietary (sic) and then this you keep yourself and you get the money, from this part [the upper part]. Everybody saves resources and all the companies can use open source code for the beginning of the stack, everybody wins in a way. It is the same situation with open data, where companies will always have some data that is proprietary data, but they can use the open data. (Rehbinder, interview by author, 2020)

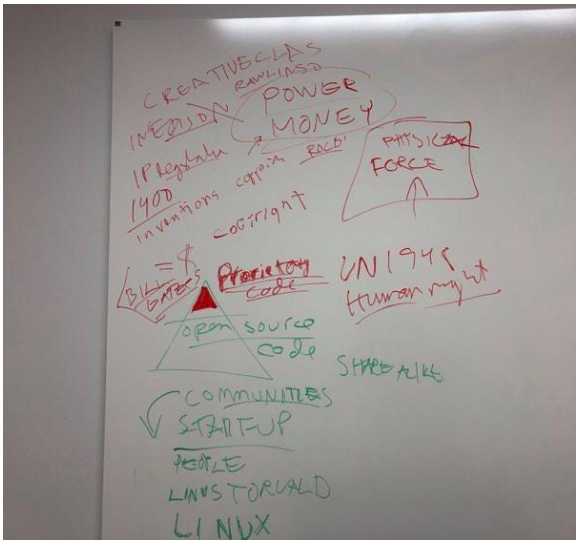

Figure 1: Graph by Maria Rehbinder drawn during our interview at Aalto University depicting proprietary and open data.

In that sense, companies can get the revenue from that part, but they get more revenue because they did not have to pay for this part as it is the open code, which is already in GitHub or other places as open source code. The open source movement emerged as a huge movement. In Finland there was Linus Torvalds, who created Linux, the open source operating system, which is now used by a lot of companies and they benefit by it. Rehbinder stated that this is similar to a grassroots movement and she highlighted that as open source code thrived, so shall it be with open data. However, she stressed that it is very important for the proprietary part to be kept and open data does not mean that the proprietary part is eliminated, it is still there:

> Because market economies (are) extremely important. That's the basis of democracy. And it is very important that we have copyright legislation and ownership of copyright can bring you wealth and money and power. (Rehbinder, author interview, 2020)

There are hundreds or even thousands of examples where people received power from copyright legislation. During our interview, Rehbinder gave several examples of this. She talked about Bill Gates, where he got his money and wealth and power from copyright. Before the copyright legislation, which started around 1400 as discussed in Chapter 2, there were other, not so legitimate ways to get power and money. This refers to the fact that before copyright legislation, power and money would come from physical force but now there is IPR legislation, as Rehbinder argues. Money and power come from inventions and copyright protects those inventions. Rehbinder stated that "this created a new social power, money created a class, people who were inventors like Edison, people who were writers like Rowling, or Rock Stars." In that regard, Rehbinder was one of the experts who argued that it is "very important that not everything is open". Through copyright legislation, the creative works are being protected and in that sense, they are not open. Rehbinder discussed how the economy and society would be if copyright protection were removed. She considered how our society would become obsolete, where:

> We would lose the power and money from all the creative class. And we would go back to having power and money only with people who have physical force, like it was in Medieval times and before intellectual property legislation. (Rehbinder, author interview, 2020)

Moreover, copyright is in the United Nations' declaration to maintain human rights. Rehbinder expressed that writers gain money from copyright and then keep writing books that criticise the government, for example and if they did not have copyright, they could not do that. Thus, according to Rehbinder "there has to be the two worlds, there has to be the proprietary world and then there is the open source world. But, they have to co-exist, if you remove this [the proprietary], you destroy democracy and human rights.

Furthermore and along the same lines, it was apparent in eighteen interviews that the ideology of "open everything" must be re-considered. During the interview with Andrew Gryf Paterson, he discussed that, in Europe, there is a particular understanding of what, or how, culture is, who owns it and how it should be shared:

> I would argue that in a Western-developed European-led, but also in North America-led culture, we are promoting open knowledge, as a virtue, meaning that it is positive, that nothing is wrong with it, that it is the ideal, that it should be democratic, it should be open, everyone should get access to it. But what I have learnt in different contexts is that there have been different circumstances for that not to apply. (Paterson, author interview, 2020)

Paterson expressed his views on how in the European sphere, open knowledge is being promoted as a "virtue" and the default. There is a growing body of literature that supports that notion (Koch 2018; Fuchs 2020b; Lund and Zukerfeld 2020). There are cases and situations where openness might not be useful, where maybe closing up, or better protecting, is more applicable. Moreover, he discussed how people who follow the open knowledge movement in culture think "the open is good and always good". The reasons for closing knowledge and the situations can vary from indigenous knowledge to private and intimate data. Susanna Ånäs also stated that there are crucial next questions to tackle that she sees on the horizon from her perspective that she has encountered in the memory sector:

> [It] is the grey area or the borderline between opening and closing for some reason, such as privacy that you have certain regulations based on, which you have to, you know, protect privacy, GDPR, etc. (Ånäs, author interview, 2020)

Ånäs is one of the eight experts on digital cultural heritage and open data who brings forward the issue of privacy. There are assets, or aspects of assets that should not be open at the same level. For example, the aspect of privacy, when it comes to individuals, emerged. Paterson shed light on that matter. He stated that living during this excruciating attention-seeking and demanding economy through surveillance mechanisms that have been imposed on us, might have such an effect on us that we might not want to be open anymore:

> This is what we have to keep negotiating now, because we will find there are new circumstances and new biopolitics, new political structures affecting our lives and oppressing our lives that we actually may not want to be open. There are some things that can and should be open. And some things that can't and shouldn't be open. (Paterson, author interview, 2020)

It seems like the ideology of openness and the emerging digital ecologies (Koch 2021) dictate a strong online presence and also thereafter openness on a certain degree, can feel oppressive, as Paterson stated. Perhaps people do not feel that it is right for them to open up their data. Notwithstanding, somehow, they feel that they are obliged to do so, whether they are individuals, or private companies. Along the same lines, although CHIs are, for the most part, available through taxpayer money and are meant to be the agents for knowledge transfer, thus, have their collections as open as much as possible, privacy or ethical issues are entangled in this in some cases, which can complicate or restrict the process. The cruciality and impact of copyrights on digital cultural assets of CHI collections, in relation to reusability, was pointed out by sixteen interviewees. This was illustrated by Aki Pohjankyrö working at the Helsinki City Museum. The collection at the Helsinki City Museum and in particular, the photo collections, is quite easy and straightforward when it comes to copyrights, because most of the photos that the museum has, their copyrights are given to the museum. They have therefore been able to open up a lot. Nevertheless, issues of privacy bound to personal data are quite prominent. Pohjankyrö stated:

> And I think the bigger issue is the personal data of people. When you have photos with people whom you recognise. And I think that it is the most common question that we are being asked. Can I use this in an ad? Can I can I put it on a book cover? Then we say that if the person is alive, you should try to clear the rights. (Pohjankyrö, author interview, 2020)

Moreover, that comes under the responsibility of respecting the law regarding personal data – it is up to the user. The CHI informs the user as to best practice and so here, perhaps, digital media literacy, education or related policies like GDPR in general, could ensure its good use. Surely more care needs to be taken with sensitive personal data such as, for example, health data, religious beliefs and so on. Different levels of openness would reflect the different needs of the digital materials, protecting any sensitive details. GDPR refers to sensitive personal data as "special categories of personal data" which could include one's name, identification number or location data, such as an IP address. It could also include other information (physical, genetic or cultural) that leads to an individual being identified. Personal data, including sensitive data, should be protected, which conflicts with the ideology of openness. Susanna Eklund, a service designer at Finna (Finna 2022), at the Finnish National Library, also stated that there should be a framework and provision "for different levels of openness". Indisputably, there is the open knowledge movement advocating for the sharing of knowledge. Moreover, the Open Science initiatives advocate for opening up research, saying that we actually should share and distribute our research data, for being good scholars, while we have been listening that "*sharing is caring*" (Sharing is Caring 2021). The same applies for nearly all disciplines and fields. Openness must be a good thing then – this is what someone might think. Sharing must be good as well. From my interview material, I observed that this is not the case always. The "open everything" ideology is linked with the Western discourse of openness being a *virtue* (Koch 2018; Lund and Zukerfeld 2020) as Paterson expressed; an ideology that digital capitalism is exploiting (Fuchs 2020b). Not every data can or should go public, or if they do, there should be certain levels of openness and only openness to a specific group of people should be considered. Digital assets and archives are diverse. To explore how to address the level of openness may require a holistic and analytic approach. This means that sociotechnical aspects of assets can be considered, as derived from the research findings on the conditions of openness of cultural data in Chapter 5. Indisputably, there have been advances towards this direction with the CC licences, for example, which focus on the dissemination and reusability of the assets. Digital archives do not merely live online as neutral digital entities. They are part of the digital ecosystem that is constantly expanding and they encompass its interweaving and emerging complexities. Before opening up, it is important to reflect on who to open up to and how and in relation to what is not open. Openness is also situational and contextual (especially for ethical issues) as I derived from the analysis of the data, which I discuss in the next section.

7.2.2 Openness is situational

A central reason why the (goodness of) openness is conditional to a context and situation is that opening up assets online is often at odds with the struggle for privacy. Yet, identifying privacy holds some challenges. In some instances, such as Open Government initiatives, citizens expect transparency in terms of government issues, where public money is spent and related other processes. It is expected that these processes are well documented and accessible on the Internet, so that the practice is in the interest of fairness. However, although full transparency and openness is expected in the case of public-sector hiring processes, for example, to document how the required criteria are met, the personal data of applicants should be protected. Therefore, personal data is intertwined with data protection and privacy. When it comes to digital cultural archives, the issue becomes more complicated. Six interviewee experts in data practices and digital cultural heritage argued that openness is situational. Minna Ruckenstein discussed how openness and in particular the idea of transparency can actually be a tyrannical idea – when one forces things to be open, referring to Strathern's (2007) work and "The Tyranny of Transparency". The analysis of the research data defines that openness depends on the context. Ruckenstein stated:

> So open is something that is always defined in terms of open to whom and open how and in relation to what is not open. So I see it as very much that this is a kind of situational and contextual field. (Ruckenstein, author interview 2020)

Openness is related and therefore perhaps, co-dependent on what is not open and what should be kept private, for example, intimate or sensitive data. In that sense, the level of openness could reflect that as well, namely what is not open and in relation to what. Paterson observed:

> This idea of open data and open culture is a fluid concept which should be changing according to different contexts and different circumstances. (Paterson, author interview, 2020)

Six interviewees agreed that "openness is not a panacea, or the default". Open by default can be realised in relation to very few cases, related to public service data. In other cases, this issue should be re-considered. Undoubtedly, the times of merely "consuming" big data have been replaced by a call to use and reuse these enormous amounts of data creatively, in a fair way, through meaningful participation. With this fact comes the realisation that different levels of openness need to be secured for privacy issues. In addition, open data does not in itself automatically make assets more open. There is a lot of open data that is not used. Notwithstanding, in order for this to take place, transparency and fairness are key points in ensuring meaningful public participation.

Moreover, for the regulation of the level of openness Effie Kapsalis, Senior Digital Program Officer and Ryan King, Program Manager at the Smithsonian Institution, also shared their experiences from their Open Access initiative in 2020. They brought significant perspectives on this topical matter, discussing how (the level of) openness is surely inevitably interrelated to ownership and what this means in particular when native communities are implicated and how it is bound to the inherent biases of the data.

Kapsalis referred to issues concerning shared ownership, in particular, in Native American communities. She highlighted that the American Indian Museum is responsible for the repatriation of objects. Moreover, they have been in conversation with the communities. Kapsalis stated that:

> We were very protective about what we released as open access when there were cultural living, cultural stakeholders and anything that was considered private to the living communities was not ours to give away – so that's just not included. (Kapsalis, author interview, 2020)

Realising the different levels of openness, or closure, that are required to accommodate the different and versatile needs of cultural assets is most pertinent currently. This is particularly topical now, as it is apparent that technology is not a remedy and certainly needs policies to protect specific assets and its related communities of course. Kapsalis expressed her views on that topic and how it is connected to the level of openness that is needed in the current digital ecosystem:

> I think open access twelve /fifteen years ago was like you release everything and technology is a panacea where only good things happen. And I was like that, too. I shared all my information. But now I'm more guarded and realise the dangers of, you know, what can happen after a big release like that. (Kapsalis, author interview 2020)

Indisputably, caring for collections is important. However, caring for people as well, their shared ownership over knowledge, their stories, is crucial. This is inextricably related to what Kapsalis said. The concept of care is pertinent to the museum's context (Morse 2021), adding an affective dimension. With regards to the evaluation of the level of openness, all the research participants agreed that it is very important that not everything is open, although they did not delve further into this point.

7.2.3 Human(e) AI

It is evident that in order to achieve a fair digital ecosystem, the levels of openness of cultural data have to be seriously considered. As opposed to algorithmic opacity discussed in Chapter 6, the openness also refers to AI and to the way algorithms perform. This is connected to the analysis of data that showed that good governance is an essential element to revitalise and reinvigorate the digital ecosystem towards fairness and equity, performing transparency and fairness in algorithms, as well. There is a long-standing discussion on algorithmic inequality (Ferrari and Graham 2021) and fairness (Dwork et al. 2012; Fricke 2020; Hoffmann 2019; Mohamed et al. 2020; Nissenbaum 2001). While I was analysing the research results, I realised that a growing number of categories were emerging on related issues to AI and its development. In particular, there were six interviews in total that these categories and codes were emerging. I only used this subset of six interviews to develop a framework for AI development which is critical to born-digital archives with regards to openness and privacy, referred to in the article titled: Openness and privacy in born-digital archives: reflecting the role of AI development (Tzouganatou 2022). The article proposes a human-centred or human(e) approach to AI development highlighting AI

transparency and inclusivity, as opposed to opaque algorithmic practices. The human(e) approach to AI considers human agency as a central element in the development of AI. Often, algorithms are portrayed as powerful agents (Ziewitz 2016) that run autonomously. However, behind this "abstractness" there are people everywhere in the process of design, development, sustainability and so on. One central issue that AI is confronting, which is of great significance, is incomplete data sets (Little and Rubin 2020). Ryan King and Effie Kapsalis reflected on that issue, too, connecting the levels of openness with the inherent biases on data. Kapsalis stated:

> Gaps in data can perpetuate as our collections are ingested on more public platforms. I think that's a big concern with the sector as our data becomes made at scale on commercial platforms and the like. (Kapsalis, author interview 2020)

Ryan King added that they have been thinking about employing AI and machine learning aiding with tagging information, but bringing that conversation into thinking about "inherent biases in those tools as well" and acknowledging the inherent biases that their collections have. Together with their technical team, largely in data science, they discussed that they will not be able to use any kind of auto train, for training the computer data models, or even for "augmenting the existing data models because of those inherent biases". Kapsalis added, with regard to the collection biases:

> Well, in all transparency, we have biases in our collection, so that's a concern, I think. I think that it will take some coming together across the sector to start to fill those gaps. (Kapsalis, author interview 2020)

They have taken steps to address these issues, conducted with the American Women's Initiative.[26] Kapsalis said:

> That is something we are doing with the Women's Initiative – involving our affiliate museums in the United States to help them get their resources. That gap needs to be addressed by many people. (Kapsalis, author interview 2020)

That initiative aims to foster the diversity of American women and their stories that are not widely known, in order "create a more equitable America" for the Smithsonian American Women's History Museum. The purpose of the initiative is to empower women and amplify their voices (Smithsonian Institution 2022). ML and AI are being trained to "learn" and therefore perform certain tasks. However, collecting data in conditions that do not reflect the ones that are collected in "lab conditions", might lead to incomplete data sets. This stems from the issue that society is biased and that the data will replicate and reveal that same bias (Fricke 2020). Moreover, another aspect supporting the human(e) approach to AI development is the importance and relevance of human agency in the development of algorithms and

[26] https://womenshistory.si.edu/. To create a more equitable America, the Smithsonian Institution is researching, disseminating and amplifying the histories of American women through its American Women's History Initiative in preparation for the future Smithsonian Institution.

related models. In that sense Minna Ruckenstein who is part of the "Re-humanising automated decision-making" project stated:

> The move towards rehumanising is a starting point for exploring the complexities of content moderation by re-establishing the human as a critical and creative actor in current and future platform arrangements. (Ruckenstein, author interview, 2020)

Ruckenstein had described in detail the reasons why they wanted to develop and conduct research on the rehumanising movement because, "humans are there everywhere". Undoubtedly, humans are taking decisions, are designing the technologies, then developing them, letting them run and ultimately, they are monitoring them. The rehumanising movement emerged through that context and particularly due to the fact that "algorithmic power is inherently only ever partial" (Ferrari and Graham 2021). Ruckenstein and three other interviewees, with expertise on data economy and related practices, had discussed during our interview that apart from focusing on the data, to be able to achieve technological sovereignty, policies and governance issues must be considered and not undermined. The different levels of openness should reflect the different needs of the digital cultural assets. Human agency and intervention need to respond to the degree of importance of each level of openness; more care needs to be taken when personal data are embedded versus when public domain data are involved (Tzouganatou 2022, 7). The ethical issues are prominent in AI. A human(e) AI, would also aid leveraging transparency in its development, towards its democratisation.

7.3 Conclusion

Envisioning independent digital futures from large-scale commercial platforms is a crucial aspect for the democratisation of knowledge in the current digital ecosystem. It comes as a response to the monopolistic tendencies of digital platforms that have been providing impetus to digital colonisation practices. Hence, other kinds of logic dictate distributed and decentralised modes of managing and sharing knowledge, capable of actually enhancing the possibility and potential for equity and co-creation. These emerging modes of arranging knowledge, alongside its sociotechnical elements, would prescribe the distribution of power and tap into the potential for participatory governance. Digital and data sovereignty is a complex issue to navigate, being data-centric and human-centric at the same time so that the different needs can be accommodated for a fertile, fair and inclusive ecosystem. What the analysis of the data showed, is that the notion of the user being in control of their data, as well as the level of openness, need to be considered. Openness cannot be forced, unless it refers to governmental or other assets that have to be documented and be accessible by all. Moreover, in that regard, through the analysis of the data, I derived that it is more beneficial to leave behind the concept of ownership – in particular when it comes to personal data, due to the fact that in the digital condition, often data about one person are interlinked and interrelated with others' data, as well. Ownership of data is a challenging concept that is linked with legal as well as ethical issues. That being said, it is perhaps more pertinent to

talk about other forms of ownership, like stewardship, namely what to do, how to use – in beneficial ways – our legacy, the digital cultural commons, for envisioning positive potential futures. In Chapter 8, I discuss the model and frameworks derived from the synthesis of the research results towards openness and fairness for cultural knowledge production in the digital ecosystem.

Chapter 8. Memory Ecosystems through Openness and Participation

In this discussion chapter, I synthesise the research findings, which I presented and analysed in Chapters 4, 5, 6 and 7. Following the two research questions: 1) what are the conditions for the openness of cultural data? and 2) what are the resources required for opening up knowledge in a fair and participatory way in the digital economy? I conclude with suggestions and guidelines developed on the basis of my doctoral work. The research aims to explore the conditions and resources required for fostering public participation for a fair digital ecosystem with regards to cultural knowledge production online, through open knowledge. Undoubtedly, as derived from the research findings, open knowledge is a central element for envisioning a democratic and equitable society, where people can actively participate in knowledge production by co-creating knowledge, while maintaining a collective memory. However, it is only when the data is open that someone can produce open knowledge, but open data does not automatically produce open knowledge. My empirical observations indicated that data could be seen as (raw) details without a context. Furthermore, contextual data could lead to what we refer to as information. Knowledge, on the other hand, beyond an individual cognitive process as discussed in Chapter 2, can be derived from synthesised information and has to be useful to the receiver. However, merely open data should not be conflated with open knowledge. Notwithstanding, there are several processes that need to take place for data to become knowledge as discussed in Chapter 5. Open knowledge is a key element in the digital era, advocating for values such as transparency and fairness. Still, there are many dominant commercial online platforms where users perceive them as "free and open to use", however, the above-mentioned digital infrastructures use the ideology of openness (Koch 2018; Lund and Zukerfeld 2020) and instead monetise user data, generating issues of trust and inequalities (Fuchs 2020b). This is not actually an open knowledge practice as has been discussed in my doctoral work as evidenced in Chapters 6 and 7, whereas the research findings portrayed that openness calls for malleability and reusability, transparency and fairness, as alluded to in all findings chapters.

In this section, I summarise the key findings of this research. The analysis of the data showed firstly that CHIs can have hierarchical structures due to multiple factors and are operating under certain established ways. This confirms what a substantial volume of literature has reflected upon (Sandell 2002; Lynch 2011, 2017; Riedler 2017; Lynch et al. 2020; Crooke 2021). Nevertheless, drawing from the research findings, openness is not compatible with such modes of organising, managing and disseminating knowledge. Also, the research showed how the open GLAM Working Group acted as facilitators and change agents in the CHI scene in Helsinki, advocating the benefits of openness, while communicating the new emerging practices that digitalisation and the open movement has brought. This is intertwined with a new emerging practice towards the regulations of the control mechanisms for data management and distribution online. Moreover, it is evident that the terminology "open access" that has been adopted by CHIs is not reflecting nor addressing the vision of the open movement. The word "access" is limiting its scope for a "sharing culture", as per the findings. Merely providing access to the digitised assets can

minimise the reuse aspect and mostly refers to the first step, which is the access to an asset. However, the accessibility is a vital aspect, as derived from the analysed data; so that the data can be findable by the users, as well as thereafter useful and used. Furthermore, the concept of the conditions of openness of cultural data derived through the analysis of the research data describe and designate aspects and modalities by which knowledge is being hindered or encouraged while affecting future memory making as stated in Chapter 5. The conditions of openness of cultural data are being summarised, after incorporating the formative evaluation results as well. These are CHI' structures (which can be quite hierarchical); legal aspects such as IPRs, copyrights and licences; the business model (revenue from copyright fees, insufficient resources, long-term funding needed, partnerships); standards (CC licences, FAIR guiding principles and interoperability); technical infrastructures (whether open, interoperable, usable, visible and an easy discoverable interface); mindset, practices and motivational aspects of the cultural heritage professionals working at the institutions; the know-how (digital skills and expertise) and ethical aspects as well.

This research investigates via digital platforms to explore the socioeconomic aspects and resources needed for participatory modalities in the digital ecosystem for collective memory making. Hence, I examined how large-scale commercial platforms acting as monopolies have been dominating the digital ecosystem, impacting knowledge production, often acting as (digital) colonial powers. Through the research findings it was confirmed that commercial platforms are monopolising knowledge production through opaque and obfuscate practices, undermining healthy competition in the digital economy (Langley and Leyshon 2017; Srnicek 2017; Zuboff 2019; van Dijck 2020a, 2020b; Arriagada et al. 2020). The findings demonstrated that large-scale commercial platforms hinder cultural participation. From the analysis of the research data, it was evident that the open GLAM community see this as a significant risk. The opaque practices have a huge impact on knowledge production, hindering dissemination and proactive participation, thus deviating from the vision of a fair and democratic Internet (Tzouganatou and Krueckeberg 2021). This can be illustrated in the way that knowledge is being assembled, generated, articulated, presented, distributed online and ultimately being reused online, through approaches that can hinder meaningful cultural participation. Moreover, in the last analysis chapter, I explained how notions of sovereignty, empowerment and collectiveness can potentially hone and address monopolies implementing digital colonialism tactics. The latter, is significant to highlight the level of openness of cultural data for envisioning a fair digital ecosystem. An equitable framework could aid the Internet to truly realise the full potential of open knowledge, maximising public benefit, going beyond the market and re-examining legal and economic issues. Undeniably, issues of data management are crucial. For example, copyright constraints are capable of restricting certain actions, ranging from access to the reuse of digital archives. The prototype that this work is suggesting embeds holistic approaches, not merely placing the human at the centre of the ecosystem, but viewing it as an assemblage, as part of it. Currently, the accessibility and openness of these entities are regulated by business models and user behaviour and remain unclear for the future.

CHIs and platforms can have well-established structures. However, the priorities and motives of platforms diverge from the CHI perspective, as they are oriented towards the business and market place. Also, issues are created related to the ideology of openness, where users perceive these platforms as "free and open to use" (Lund and Zukerfeld 2020). However, they are monetising user data, generating issues of trust, while raising ethical issues. Moreover, CHIs are relying and operating too many of their activities online through private commercial companies. This can be problematic in relation to what CHIs stand for, their values and their mission, standing towards knowledge equity, transparency and collaboration. The research results showed that achieving practices of openness and fairness in the digital ecosystem, decentralised and distributed modalities are much needed. Distributed practices refer both to the organisation arrangements of CHIs that currently can have very hierarchical and steady structures and also to the mode of production. The foundation of this prototype therefore is based on the concepts of openness and fairness, so that there is a space and fertile ground for openness to permeate these modalities and accordingly, for people to be able to meaningfully and actively participate in the production of cultural knowledge, rather than being solely (passive) receivers. With such perspective, the bidirectional relationship (Simon 2010) of CHIs and their audiences could potentially be solidified. The prototype that is going to be presented and discussed in this chapter has incorporated a holistic approach to address the research questions and the problem of this study. The prototype is planned to provide guidelines on how to do open knowledge in the CHI sector in a participatory and equitable way in the digital economy, considering the role of CHIs as agents in larger economic and cultural ecosystems. It proposes a model for the organisation, management and dissemination of cultural knowledge online. The prototype explores decentralised and distributed practices, for CHIs to change their practices and therefore flatten the hierarchies for participation. This includes practices on legal, economic and social issues as well. Openness has to consider legal, economic, motivational and infrastructural aspects too. What if the data is open, but the infrastructure, is closed (e.g. not interoperable)? Or what if the interests driving the initiative are in favour of commodifying the data? Therefore, openness refers to and considers all the different aspects of the digital ecosystem. Openness both as value and in practice by design should penetrate all the elements of the ecosystem. In this doctoral work, I have implemented and used an ecosystemic lens. Through the analysis of the research data and in particular due to the formative evaluation event, I came to the conclusion that I should not be focusing on human-centred approaches to the digital ecosystem. I am not taking the stance of an ego-system (Scharmer and Kaufer 2014), being ego-centred merely to satisfy people's needs, but rather I suggest a shift in practices, that focuses on caring for humans, rather than just technology and the market. Therefore, rather than discussing human-centred machines, it is more appropriate to focus on a human–machine symbiosis.

The elements and aspects of the digital ecosystem are being characterised by relationality, while working dynamically, they are fabricating the modalities which dictate how someone accesses, uses and reuses an asset for future memory making. These processes and interrelations are alluded to as memory

modalities as stated in Chapter 5. The modalities are not defined as the elements of the ecosystem per se, or as seen in Chapter 5, as the conditions of openness of cultural data per se. Using the assemblage lens, memory modalities focus on the emergence and evolution, or ecologies, of media infrastructures. Digital media infrastructures, are part of an ecosystem which is constantly emerging around them, as they do not operate solely. Rather, their existence and operation in the digital condition is fundamentally interwoven in a perplexed ecosystem of components interacting in an iterative process. Therefore, memory modalities pay attention to the connections and interrelations of the ecosystem's elements. An example to visualise memory modalities' concept which can be useful in highlighting the relationality of the different ecological elements that are co-producing knowledge together, is the relation of CHI hierarchical structure, their business model and the IPRs' policies, which have been identified in Chapter 5 as part of the conditions of cultural data. Related CHI policies with regards to openness (e.g. CC licences) or enclosure (e.g. copyright regimes) practices, affect memory modalities and their capabilities to represent and convey memories in the digital realm. The ecological lens points to how different aspects of these policies encourage or hinder knowledge production and its accessibility within the frame of specific memory modalities. These aspects could vary from the (un)availability of open or closed APIs, a non-interoperable infrastructure, to IPRs. With regards to the latter, copyrights and other IPRs form a regime, which exercises power on the ecosystem of the digital media infrastructure simultaneously as it is a part of it. As discussed in Chapters 4 and 5, some CHIs have based their business models on receiving copyright fees of digitised works. In that sense, copyrights and the business model are both elements of the digital ecosystem and concurrently they are interconnected with one another. However, the need to pay for engaging with a particular asset is being seen as a hindrance in that sense, as discussed also in Chapter 5, due to the fact that someone might not do this extra step to have access to an artwork. Indisputably, this practice influences knowledge production and accessibility and consequently, what or how something should and can be remembered (Marttila and Hyyppä 2014). Marttila and Hyyppä (2014) reflect on whether such a model of enclosure could create "a society of dementia or amnesia" and initiated the discussion of how memory making is co-dependent on IPRs. In this work I argue that the ecological elements (i.e. business model, IPRs, motivational aspects, infrastructural aspect such as APIs) and memory making are interdependent. The assemblage lens reveals that due to the relationality and interdependency of the above-mentioned elements, the ecologies co-produce knowledge through the multitude of memory modalities. The production of knowledge is interdependent on both human and non-human factors all forming and producing the assemblage. This was also designated by the conditions of openness of cultural data. The evolution of memory practices is a complex sociotechnical issue. The new emerging memory modalities prescribing notions on how something would be remembered and also by whom. Therefore, the modalities formulate an assemblage where the elements are interrelated while forming a complex fluidity of sociotechnical negotiations. The openness of cultural data, presented in Chapter 5, suggests a concept, for participatory knowledge production in the cultural heritage sector. This cannot just be realised separately, but only considered

together with the other elements of the ecosystem. It is intrinsically linked with all the aspects of the ecosystem. However, decentralised and distributed modes could provide the potential for more openness while allowing space for a greater distribution of power within the digital ecosystem and opportunities for meaningful participation and co-creation. Transitioning from hierarchical models to fairer models that are participatory and can have the potential to collaborate with people and groups, in decentralised and distributed forms, could be a way to move forward. The change of practices is at the core of this. Building open models by design, providing the capability of embracing more openness and enhancing the distribution of power, could tap into the potential of an open ecosystem nurturing participation towards fairness.

Chapter 6 demonstrated the commercialisation and monopolisation of cultural knowledge production through opaque practices, which hinder cultural participation. These obfuscate practices have a huge impact on how knowledge is being assembled and disseminated in the context of cultural knowledge production. The consequences of these practices are affected in envisioning a collective future memory making where democratic values would thrive, as currently cultural knowledge production is organised (primarily) and circulated by large commercial platforms and their business-driven values and interests. In Chapter 6, it was demonstrated that the opaque practices impede the participation of people in being active in the process of knowledge production due to opacity, for example, intelligible algorithms or by implementing anti-competitive strategies that impede other initiatives from flourishing. Moreover, it was demonstrated that opacity in the digital economy in terms of practices, policies and governance, is opposed to openness and open knowledge, from the perspective of what the open knowledge activists consider as open. The (value) chain of the digital ecosystem is so opaque, in particular due to the fact that it is hard to know how and what exactly the role of third-party companies is in relation to how they use the data of users and what they do with it (Zuboff 2019; van Dijck 2020b). In Chapter 7, it is evident from the analysis of the research data that other forms of logic dictate practices beyond the market and the commodification of data, towards the idea of data commons and co-operatives, as well as perspectives that collectively govern "our culture". Notwithstanding, this is a structural systemic problem that should be addressed and as it was evident in the research data, it concerns how we organise our societies and is precisely why new structures are needed. The current digital economy is being conceived as its only aim is to grow and thrive as much as possible, but independently from society – as if the economy is separated from society and thus can grow alone, by itself. However, the economy should work together with society to mutually help each other to restore their power, be sustainable and thrive together. To perform this structural change, a focus towards practices is required. To practice care, collectiveness and structural restoration are required as an effort to see, think and envision beyond just the market. Practices of care are linked with empathy and consideration for one another, as well as concern for cultural heritage and the environment. In addition, practices of collectiveness can be a vehicle to that (i.e. care). Moreover, restorative practices are necessary in the current digital ecosystem, facilitating in fixing the ideology that humans should be at the centre of the ecosystem. This work uses

an ecological lens to support the relationality and importance of all aspects of the ecosystem, not considering humans to be superior to other ecological aspects. This could support thinking of the economy as part of society and not as a separate arena which works independently, but rather reifies structural change in a way that the economy and society are constituent parts in the digital ecosystem, alongside the other aspects as well. Another vital element is the aspect of collectiveness as a practice. Indisputably, individualism is a "sign of our times". It is often linked with new media technologies and how people spend time with social media networks, or stream movies through platforms and thus are becoming estranged or even alienated. This was particularly accelerated during the COVID-19 pandemic. As argued in Section 6.3, individualism is correlated with neoliberalism ideologies, which conflate individualism with success and competitiveness (Davies 2015). However, as discussed in Chapters 6 and 7 mere individualism and competitiveness cannot grow a healthy, open and sustainable ecosystem. It is only through collectiveness that ecosystems can thrive, through collaborative mechanisms and participatory governance (Ostrom 1990; Olson 2003; Sandler 2015). On that note, people who are eager and willing to contribute towards the transformation of commercial platforms and the sharing economy, to a more ethical paradigm for an equitable future, have been questioning whether new infrastructures are needed (Scholz 2016; Poderi 2019). As discussed in Chapters 6 and 7, exploring perspectives beyond the market was vaguely defined in my empirical material. The different kind(s) of data logic prescribe that the exploration of these perspectives does not refer only to infrastructures, or to networks. It should be approached from a holistic perspective. This is because the data logic essentially derives from how an infrastructure, or how a business model is formed. This exploration concerns governance; the many different kinds of work and data flows that are taking place. Principally, it concerns how "things" are organised, namely, the ways that data are generated, managed, distributed, shared and (re)used. As discussed in the above sections, at the heart of being able to envision and design positive digital futures is transparency, openness and collectiveness, as central values, which was extensively discussed by the interview experts. If on a collective, national and European level we do not act accordingly, we will find ourselves trapped on the verge of a possible dystopic future. Mark Zuckerberg, Facebook CEO, announced in mid-October 2021, the transition of Facebook to a "metaverse" company. The term "metaverse" was coined by Neal Stephenson in his 1992 science fiction book *Snow Crash*. The book described a virtual world owned and run by corporations rather than governments, which seemed to be a dystopian corporate monopoly. Surely there is not a direct causality between the two events. However, the links and connections are interesting here. Let us fast forward to 2022, when the attention economy is ever thriving, while the fetishisation of the "digital" as a response to everything has truly taken over. Society is being ruled by digital capitalists and monopolies that are seeking for the "next big technological thing" for acquiring more revenue behind closed infrastructures and opaque business models. The research findings showed strong evidence that the obfuscate practices of the large-scale commercial digital platforms are monopolising knowledge production, from the perspective of what the open knowledge movement and the open knowledge advocates consider as open.

Instead, the analysis of the research data revealed that (the level of) openness, (re)use of the collections through co-creation (Sanders and Stappers 2008; Govier 2009; Fuster Morell and Senabre Hidalgo 2020; Tzouganatou and Krueckeberg 2021; Mucha 2022), participation (B.-N. Sanders 2002; Simon 2010; Seravalli 2012; Poderi 2019; Crooke 2021; Koch 2021) and collectiveness (Sandler 2015; Lehtiniemi and Ruckenstein 2019; Lehtiniemi 2020), could be at the heart of how we envision positive futures and a shared collective memory. The conceptual prototype that this work concludes, proposes suggestions and principles for opening up cultural knowledge in an open and fair way in the digital economy. It refers to cultural data and includes suggestions on accelerating this goal successfully through participatory approaches. The suggestions also include grassroots and bottom-up approaches for community-led initiatives and managing data through collective ways as well.

8.1 A Prototype for open knowledge

As part of this research, I have developed a socioeconomic model, based on a synthesis of the research data analysed. Bringing the findings of this research together, I observed that an intermediary could help reduce and limit the existing monopolies through decentralised and distributed forms of managing knowledge. The idea of an intermediary was first introduced in Chapter 6 (Section 6.3) and extensively discussed in Chapter 7 (Section 7.1.2), as a way to tackle the existing power of large-scale commercial platforms acting with monopolistic tendencies. Moreover, taking into consideration the findings of Chapters 4 and 5 and particularly the cardinal role of the open GLAM Working Group (Section 4.2.2) which acted as a change agent in the CHI scene in Helsinki, I concluded that their role could also be seen as an intermediary, as they facilitated change towards openness. The role of the open GLAM Working Group was to inform, empower and help CHIs to open up and make their collections accessible and (re)usable for the wider public. As analysed in Chapter 4, the working group empowered CHI experts to start changing their practices; from protecting the digital collections to realising their benefits. Moreover, as extensively discussed in Chapter 7, the concept of ownership of data is not a particularly useful one, as it does not reflect the rights and (re)uses of data. For that reason, I directed my work towards implementing an intermediary to be engaged with stewardship approaches, which derived from the analysis of the research data that an intermediary could facilitate highlighting and enhancing the (re)uses and rights of data by the users. Moreover, I engaged initially with the stewardship perspective because, as was discussed in Section 7.1.2, it was evident that an intermediary can assist in strengthening the participation of the public, while possibly tackling the existing monopolies. Furthermore, in Chapter 7, the analysis of the research data showed the argumentation of the interviewees that an intermediary could delegate and facilitate the process of deducing how much fairer a governance could work, as well as empowering the users to make (good) use of the data, due to the fact that not everyone has the digital skills or expertise to know how to use the "open resources". Furthermore, drawing from the change that the activists brought in CHIs as demonstrated in Chapters 4 and 5 and extending it even further towards participation and collaboration, in an effort to bridge the participation gap in cultural knowledge

production and in particular the (creative) (re)use of cultural collections, I propose a knowledge stewardship model, which can be used in two ways. These are a) within a participatory stewardship framework and b) within a collective approach to knowledge stewardship, which I discuss later in this chapter. These concepts could facilitate bridging the participating gap, while attempting to eliminate (most of) the barriers posed to users for (re)using digital collections as identified by scholars (Terras 2015b; Valeonti et al. 2020; Wallace 2022), through the dynamic role of the steward, as is discussed in depth in the next section. The concept also attempts to limit the growing monopolies in the digital ecosystem while amplifying the reuse of cultural data through the proposed frameworks.

Through the research findings in Chapter 5, I have mapped and defined the conditions needed for opening up cultural knowledge online. Drawing from the analysis of the research data, from the empirical findings I observed that there is a significant aspect that permeates the findings of this research work and thereafter, the elements of the ecosystem: the "values". The values mould, shape and establish the main characteristics that a project or initiative would have incorporated. They determine their scope, aim and role. They control and regulate how something would be governed. For example, in relation to the values of CHIs, their scope and aim to preserve, conserve, transfer and disseminate knowledge to future generations and their goal for social inclusion and collective memory making. The concept of the openness of cultural data, for example, concerns these values interwoven in the process and their related practices as well. An inclusive data governance is required, which encompasses these two main aspects:

- **Openness**, which involves the use of (open) standards (FAIR guiding principles, CC licences, Traditional Knowledge Labels. Data sovereignty has been incorporated as a standard in this work.). It also includes practices aiming to the creative and meaningful (re)use, so that the data becomes useful. One potential of openness is situated within co-creation and participation
- **Fairness**, which refers to accessibility and social inclusion aspects (co-created governance and related policies with relevant stakeholders, so that the policies are equitable as well)

Moreover, through analysis and synthesis of the research data, conclusions could be derived such as the resources of opening open cultural knowledge in a fair and participatory way in the digital economy, which is my second research question. These key principles and strategies are:

- Open and interoperable infrastructures (e.g. the case of open public APIs)
- Data sovereignty
- Knowledge stewardship
- Participatory governance and related policies with relevant stakeholders and shareholders
- Collaboration and co-operation with the creative industries, or travel industry, for generating income through Web services (e.g. through open public and well-documented APIs)

8.1.1 Interoperable and sovereign infrastructures

CHIs can have hierarchical structures, as discussed in Sections 2.2 and 4.2 and this issue is being expanded, as well as it is indisputably reflected in their digital infrastructures, actions and further engagements. However, the emerging digital ecologies prescribe openness and sovereignty to grasp the ramifications and pitfalls of the fast-evolving digital era. As discussed in Chapter 5, interoperability and standards are central elements for making the transition from access to accessible digital cultural assets. The analysis of the research data showed interoperability and standards to be important elements so that anyone can use and reuse the assets, universally. In Chapter 5, it was argued that interoperability is extremely important for open infrastructures and it allows the systems to interact and speak to one another. Open infrastructures set interoperability at the centre of the discussions placing it on an infrastructural level. What if the data is open and the infrastructure is closed? In this context, a closed infrastructure is considered one that does not have the technical capacity to interact and connect with other infrastructures on the same level and also one that is not easily accessible, or discoverable by the users. Openness refers to the accessibility aspect so that infrastructures can be findable, accessible and usable by people. What is the most pertinent here is the case of open public CHI APIs. Interoperability has a dual meaning in this work. It refers to achieving interoperability through cultural data and in this context semantics or thesauri and controlled vocabularies are required. Moreover, there is interoperability on an infrastructural level, namely, a technical interoperability. Interoperability on an infrastructural level is vital. In this context, interoperability holds a significant position for the communication of digital infrastructures – machines. A connective element of this constellation is the API, as also discussed in Chapter 5. APIs can be seen as change makers when it comes to opening up knowledge, while allowing new possibilities to flourish; augmenting the creative reuse of cultural data, towards a participatory manner, for example, innovative applications can be developed to foster creative industries (Tzouganatou 2021). Notwithstanding, in order for their full potential to be realised, several improvements need to be accomplished with regards to their documentation, design and accessibility, towards a social API which could aid in programming the social aspect in the digital ecosystem. The potential for participatory and open APIs is vast. Open public participatory APIs are capable of fostering meaningful participation, be inclusive by design, integrating interested parties and relevant stakeholders and shareholders in all the stages of design, development and evaluation. Moreover, CHI experts are interested in getting to know their users, those using the API and this remains one of their challenges, due to the fact that they do not have any register logging their details. When CHIs perform technical changes, they cannot always predict how it will affect API users. The changes might affect them quite a lot and CHIs do not have any way to contact them, because they do not have any record of them. Finding a way to start reaching out to API users, so that they can be informed beforehand when CHIs are making some major changes, is a first step for realising aspects of reciprocity in that domain.

CHIs could reflect on which platforms they are using and have based their digital communication strategy. In Europe, CHIs mainly use GAFAM platforms and products as a way to attract and build new audiences, due to the fact that they are lacking resources and so it is easier to use these platforms where

the users are already present. Surely social media platforms are more popular than a CHI's repository, portal or website. However, currently, digital sovereignty is at risk (Floridi 2020; van Dijck 2020b). Digital sovereignty has a twofold meaning. It both includes technological sovereignty and data sovereignty as well, as discussed in Chapter 7. I discuss the latter in Section 8.1.2. For technological sovereignty, rather than using services that are owned by Big Tech corporations which are monopolising knowledge production, public services or community-owned services can be developed which can be more trustworthy and secure. The initiatives could be characterised by decentralised and distributed modes of organisation. The decentralised model can be illustrated as a model of several centres which have a contract with each other. There can be also certain rules about which data can be released according to specific rules and preferences. Notwithstanding, there can also be competing data centres. The users, for example, are able to choose their data to be stored on a more safe and accountable data storage centre than in another. This was, for example, the idea of a European data infrastructure, called GAIA-X,[27] which was initiated at the end of 2019. GAIA-X was developed to be a more trustworthy European data cloud than the large American platforms. It is an initiative developed initially by Germany and France in 2019 and currently many European countries are part of this initiative. This initiative aimed towards sovereignty and has been designed as a federated data infrastructure (Schneider 2020). On the other hand, a decentralised model can also be very confusing and non-transparent due to issues of diffusion that might arise as well. Questions about transparency, auditing and control might also surface in both centralised and decentralised models. Undoubtedly, a centralised model is more prone to dominance, because it is easier to dominate. However, a decentralised model might become diffuse and heterogeneous. Then, concerns with regards to power relations arise, concerning decision-making, distribution or access of data. I discuss aspects of these modes of knowledge in Section 8.1.2.

8.1.2 Knowledge stewardship, participatory approaches and collectiveness

As demonstrated in Chapter 7 by the analysis of the data, the de facto data ownership might not be a useful concept in amplifying the uses or rights of data. In the digital age it is not easy to answer the question of who owns the data, but also simultaneously, data can be treated as a common good and not merely as a resource. Notions of stewardship might aid in the aspect of considering and treating data as a common good, beyond the data commodification model that has prevailed in the digital economy so far, as well as empower users to make (good) use of the data while fostering participation. The concept of a shared responsibility of assets for ensuring the quality of the data is intertwined with data management practices, as well as data governance and has been emerging through the last two decades, which some scholars call data stewardship (Plotkin 2014a; Wilkinson et al. 2016; Henderson and Earley 2017; Peng et al. 2016; Kapoor and Whitt 2021). Wilkinson et al. (2016) state that "Beyond proper

[27] https://www.gaia-x.eu/.

collection, annotation and archival, data stewardship includes the notion of 'long-term care' of valuable digital assets, with the goal that they should be discovered and re-used for downstream investigations, either alone, or in combination with newly generated data.", while highlighting that "the outcomes from good data management and stewardship, therefore, are high quality digital publications that facilitate and simplify this ongoing process of discovery, evaluation and reuse in downstream studies." (p. 1). Different types of (data) stewards have been identified, namely those who serve as stewards for the business products and those who are responsible for the technical parts of the assets (Plotkin 2014b; Henderson and Earley 2017). Although data stewards are not a new concept, new models have emerged with regards to stewardship in an effort to also address, apart from data quality and use issues, the power inequalities that have been amplified through opaque practices in the digital ecosystem (Nanda 2020; Manohar et al. 2020), as analysed in Chapter 6. This research work sheds another perspective on the stewardship concept, suggesting knowledge stewardship approaches for aiding in fostering cultural participation through open practices, by empowering users to make (good) (re)use of the data, as well as aid in treating data beyond the current data commodification model that has prevailed in the current digital economy. As discussed in my empirical findings in Chapters 4 and 5, I observed that for data to (be able to) become knowledge many processes are required. Contextual data can lead to what is called information. However, knowledge, beyond an individual cognitive process, can be derived from synthesised information and has to be useful. The model of knowledge stewardship therefore stems from the analysis of the data, extending stewardship perspectives to knowledge stewardship denoting and reflecting the process required from the data to become knowledge. Furthermore, through the analysis of the doctoral research data in Chapter 6, I showed evidence that due to the pitfalls of large-scale commercial platforms in knowledge production and cultural participation, new models are needed to foster openness and fairness. Furthermore, in Chapter 6 it was first suggested that an intermediary could tackle the current landscape of the large-scale commercial platforms. Through Chapter 7, it has been demonstrated that an intermediary can aid in distributing the power through the ecosystem, allowing openness, as well as encouraging the general public to participate in the knowledge production and decision-making process. As discussed in Chapter 4, the catalytic role of the open GLAM Working Group in the CHI scene of Helsinki facilitated change and suggested a move towards acting as an intermediary. Apart from the good quality of the data management, my position on stewardship in this thesis emphasises the dynamic role of the steward in facilitating the establishment of a collaborative mode with the general public and CHIs. Moreover, data sovereignty, derived through the analysis of data, is a fundamental element of the stewardship concept. The model that I discuss later has incorporated all the elements that were presented and formed the conditions of openness of cultural data in Chapter 5. To begin with, one element is that openness is not compatible with hierarchical and monolithic infrastructures as seen in Chapter 4 and so, as derived also through Chapter 7, distributed modes of organisation, an intermediary would be helpful to amplify the uses and quality of data, as well as distribute the power.

In Figure 2, the aspects encompassing knowledge stewardship, as derived from the analysis of research data, are showcased. The model of knowledge stewardship builds on top of them. These elements are legal, privacy, ethics and technical infrastructure. Moreover, the grey aspects are interlocked and interwoven with the aspects forming the foundation of the framework and are based on and resulting from them, playing a crucial role. These are data rights and the sharing control, data sovereignty and data portability, which are crucial to the concept of knowledge stewardship and complementing, or addressing the aspects that form from the foundation of the model. The latter aspects form a basis where the concepts depicted in grey can be applied on that basis and the outcome is knowledge stewardship.

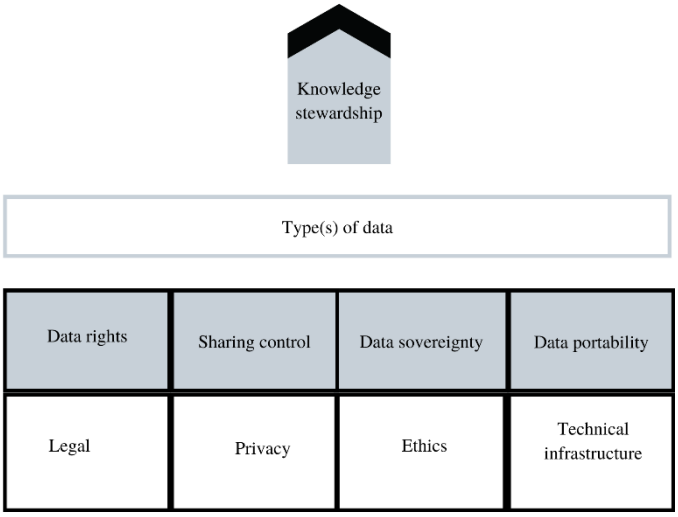

Figure 2: Knowledge stewardship model. Author's own model developed during the PhD process.

Each of the aspects of the model encompasses elements which facilitate the realisation of knowledge management towards knowledge stewardship. Legal, privacy, ethics and technical infrastructure, establish the foundations of knowledge stewardship. These elements derived from the analysis of the research data as discussed in the findings Chapters 4, 5, 6 and 7. Breaking down the model, I firstly discuss *legal aspects*. *Legal aspects* are at the centre of data (re)use, sharing and distribution as extensively discussed in Chapters 4 and 5. *Legal aspects* refer to the ways that data can be accessible, (re)usable and ultimately useful. It refers to IPRs, as well as the use of standards, that is, i.e. CC licences, as well as the fact that CHIs can loosen the control of mechanisms for safeguarding cultural data towards participatory approaches, so that people can enjoy data at the highest level. Moreover, the second aspect that I discuss is *privacy*, which concerns data protection, data access and data safeguarding. The *privacy aspect* is crucial in the digital age, which was evident through the analysis of data, considering the research findings in Chapter 7. Data protection can develop mechanisms for protecting private or sensitive data, by encrypting the data or pseudonymising it. Also, for safeguarding the data, policies can be developed for checking and monitoring the process. Connections can be established with the "sharing control" aspect, which I discuss later in this chapter. In addition, a third aspect I discuss are the *ethics*, which are interwoven with private, sensitive or even contested data. The *ethics aspect* was a prominent

result of the formative evaluation I conducted, where research participants raised their concerns about it. In addition, *ethics* pertain to the design and development of opening up data online. For that, the users must be consulted beforehand for their permission to open up their data. The formulation of consent forms is considered appropriate, so that interested parties, that is, users, are informed about related processes. As *ethics* are interwoven with sensitive data, therefore, that is why maintaining consent forms is crucial for the safeguarding of data. This is an element that is correlated with the sharing control element, which is discussed later in this section. Consent can be contracted via various ways. It could be realised in the form of written consent or even through novel mechanisms, for example, online via application where consent can be granted. The process of the consent can start by granting information about related processes to the user. The consent form must be flexible in a way that it can accommodate the different user and stakeholder needs and requirements, with regards to knowledge stewardship and management. In that sense, the consent should be accompanied by an information sheet and should have some flexibility to be co-created and co-designed with the needs and requirements of the users and the specific type of data in mind, aiding the participatory approach. Moreover, another critical aspect pertaining to *ethics* is linked with contested data, which can be connected for instance to the colonial past. There are several cases, as derived from the formative evaluation, where assets have been acquired illegally and were stolen from indigenous and native communities. Even when the provenance of an asset is difficult to identify, or it is impossible to identify the legal owner, it could perhaps be that this issue be included in the format of metadata or reflected in the documentation process, describing the process of acquisition and at least then, there is complete transparency.

A fourth aspect of the model is the *technical infrastructures*, where I had identified through the analysis that data sharing is a necessity in Chapters 5 and 7. There is the significant aspect of data sharing, which is bound to interoperability and other technical issues, which were very prominent amongst my findings discussed in Chapter 5. Moreover, data sharing refers to data portability and also to the format of data sharing. It should be in such a format that is machine readable, for example, PDFs or cvs. Another element of data sharing is through open public APIs, as was evident via the analysis of data. APIs can advance their documentation practices so that they can be more accessible and therefore lead towards openness. Indisputably, data sharing does not merely concern technical aspects, but motivational and ethical aspects as well. What I mean by that is that for someone to share their data, they have to want to do so or even be in a position to do so. Thus, there are data that perhaps is more ethical to be kept private and be protected, rather than be shared, as extensively discussed in Chapter 7, through the level of openness discussion (Section 7.2). Moreover, through the research work it was suggested that data storage, which is bound to technical elements, is another important element. Through the research work, I have realised that the question of the "data storage" is a central one, as alluded to in Chapter 7. This is because the monopolisation of knowledge that takes place is carried out through large-scale commercial platforms that are owned by a few Big Tech giants, as extensively discussed in Chapter 6. Rather than for the data to be stored privately, owned by companies' repositories, it can be stored in a public or state

service. In such a way, data could be seen or treated differently than a resource – merely for economic exploitation. However, to prevent state surveillance, as is the case with corporate surveillance by large-scale commercial platforms (platform capitalism), rather than envisioning a sole public/state-owned service, it could be a hybrid version, so that the state can have the final oversight.

Moreover, the other aspects of the knowledge stewardship model, which are demonstrated here in grey, that is, data rights, sharing control, data sovereignty and data portability, are fundamental to the concept of knowledge stewardship and complementing, or addressing the issues that stem from the foundation of the model, as discussed earlier. Therefore, a fifth element of the model is *data rights*, which are intrinsically linked with the legal aspects and also GDPR guidelines. They include elements of access and process data, the right to correct data and the right to the deletion of data. Furthermore, the sixth element is the *sharing control*, which is critical in data sharing. As extensively discussed in Chapter 7 there are different levels and degrees of openness – not everything should or can be open due to legal restrictions or privacy and ethical reasons. Therefore, a *sharing control* mechanism can work for determining the level of openness of data from third parties. This mechanism would include aspects of a) no access, meaning restricting the access to data by third parties, b) full access and accessibility, meaning that the data can be treated as open data, where they can be licensed and reused accordingly and c) partial access, meaning that data can only be accessed for view-only purposes by third parties. In addition, a seventh aspect of the model is *data portability*, which is bound to technical issues and requirements as seen above. *Data portability*, as it is referred to in GDPR, is essentially a way of making the data portable, as the word suggests: "The data subject shall have the right to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured, commonly used and machine-readable format and have the right to transmit those data to another controller without hindrance from the controller to which the personal data have been provided (EU Commission 2016)." In addition, the eight element, *data sovereignty* has been characterised as a focal point. As discussed also in Chapter 7, an essential part of digital sovereignty is data sovereignty. *Data sovereignty* is described as "The capability of an individual or an organisation to have control over their personal and business data. This entails that they should be able to know which party holds which data, under what conditions (purpose, duration, reward), where data is kept and are able to re-use the data at other places" (Data Sovereignty Now 2022). Moreover, being sovereign of their own data is also somehow already in the GDPR regulation with the form of the data portability aspect, as stated earlier as well. It is important to mention that although the concepts of sovereignty and governance are interrelated, however, sovereignty operates to a higher degree than governance, "digital sovereignty is the authority to set rules that regulate and govern action (relying, we have argued, on legitimacy and control) and hence that the (digital) governance process involves the exercise of the capacities afforded, a priori, by sovereignty." (Roberts et al. 2021).

Additionally, the ninth element of the model is the "*type(s) of data*". The "*type(s) of data*" element is central to knowledge stewardship, which determines and specifies how the other elements would unfold

and this is exactly the reason behind the rational of positioning it on a different level than the rest of the conditions of the model. With my doctoral work, I investigated and explored cultural data, so this type of data is most pertinent. However, through the analysis of the data in Chapter 7, I observed that the lines of cultural and personal data can often be blurred, due to human–machine interactions. Cultural data that are in the public domain, for example, can be treated differently from personal and private data, like health data. Thus, the issue of how to define personal data arises, along with cultural data on the focus of this research work. Undoubtedly, there is the detailed definition from GDPR on what is and how to define personal data. According to GDPR, personal data is "any information about a living individual which is capable of identifying that individual" (EU Commission 2016). Moreover, definitions on cultural data online (Manovich 2016) or born-digital assets (Jaillant 2019) identify key qualities of these assets. However, owing to the rapidly evolving digital ecologies, the human–machine interaction online makes it almost impossible to distinguish these two. Through the research and observations, I derived that in most cases, even if people interact with machines, there is some personal contribution or personal part in it; someone can identify some movement patterns or when people are at a certain machine, for instance.

8.1.2.1 Participatory Approaches to Knowledge Stewardship

Synthesising the research findings, it was evident both in the analysis Chapters 4 and 7 that openness requires distributed modes of organisation, while highlighting the significance of involving users in the mode of knowledge production and decision-making. Notwithstanding, reflecting on the prominent issue of empowering people through their data, it was demonstrated by the material record, that there are advantages in the practice of putting people in a position to control (their) data. However, this could also be seen as an assumption. What I mean by this is that it can be seen as an assumption to hypothesise that every user would be interested, or even able to choose – correctly – for themselves what should be done with their data on a daily basis. It might be the case that some people would not be interested to make the choice about their data and formulate certain preferences. Others, however, might not even be able to perform that step, due to digital media illiteracy and lack of certain related skills. An intermediary therefore might be useful to facilitate the process as discussed in Chapter 7 by the research participants, similar to the open GLAM Working Group acting as change agents in the CHI scene in Helsinki, as derived from Chapter 4. Having data intermediaries or distributed work packages to keep a service accountable to a community is essential. The Fiduciary Trust model could facilitate that, as discussed by Schneider in Chapter 7. This model represents the idea that there could be a data intermediary instance where people could delegate certain decisions. The decisions could vary as to how the data should be used and they could also "delineate positive uses, but also restrict certain uses people might find intrusive or negative when it comes to common good", as Schneider had pointed out in Chapter 7. It also depends on what kind of data are at stake. Is it personal data? Is this metadata? Is it geo location data? Date that are automatically collected data about certain social groups. Depending on the types of

data, different potential uses emerge. This depends surely on the needs, negotiations and policies that would emerge from the community and groups delegating this issue. As seen in Section 8.1.2, there are different types of data that stewardship must take into consideration. I suggest a framework which involves one or more KS between the CHIs and the users. The respective KS would implement the model used above to delegate user data rights and uses for knowledge stewardship.

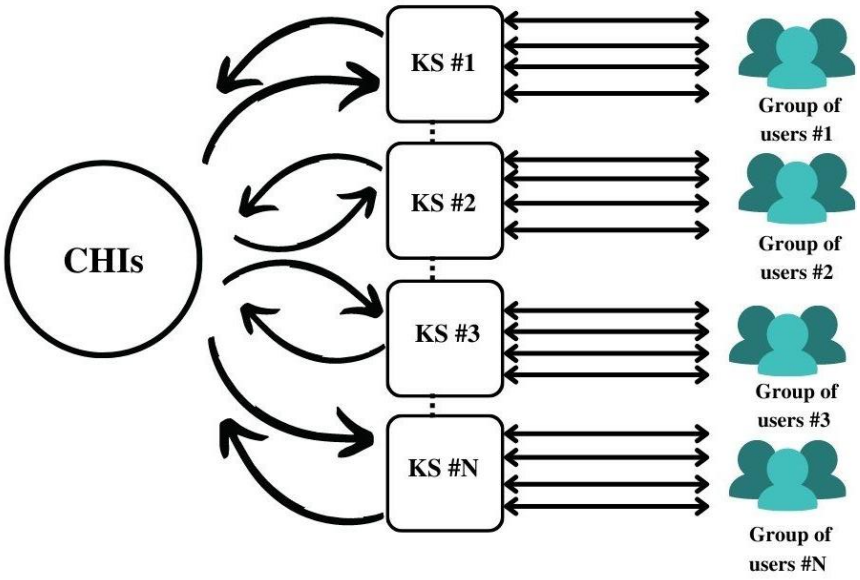

Figure 3: Distributed approaches to participatory knowledge stewardship. Author's own model developed during the PhD process.

In Figure 3, the prototype suggests a range of decentralisation. The number of KS presented in the graph of Figure 3, is indicative. In Figure 3 the dashed lines connecting the different KS, indicate that they could be interacting with one another and possibly collaborating upon certain relevant issues that could arise. In order to better display the model, I am going to explore the different aspects and focus particularly on the KS and users, which concerns the dynamic relation between the stewards and the users. The framework proposes a dynamic, reciprocal relationship between the entities, that is, the steward(s) and the user, as a way for the latter to be part of cultural knowledge production and be empowered through the(ir) data. Through this practice, the framework adds a participatory aspect in knowledge stewardship. To begin with, reading the framework from the left side, arrows flow from the CHI to the steward, showcasing that CHIs will be giving input to the steward. Moreover, arrows flow from the KS, pointing to the CHI. This dynamic states that the steward in turn will give input to the CHI. The relation between the CHIs and the steward will be characterised by collaboration. Moreover, the four black arrows which reflect the dynamic relationship between the users and the KS, which designate four main actions: 1) Collaborating with the users, 2) Co-creating with the users, 3) Co-producing with

the users and 4) Empowering the users. The arrows are presented pointing both ways and this is an effort to portray the reciprocal aspect of the framework. These arrows point both ways within the same channel in an effort to reflect and highlight these actions.

Collaboration between the KS and the users is important to empower the user as to how to use their data, as highlighted in Chapter 7. As discussed in Sections 4.2, 5.2, 6.3 and 7.1.2, collaboration is a key aspect for moving forward. In that sense, incorporating a bottom-up approach, the KS does not merely indicate to the users what to do with their data. Rather, the KS works together *with* the users to understand their needs, inform them about potential data uses and also advise them as well. Moreover, the KS can work together with the user in co-designing related data policies as per the stewardship aspects that were discussed in the model, in Figure 3. Also, they can co-create and co-produce related policies for the data uses. The KS would be responsible for empowering users to actually make (good) use of their data as well as delineate data rights as along with sharing controls that were previously discussed. Moreover, addressing and tackling the issue of flattening the hierarchies of CHIs towards a distribution of power for amplifying the values of open knowledge and supporting notions of empowering people through their data, I derived that this model could facilitate these notions.

The rationale behind more than one KS is that, in such a way, more distributed and decentralised modalities of knowledge production and management can be achieved. There can be different ways or motivations behind the appointment of the different KS. It can follow a logic of collection topic; this means that each KS could be responsible for a certain collection or "data topic". Another approach that stewards and different user groups can establish is based on the ways that the users want to (re)use their data. As discussed in Section 8.1.2, there are different types of data that this prototype concerns, which can be summarised in possibly three main categories: personal data, cultural data provided by CHIs and reused cultural data. In the first category, personal data, concerns data generated through users interacting with CHI digital infrastructures, digital interfaces and/or digital experiences (e.g. virtual assistants). The user is able to identify which kinds of personal data would be collected by the museum, government or public service. In that context, whenever the user interacts with a CHI, they are able to identify and save preferences for kinds of personal data would be stored in the museum for their internal future use, either for sustaining the museum or for using these data for their own, for example, educational use. These kinds of data could include both quantitative and qualitative data. Quantitative data can include data with regards the timing/times a user visited a certain CHI page, or interacted with a cultural asset. Qualitative data can include the kinds of cultural assets the user interacts with and how they are reusing data. Personal data is not always so distinctive from cultural data, as stated in Section 8.1.2. In this case, when a user interacts with an asset and then reuses it or remixes it, this new product will also some personal data intertwined with it. In addition, personal data include geolocation data or even sensitive personal data. The user can have the right to choose which kinds of data should be recorded and how they can reuse them, or whether the CHI can have access to it and how to use these

data resources, for example, for their internal system, for assessment or evaluation purposes. Data can be stored in user mobile devices and then users can decide whether they want to disclose certain data, if/how to use them and make them interoperable with others, or open them to a certain extent and on a certain level. This aids the data portability and interoperability aspects. Moreover, the Fiduciary Trust model which is supported by the data intermediaries' model could be most applicable in that case, for possibly strengthening the data uses and empowering the public, through data intermediaries, as Schneider discussed in Chapter 7.

8.1.2.2 Collective Stewardship

Reflecting on the research findings, which demonstrated the potential for collectiveness, openness, fairness and equity, as evidenced in Chapter 7, in an effort to address individualism and the Big Techs, an explorative way directs the investigation towards different kinds of socioeconomic logics when it comes to the actual business model and its infrastructure and who has a stake in it. I therefore propose a collective stewardship model, which suggests a step for the management of data through self-organisation in terms of collectives or co-operatives. These modes of organisation and working emerged through the research findings, as analysed in Chapter 7. Interesting parties can form digital co-operatives as an emerging mode of adhering to democratic values, solidarity and transparency (Scholz 2016), as opposed to black-boxed technologies and non-transparent approaches in the current digital economy, which were discussed in Chapters 6 and 7. Shareholders could be capable of co-creating the policies and workflows and form guidelines for collective knowledge stewardship. The novelty of the framework of the collective stewardship lies in the self-organisation element, namely, collectively govern the resources, similar to the views discussed by Ørsted in "our legacy" and other research participants in Chapter 7. The conceptual framework for collective stewardship refers to the management and co-production of personal and cultural data. As already discussed in Section 8.1.2, the lines between personal and cultural data can be blurred due to the online interactions. Here a KS can be appointed, who could also be a member of the community. In such a way, the shareholders and stakeholders, are primarily the members of the collective and take decisions collectively with regards to data uses and rights. The organisation and workflow are even more distributed in this case: in Figure 4, there is a visualisation of collective stewardship framework. The visualisation focuses upon the workflow within the co-operative and I mapped certain aspects that were defined by the research findings. The users/members of the collective are depicted in the outer circle. The visualisation focuses upon the workflow within the co-operative. The relationship with the CHI is not visualised but the collective/co-operative could have a collaborative relationship with the CHI. Thus, different "kinds of logics", that were discussed in Chapter 7 and were alluded to in Chapter 6 as well, have been taken into consideration, suggesting collectively owned models. The resources can be managed collectively and related policies can be co-developed by the members of the collective, in a democratic way.

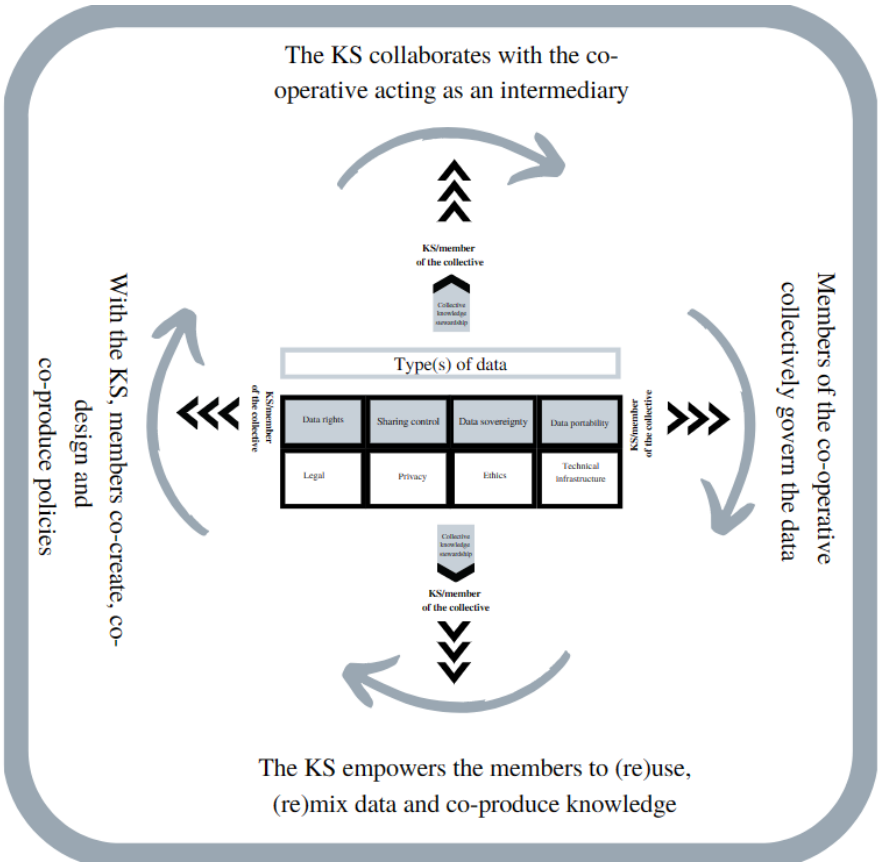

Figure 4: A collective approach to knowledge stewardship. Author's own model developed during the PhD process.

These approaches support co-creation (Sanders and Stappers 2008; Fuster Morell and Senabre Hidalgo 2020) and participatory design (Marttila and Botero 2017; Poderi 2019; Carroll and Beck 2019; Bassetti et al. 2019) by involving the general public in the design and creation process. The co-operatives can form certain working groups based on the preferences and needs on the uses of data. Some uses can include annotating the assets; creating further digital assets by reusing current available data, for example, developing 3d models from them. Others might be interested to build on the (co-)produced data sets and use them for their own benefits, for example, link with the creative industries. Platform and data co-operatives can facilitate the democratic approaches of ownership, as members can have a stake in it (Scholz 2016; Calzada 2020). Members of the co-operative, or data commons, can work together to co-design, co-create and co-produce data policies, sharing controls for a bottom-up and participatory approach of data governance. The co-operative can have KS, who could also be a part of the initiative and could empower the users as to what to do with their data.

Concerns are also raised as to how actually define who is part of the community or the form of membership which collectively manages the digital assets or even the digital commons. The idea that the communities can have a collective interest mechanism in the background could be helpful. Interested parties can form work packages and can have a stake in data and co-produce protocols on these issues. Communities always have to decide who belongs to the community and who does not. Members of a

certain community have to collectively decide on policies, guidelines, what should or should not be done with the data and their uses. Also, when it comes to sensitive data – what or how much they want to disclose or how much they want to keep private and secret, requires further research. In that respect, a community has to somehow negotiate the rules of data use and also which data should be given to third parties or restricted. Data are not a fixed resource and so it is more difficult to be restricted in this sense.

Thus, as discussed earlier, users with certain preferences can form some kind of data commons or data co-operatives to collectively govern their data, their uses of data, owing to the fact that they can have the same interests, for example. They can decide upon when/how to grant rights to others for using their data (e.g. CHI or government for educational, mobility or climate issues). They can have a collective interest that can be represented by the community with regards to data platforms. Still, the question of how to identify a community, or who can be part of a community is challenging. However, it can be suggested that data communities or co-operatives can be formed based on collective interests on the uses of the(ir) data and on pertinent preferences of storing their data. Communities, or work packages, can be formed to decide what or how they want to use their data for. Certain groups can develop forms of co-operatives, or co-operations to delineate, negotiate the uses of data and develop some kind of benefit-sharing mechanism. Co-operatives support and focus on transparency, collectiveness and data portability (Scholz 2016) tackling those issues discussed in Chapters 6 and 7. The notion of transparency permeates all the aspects of a co-operative. This means that they would be transparent in terms of how data are processed, used and/or even sold, but also, they would publish and be transparent about their budget and codes, for example. This is because co-operatives are based on the logic of openness and collectiveness. For example, when it comes to data co-operatives, their software is always open source software and it is developed on the commons (Scholz 2016, 23). Furthermore, collective and robust governance, related policies and rules that are co-created and co-developed with the community/ies, could ensure that users can meaningfully participate in the production of knowledge, while being data sovereign at the same time. However, rather than creating the conditions for the co-operatives, communities or collectives, where policies are already predefined and predetermined in a *reactive* governance approach, possibly a *proactive* governance approach could be more helpful. In that sense, a proactive governance would be capable of creating the conditions within a bottom-up approach. The interested parties would themselves be proactively engaged in co-creating and co-developing policies and strategies for the(ir) data uses. In a reactive governance perspective, a series of principles would be predetermined, for example, if there is a conflict, members can contact the advisory board and then they refer to the principles and resolve it that way. A problem for the reactive governance approach is that it does not create the conditions that a group or community actually needs. It operates in a somehow preventive way, which however, does not create the conditions for anything new, or anything that the community owns. It predetermines what should be done in each case and then when this issue arises in the community, it reacts to it. Proactive governance gives the potential for bottom-up approaches, meaningful co-creation and participatory design based on the emerging needs.

8.2 Conclusion

Decentralised and distributed modalities can be able to hone the participation gap that has been amplified by the current digital economy. Addressing questions towards a fairer digital economy to grapple with the emerging digital colonialism practices that are monopolising knowledge production online, is a crucial part of this work. The thesis proposes a knowledge stewardship model, which can be used in two ways, a) within a participatory stewardship framework and b) within a collective approach to knowledge stewardship, to facilitate fostering participation in open cultural knowledge production, by empowering users to make (good) (re)use of the data. However, as users cannot be expected to have acquired the know-how to do that, a KS could assist in that and help by empowering them to be in control of their data, according to their needs and preferences. The first framework (Figure 3) refers to participatory approaches to knowledge stewardship, for opening up and (re)using CHI collections online in a more dynamic way, by empowering users so that they can be active in the production of knowledge. By appointing an intermediary and following the Fiduciary Trust model, the KS can act as a facilitator, encourage the users to participate while potentially bridge the participation gap. The second framework (Figure 4) refers to collective stewardship and proposes a more radical way of organising knowledge which is through self-organisation in terms of collectives, or co-operatives, where the steward appointed can be a member of the collective and could collaborate directly with other members of the collective. Also, by tapping into the potential of open knowledge, CHIs can make progress into distributed modes of working and management, addressing the pertinent issue of the hierarchical structures.

Chapter 9. Bridging the Participation Gap in Cultural Knowledge Production

Concluding my doctoral research, this chapter outlines the main results of the thesis, as well as discusses the limitations of my study and suggested areas for future research. To begin with, the conclusion of my research puts forward the approach that to bridge the participation gap in cultural knowledge production, new practices could be adopted to diverge from the increasing monopolisation of knowledge by large-scale commercial platforms and to embrace practices that encourage and foster the public to be active in the co-production of knowledge online. Through my thesis, I propose a knowledge stewardship model, which can be used in two ways: a) within a participatory stewardship framework and b) within a collective approach to knowledge stewardship, incorporating and synthesising the findings of this work to encourage and foster the public's meaningful participation in the production of cultural heritage knowledge through open and fair ways. This could be accomplished by empowering users to make (good) (re)use of the data, as well as aid in treating data beyond the current data commodification model that has prevailed in the current digital economy – the aim for both frameworks.

Amid evolving digital ecologies, CHIs *need* to adapt, reposition themselves and negotiate how to tackle pertinent questions and issues with regards to meaningful participation of the public in the production of knowledge. The research problem that triggered this work was motivated by the emerging monopolisation of cultural knowledge production via large-scale commercial platforms and the participation gap in knowledge production. CHIs have been heavily reliant on large-scale commercial platforms for their digital communication. However, the participation gap of the public in cultural heritage production is extremely wide and CHIs have to renegotiate their relationship with communities in the digital realm to tap into their potential for social value and their impact on civic welfare. In order to address and possibly attempt to solve the research problem, to bridge the participation gap in a fair way, I identified two research questions: a) what are the conditions of openness of cultural data? b) what are the resources for opening up knowledge in a fair and participatory way in the digital economy? In order to address the research questions and thereafter respond to the research problem, I propose two frameworks for knowledge stewardship: participatory and collective knowledge stewardship. In Chapter 4, it was discussed that openness is not compatible with hierarchical and monolithic infrastructures and thus, as also concluded from Chapter 7, distributed modes of organisation would be helpful to amplify openness and the uses and quality of data, as well as to distribute the power through an intermediary. Furthermore, in Chapter 4, it was demonstrated that the catalytic role of the open GLAM Working Group in the CHI scene of Helsinki, facilitated change and hinted towards acting as an intermediary. As derived from the research results in Chapter 7, the de facto data ownership, might not be a useful concept in amplifying the uses or rights of data. Also, in an effort to address the growing participation gap in the digital ecosystem when it comes to cultural heritage knowledge production online, where users are struggling in some cases to (re)use digitised collections (Terras 2015b; Valeonti et al. 2020; Wallace

2022), or realise how or what to do with the data, as my research has shown, establishing an intermediary to empower the users could be a way to move forward.

Both frameworks have at the core the knowledge stewardship model as discussed in Chapter 8 (Figure 2). The foundational elements of the model as seen in Chapter 8 are legal, privacy, ethics and technical infrastructures. There are additional aspects that are interlocked and interweaved with the aspects forming the foundation of the model and are based on and result from them, which are fundamental to the concept of knowledge stewardship. These elements are data rights, sharing control, data sovereignty and data portability. They address issues that derive from the foundation of the model, focusing on specific aspects that, through the analysis of the findings, it became evident are important for the model to operate, where openness and fairness could permeate all aspects of the ecosystem. I propose that this knowledge stewardship model can be realised in two ways; incorporating as well as embodying all the research findings analysed as part of the results of my doctoral work. The stewardship model acts as a basis for the two knowledge stewardship frameworks that I propose. Moreover, the first framework refers to participatory approaches to knowledge stewardship. For this conceptual framework, I suggest a framework which involves KS between the CHIs and the users, in order to boost the facilitation of knowledge exchange, empowering the users to participate dynamically in knowledge production, as discussed in Chapter 8. In that mode, a dynamic relationship could be established between the users and the KS which includes the actions of collaborating with the users, co-creating with the users, co-producing with the users and empowering the users. The reciprocal relationship aims to establish a fertile collaboration between the KS and the users to make (good) (re)use of the data. The second prototype proposes a stewardship framework for collective organisation, management and knowledge production, in the form of a co-operative and puts forward an emerging distributed socioeconomic model to tackle the obfuscate practices of large-scale commercial platforms. The collective stewardship framework proposes a more radical way of organising knowledge which is through self-organisation in terms of collectives, or co-operatives, where the steward appointed is a member of the collective and collaborates directly with other members of the collective. Indisputably, the appointment of one or more stewards would depend on the needs of each case and community. The steward, the mediator and facilitator of the process would play a key role in the realisation of this initiative. They would need to have undergone certain training to be efficient to achieve this aim of their position. In spite of their training, not all KS are benevolent and so assessment processes would need to be integrated to ensure that the steward acts according to their role. To that end, the suggested collective knowledge stewardship model could be a way to amplify and strengthen the multivocality against potential malevolent practices from the steward. Forming such organisational modes of collaboration can contribute towards fairness, equity and transparency, as opposed to the monopolistic practices imposed in the digital ecosystem. As discussed, the two frameworks have as a basis the knowledge stewardship model that was presented in Chapter 8 (Figure 2). Also, they share the same aim, that is, assist in fostering participation in open cultural knowledge production, by empowering users to make (good) (re)use of the data, as well as facilitating

in treating data beyond the current data commodification model that has prevailed in the current digital economy. However, they differ in organisational structures and propose different socioeconomic modalities of assembling and producing knowledge, as discussed.

A crucial aspect of the participatory framework is the realisation that notions of *openness* and *sharing* are intertwined with Western ideologies of openness, portraying "being open" merely as a virtue and a purely good positive practice (Koch 2018; Lund and Zukerfeld 2020), as analysed in Chapter 7. Through the research work, it is apparent that openness is situational and contextual. Being open must be considered in relation to what is open and what is not. In this context, there are three major issues to take into account: 1) ethical issues 2) security of people and their stories and 3) provenance and contested ownership of assets. Thus, it requires a balance between opening up, sharing and also closing and protecting, when necessary. Decisions for these processes could take place according to each specific case and needs. For the proposed stewardship framework, CHIs have to be ready to adapt to the new emerging (digital) social worlds. One central aspect that was discussed through the research findings in Chapters 4 and 5 is how CHIs adopt a new mindset and practices to realise openness. It was evident that this process requires time and resources. As a concluding remark and having made observations throughout the four-year doctoral journey, I believe that CHIs have to be able to adapt to the continuous rapidly changing world. They have to develop agile[28] digital infrastructures that would be capable of adapting to the rapid changes and development of the digital as opposed to monolithic, steady and obsolete structures, all of which has been evident and derived from Chapters 4 and 5, where I discussed the new practices. The new practices that have been set out for distributed modes of sharing cultural knowledge freely, aligns with notions of agility. Agile infrastructures would be able to incorporate the growing complexities and openness. Also, it is significant that the agility of the infrastructure would develop such mechanisms for meeting operational needs and assessment tests as well. Agility and/or adaptability of CHIs are much needed to be relevant to society at large, as well as the communities they serve. In the current rapidly changing world, priorities are altering too. The potential for such organisations to be adaptable and able to reprioritise, considering the emerging needs of society, could be considered an advantage in the existing digital ecosystem. Therefore, the need for new practices that my doctoral work has been discussing in relation to openness and sharing of data, could be interpreted or even translated in the larger context, as the capability to innovate. Indisputably, CHIs are bodies with traditional practices and responsibilities, as discussed previously in Chapter 4 and have long been focusing on the preservation and security of cultural assets and the shaping of our collective memory. But they also need to be agile and capable of adapting to the needs and requirements of the ever-changing digital landscape. Hence, CHIs have to address balancing their traditional role with new emerging needs

[28] In the context of my doctoral work, the term "agility" does not incorporate merely the connotation attributed by the Marketing field, but rather encompasses the elements that define flexibility and the notions of adaptability.

and modalities. This is a challenge between continuity and innovation. Continuity refers to the aspects and practices that an institution needs or is required to follow as a formal body. In addition, innovation is required in order not to become obsolete. Innovation is not being referred to in terms of technology here, or how to implement novel technologies. Innovation here refers to the capability of being able to adapt to new circumstances which requires continuous and permanent effort. To realise innovation, CHIs must have enough human resources available to dedicate part of their time to observe what is needed, to change. This approach requires incremental steps, while being pragmatic, a constant dedication and willingness to adapt. There can be multiple factors identified that can designate the need for innovation, new practices and emerging perspectives. One factor that is prominent around my doctoral work is disruption. The advances that digital technologies have brought which led to cognitive capitalism is still a crucial factor that, for example, urges and mobilises innovation and new practices. In Chapter 6, I analyse the disruption that large-scale commercial platforms brought in relation to cultural participation and knowledge production. In Chapters 7 and 8, I analyse and discuss emerging practices (i.e. digital and data sovereignty, knowledge stewardship) that could potentially tackle the disruption. Other factors which can also be linked to disruption are natural disasters and pandemics. For example, the COVID-19 pandemic has intensely changed the digital heritage landscape, namely, the work flows, organisational and managerial issues, as well as labour conditions, to name just a few of its impacts. Indisputably, the pandemic accelerated and boosted the digital aspect, at least since 2020, transactions and any kind of social interaction have been taking place primarily online due to the worldwide lockdowns imposed. Therefore, observing the larger picture, it is apparent how disruptions act and consequently alter the landscape. This then also explains why innovation or new practice(s) are crucial and how these are not necessarily intertwined with novel technologies. The notions of collaboration, through co-creation and co-production of knowledge, are regarded undoubtedly as innovation. Through my empirical work, new practices have been discussed that could bridge the participation gap of the public in cultural knowledge production, as well as tackle power imbalances by opening up knowledge production through fair ways.

Furthermore, through the research work, I observed that developing human-centred approaches in the emerging data ecologies is not “enough”, as discussed in Chapter 6, through the formative evaluation I conducted. Through the evaluation it was demonstrated that a human-centred approach to the ecosystem resembles more of an ego-system, rather than an ecosystem (Scharmer and Kaufer 2014) and is thus considered limited. There is a widespread notion that if a service, or experience, is by design human-centred, then it would serve the needs of users. However, this seems to be somehow naïve in the emerging digital world. There are numerous examples of how online developments and applications for good have turned upside down and have shifted the narrative. It is evident that not every user or person uses a service for the same reason and under the same motivation (Madianou 2021). One example, already stated in Chapter 6, is the abundance of surveillance mechanisms that are being imposed on large-scale social platforms, such as the Cambridge Analytica scandal. Other examples might include

the misuse of public domain cultural assets that have been digitised and are online. What if a service is actually designed for serving human needs for good reasons – whatever that actually means – but is being exploited by a user for their own motivations that potentially, are in reality, subject to fraudulent interests? Because of my theoretical lens and the ecosystem perspective, I observed through this study that taking into account both human and non-human actors – and their different levels of agencies – could be useful in understanding the way the ecosystem works and thus how knowledge is produced, within assemblages, in the nexus of the multitude of digital modalities. Similarly, Madianou (2021) reflects on the ideas of "AI for good" and discusses in a similar way that the "for good" does not mean that it cannot be harmful. Therefore, human-centred cannot actually be controlled, or accounted for, in the dualistic perspective of good or bad. Therefore, rather than discussing human-centred machines, it might be more appropriate to discuss human–machine symbiosis. In Chapter 7, I discussed that the analysis of the research data clearly showed the human intervention needed in emerging technologies and more specifically in automation. Although the "algorithmic power is inherently only ever partial" (Ferrari and Graham 2021, 13), in reality it does exist. On the other hand, it is undoubtedly true that human agency is present, as humans are part of the processes of designing and developing the systems and should not be undermined. Nevertheless, when humans develop these systems, they then let them run. Therefore, automation also runs itself in a way. It is crucial then to recognise a degree of digital or technological agency of machines (Hayles 2017; Demetris and Lee 2018). Although humans can monitor the technology and intervene if/when needed, algorithms ultimately run themselves. Hence, the discussion of forming a latent fertile human–machine symbiosis (Cooley 1996; Gill 2019) becomes even more pertinent. This involves, at the core, considering both human and digital agency (Stapleton et al. 2020) and their different degrees of agency(ies). Therefore, as also derived from the formative evaluation, it seems that the emerging new data ecologies prescribe elevating the human-centred design toward human–machine symbiosis. A human–machine symbiosis could potentially be able to incorporate the emergent qualities of (the different) assemblages. A human–machine symbiosis embodies the fact that human and non-human actors are intertwined and inseparable in a way; humans, processes, technology, data, objects are all connected. This approach can facilitate in highlighting the interconnections and interdependencies of the above-mentioned elements in knowledge production within assemblages. The assemblage lens reveals that due to the relationality and interdependency of the above-mentioned elements, the ecologies, are co-producing knowledge through the multitude of memory modalities. This can be seen through the research work I presented in this thesis. The production of knowledge is interdependent on the proposed KS, the users and the CHIs (i.e. staff and experts) but also it is interconnected and interdependent on the infrastructure in which the process is taking place (i.e. whether open, interoperable or not) and consequently the technology (i.e. algorithms) that operates through it, the business model behind it, the motivations and related practices, all forming the assemblage and consequently co-producing knowledge.

9.1 Limitations of the study

It is necessary to acknowledge and discuss the limitations of my research work. I must acknowledge that, owing to the fact that the "heaviest" part of data collection was conducted in February 2020 (fifteen interviews) and later, after a first phase of analysis of the research results, I realised I needed some more data in some cases. I therefore conducted a second round of interviews for data collection all of which were completed by December 2020. I had, however, already defined thematic topics and categories that were emerging by June 2020 and as I wanted to follow my research design and methods, that is GT, I did not extend into other emerging fields, but continued as originally planned. What I mean by this is that in my research I have not incorporated practices, or trends that were emerging during, or after the data collection took place. For this reason, my research work has not incorporated the Non-Fungible Tokens (NFTs) trend or even blockchain technology. These technologies propose emerging modes for the digital ecosystem. It could perhaps be an opportunity for future research to explore new emerging economic models for cultural data though NFTs but I do not suggest by any means that CHIs should follow each and every trend that is promoted.

Another limitation of my research is that it did not include at its core the ownership of contested objects, that is, ethics. It was only through the formative evaluation conducted that this issue was raised. In my doctoral work, I have been analysing issues involving aspects that would be more beneficial, on reflection, to omit; questions pertaining to the ownership of cultural data. I focused on the (re)use of cultural assets from an ecosystem's perspective. However, I do not discuss in depth issues of authenticity and contested ownership. As this is a really extensive and significant part of cultural heritage discourse, I believe that it holds a prominent position for future work. Also, with regard to the limitations of my doctoral research work, I had to consider the time frame of the PhD programme. For these reasons, I have not discussed extensively in my work the newly introduced discourse about the rebranding of the Facebook company to Meta and their vision of the development of the metaverse. However, some of these aspects could be considered for future exploration. Another limitation of my research work is that although I collected and analysed a considerable amount of material and a lot of perspectives (twenty-three expert interviews), I conducted the study from the open knowledge perspective with a particular set of premises in the context of understanding openness and open knowledge.

9.2 Suggestions for future research

In addition to the limitations of my research, future research could investigate how to put the proposed framework(s) into actual practice. Currently, the stewardship model proposes two conceptual frameworks for knowledge production, in participatory and collective ways. In order to put this into practice, I suggest that there are multiple incremental steps which should be taken into consideration. The stages prior to the design and actual development of the model are of utmost importance as they determine how it would operate and ultimately determine its function. In order to realise the stewardship

framework in fair and open modalities, there are several steps to consider. As already discussed in Chapter 5, from the research findings it is evident that openness is a process; it is not an end-point. Thus, opening up the collections is a continuous process. There are constant negotiations and decisions that need to take place for that process. What I propose through this work, is that a core part of opening up through participation, is to involve people and groups throughout the project. As my empirical work showed, an important aspect of this is to actually include people in the decision-making process and for CHIs to loosen the control of cultural data. Thus, collaborating *with* people is essential as discussed in Chapter 5, whereby CHIs could allow space for such opportunities to thrive, such as good documentation of digital processes (i.e. how to use a CHI's API) so that users who are not familiar with these infrastructures would be able to use them. Another aspect that could be considered for future research is the polycentric approach that was primarily derived through the formative evaluation event. Furthermore, the research findings from Chapters 6 and 7 conform to the very recent provisional political agreement on the Digital Markets Act (DMA) (European Parliament 2022), aimed at shaping a fairer and more competitive digital ecosystem. On Thursday 24 March 2022, the European Parliament and the European Council agreed the focus of the new DMA. The agreement includes setting up clear regulation for limiting the power of large-scale commercial platforms that act as "gatekeepers" which operate under obfuscate and unethical practices, while empowering users to have more control over their data (European Parliament 2022). The agreement still needs to be approved by the European Parliament and Council. Although this is a provisional agreement, it is hopeful that European official bodies are raising awareness about these crucial matters and aim to put these ideas into action respecting European values for a democratic and sustainable future. In contrast, being pragmatic, we have to acknowledge how much time is actually required for these practices to be put in place and finally implemented. The DMA is linked with a large portion of my research findings, in Chapters 6 and 7. In Chapter 6, I analyse the pitfalls of large-scale commercial platforms in cultural participation and knowledge production, operating under unethical practices, whereas in Chapter 7, I investigate practices which regulate the power of these platforms through digital and data sovereignty.

Furthermore, one aspect that I find essential is the link with innovation that was discussed at the beginning of this chapter. In order to move forward and start executing the stewardship model, the CHI has to be ready to innovate. By that, I mean that the employees and senior management need to be interested in changing their structure towards distributed modes of management and organisation. This includes as a first element, shifting the practices and being ready to explore, experiment and think out of the box. Then, the institution should be equipped enough to achieve such an endeavour in terms of resources. It will require staff resources that have the time and expertise to dedicate and negotiate with the steward, as well as the appointment of (multiple) stewards. Thus, people that have the "know-how" are needed. To that end, as these are emerging needs it would be useful if courses – or specific trainings – could be formulated and set up to teach relevant skills. Moreover, other requirements for the realisation of the project would be the technical requirements of the infrastructure that could be put in place (e.g.

interoperability aspects). In addition, a crucial part of future research work can be directed to how the data could be used, as well as the design perspectives and approaches for envisioning future infrastructures. For example, (cultural) data can be (re)used for many different purposes, such as to help with mobility reasons. Users could be able to donate their personal data to the proposed stewardship model for a variety of reasons. If users would like their data to be used to develop an integrated system of mobility data in their city, in cases where not so many cars are needed, for example, this could be an interrelated system of data sharing. It is important to take privacy into account and so certain data might need to be excluded such as, for example, certain geolocation data, which could detect an individual's movement pattern.

Finally, the challenges of future research are diverse. One main challenge refers to and is linked to the discussion of a human–machine symbiosis. Technology is not a panacea and neither is openness, as discussed in Chapter 7. One challenge that I have observed in the emerging (digital) social worlds is not to follow the trend or hypes, but rather reflect on the "whys?", or "who does it serve?". Staying true and transparent is crucial. Changing practices in the memory landscape is undoubtedly challenging as many actors are involved and it is also time-consuming. The advances in the digital condition, new digital media technologies and datafication assume that everything is quantifiable and at times commodifiable as well. The latter is linked with the free digital market-related ideologies of (digital) capitalism which has the tendency to turn (any kind of) goods into commodities. However, when it comes to knowledge and memory, not everything can be measured and certainly not commodified. Rather than focusing on the technological means, through this thesis I argue that the values are of high importance. Values such as openness, transparency, collaboration and participation must be negotiated. This research proposes that all the elements of the ecosystem must work towards that direction; to accomplish the social dimension in a meaningful and participatory way within different assemblages. Therefore, the infrastructures must be capable of supporting the social dimension of heritage. Infrastructural aspects are intertwined with social aspects. Infrastructural aspects embody the vision of openness and extraversion. Being interoperable is key. This means making connections in a sense and "speaking" to other infrastructures easily and successfully.

The (digital) cultural heritage landscape is ever changing. The contribution of this research is to diverge from obfuscate practices, digital monopolies and/or digital "gatekeepers", as these practices can have a huge impact on future memory making within digital assemblages. Rather, it encourages users to be active participants in the decision-making processes concerning cultural knowledge production in the digital ecosystem.

Bibliography

Arriagada, Arturo, Mark Graham, Ursula Huws, Janaki Srinivasan, Macarena Bonhomme, Pradyumna Taduri, Funda Ustek-Spilda, Fabian Ferrari, Alessio Bertolini and Adam Badger. 2020. Taming Platform Capitalism: struggles from the global South meet struggles from the global North. *AoIR Selected Papers of Internet Research.* doi: 10.5210/spir.v2020i0.11111.

Asswad, Jad and Jorge Marx Gómez. 2021. *Data Ownership: A Survey*. Information, vol. 12, no. 11: 465. https://doi.org/10.3390/info12110465.

B.-N. Sanders, Elizabeth. 2002. From user-centred to participatory design approaches. Design and the Social Sciences: CRC Press. http://dx.doi.org/10.1201/9780203301302.ch1. doi: 10.1201/9780203301302.ch1.

Ball, James. 2020. *Who owns the internet and how it owns us*. London: Bloomsbury Publishing.

Baltussen, Lotte, Johan Oomen, Maarten Brinkerink, Maarten Zeinstra and Nikki Timmermans. 2013. Open Culture Data: Opening GLAM Data Bottom-up. In *MD: Museums and the Web.* Museums and the Web 2013, Portland, Oregon. 17–20 April.

Barredo Arrieta, Alejandro, Natalia Díaz-Rodríguez, Javier Del Ser, Adrien Bennetot, Siham Tabik, Alberto Barbado, Salvador Garcia, Sergio Gil-Lopez, Daniel Molina, Richard Benjamins, Raja Chatila and Francisco Herrera. 2020. Explainable Artificial Intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI. *Information Fusion* 58: 82–115. doi: 10.1016/j.inffus.2019.12.012.

Barth, Fredrik. 2002. An Anthropology of Knowledge. *Current Anthropology* 43 (1).

Bassetti, Chiara, Mariacristina Sciannamblo, Peter Lyle, Maurizio Teli, Stefano de Paoli and Antonella de Angeli. 2019. Co-designing for common values: creating hybrid spaces to nurture autonomous cooperation. *CoDesign* 15 (3): 256–271. doi: 10.1080/15710882.2019.1637897.

Bendix, Regina and Valdimar Tr. Hafstein. 2009. *Culture and property*. Ethnologia Europaea, vol. 39.2009,2. Copenhagen: Museum Tusculanum Press.

Bennett, Tony. 2018. *Museums, Power, Knowledge. Selected Essays.* London: Routledge.

Berners-Lee, Tim and Mark Fischetti. 1999. *Weaving the Web. The original design and ultimate destiny of the World Wide Web by its inventor.* Harper San Francisco

Birch, Kean and Kelly Bronson. 2022. Big Tech. *Science as Culture* 31 (1): 1–14. doi: 10.1080/09505431.2022.2036118.

Birch, Kean and D. T. Cochrane. 2022. Big Tech: Four Emerging Forms of Digital Rentiership. *Science as Culture* 31 (1): 44–58. doi: 10.1080/09505431.2021.1932794.

Bodle, Robert. 2011. Regimes of sharing. *Information, Communication & Society* 14 (3): 320–337. doi: 10.1080/1369118X.2010.542825.

Brown, Michael F. 1998. Can Culture Be Copyrighted? *Current Anthropology* 39 (2): 193–222. doi: 10.1086/204721.

Byrne, Denis R. 2008. Heritage as social action. In *The Heritage Reader*, ed. John Schofield, Graham Fairclough, Rodney Harrison and Jameson Jnr. New York: Routledge.

Calzada, Igor. 2020. Platform and Data Co-Operatives amidst European Pandemic Citizenship. *Sustainability* 12 (20): 8309. doi: 10.3390/su12208309.

Carroll, John M. and Jordan Beck. 2019. Co-designing platform collectivism. *CoDesign* 15 (3): 272–287. doi: 10.1080/15710882.2019.1631353.

Celis Bueno, Claudio. 2017. *The attention economy. Labour, time and power in cognitive capitalism*. Critical perspectives on theory, culture and politics. London, New York: Rowman & Littlefield International.

Charmaz, Kathy. 2006. *Constructing grounded theory: a practical guide through qualitative analysis.* London, Thousand Oaks, Calif.: SAGE Publications.

Charmaz, Kathy. 2008. Grounded theory as an emergent method. In *Handbook of emergent methods*, ed. Sharlene Nagy Hesse-Bilber and Patricia Leavy, 155–170. New York, NY, US: The Guilford Press.

Charmaz, Kathy. 2014. *Constructing Grounded Theory.* London: SAGE Publications Ltd.

Choong, Kwee Keong and Patrick W. Leung. 2021. A Critical Review of the Precursors of the Knowledge Economy and Their Contemporary Research: Implications for the Computerized New Economy. *Journal of the Knowledge Economy.* doi: 10.1007/s13132-021-00734-9.

Citton, Yves. 2017. *The ecology of attention.* Cambridge, UK, Malden, MA: Polity.

Collier, Stephen J. and Andrew Lakoff. 2005. On Regimes of Living. In *Global assemblages: Technology, politics and ethics as anthropological problems*, ed. Aihwa Ong and Stephen J. Collier, 22–39. Malden, Mass.: Blackwell.

Confessore, Nicholas. 2018. Cambridge Analytica and Facebook: The Scandal and the Fallout So Far. https://www.nytimes.com/2018/04/04/us/politics/cambridge-analytica-scandal-fallout.html. Accessed 10 November 2020.

Cooley, Mike. 1989. Human-centred Systems. In *Designing Human-centred Technology: A Cross-disciplinary Project in Computer-aided Manufacturing*, ed. Howard Rosenbrock, 133–143. London: Springer London.

Cooley, Mike. 1996. On Human-Machine Symbiosis. In *Human Machine Symbiosis: The Foundations of Human-centred Systems Design*, ed. Karamjit S. Gill, 69–100. London: Springer London.

Cooley, Mike. 2018. *Delinquent Genius: the strange air of man and his technology.* Nottingham: Spokesman Books.

Couldry, Nick and Ulises A. Mejias. 2018. Data Colonialism: Rethinking Big Data's Relation to the Contemporary Subject. *Television & New Media* 20 (4): 336–349. doi: 10.1177/1527476418796632.

Creative Commons. 2022. About CC Licenses. https://creativecommons.org/about/cclicenses/. Accessed 2 January 2022.

Crews, K. D. 2012. Museum Policies and Art Images: Conflicting Objectives and Copyright Overreaching. *Intellectual Property: Empirical Studies eJournal*.

Crews, K. D. and Brown. 2011. Control of museum art images: the reach and limits of copyright and licensing. In *The Structure of Intellectual Property Law: Can One Size Fit All?*, ed. Annette Kur and Vytautas Mizaras. Cheltenham: Edward Elgar.

Crooke, Elizabeth. 2021. Participation, trust and telling difficult histories in museums. In *Museums and the Challenge of Change: Old Institutions in a New World*, ed. Graham Black, 113–122. London: Routledge.

Cusumano, Michael A., Annabelle Gawer and David B. Yoffie. 2019. *The Business of Platforms. Strategy in the Age of Digital Competition, Innovation and Power.* New York: HarperCollins Publishers.

Data Sovereignty Now. 2022. Data Sovereignty Now. https://datasovereigntynow.org/. Accessed 2 January 2022.

Davies, William. 2015. *The Happiness Industry. How the Government and Big Business Sold Us Well-Being.* London: Verso.

Dean, Jodi. 2012. *Communist Horizon:* Verso Books.

Deazley, Ronan. 2010. The Statute of Anne and the Great Abridgement Swindle. *Institute for Intellectual Property & Information Law (IPIL) Symposia* 47 (4).

Deleuze, Gilles and Félix Guattari. 2007. *A Thousand Plateaus. Capitalism and Schizophrenia*, 12th edn. Minneapolis, Minn.: Univ. of Minnesota Press.

Demetris, Dionysios and Allen S. Lee. 2018. When Humans Using the IT Artifact Becomes IT Using the Human Artifact. *Journal of the Association for Information Systems* 19 (10). https://aisel.aisnet.org/jais/vol19/iss10/5. Accessed 10 May 2021.

Digital Repository of Ireland. 2022. Digital Repository of Ireland. https://dri.ie/. Accessed 10 July 2022.

DiNucci, Darcy. 1999. Fragmented Future. http://darcyd.com/. Accessed 20 April 2021.

Du Gay, Paul and Michael Pryke. 2002. *Cultural Economy: Cultural Analysis and Commercial Life.* London: SAGE Publications Ltd.

Dwork, Cynthia, Moritz Hardt, Toniann Pitassi, Omer Reingold and Richard Zemel. 2012. Fairness through Awareness. In *Proceedings of the 3rd Innovations in Theoretical Computer Science Conference*, 214–226. New York, NY, USA: Association for Computing Machinery. doi: 10.1145/2090236.2090255.

Eisenstein, Elizabeth L. 1980. *The Printing Press as an Agent of Change.* Cambridge: Cambridge University Press.

European Commission (ed.). 2016. *General Data Protection Regulation. Regulation on the protection of natural persons with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC (General Data Protection Regulation)*. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679. Accessed 10 November 2020.

European Commission. 2021. Regulation of the European Parliament and of the Council: Laying down harmonised rules on artificial intelligence. Brussels. https://digital-strategy.ec.europa.eu/en/library/proposal-regulation-laying-down-harmonised-rules-artificial-intelligence-artificial-intelligence. Accessed 21 April 2021.

Europeana. 2021. Europeana. https://www.europeana.eu/. Accessed 16 August 2021.

Falk, J. H. and L. D. Dierking. 1992. *The Museum Experience.* Washington, DC: Whalesback Books.

Ferrari, Fabian and Mark Graham. 2021. Fissures in algorithmic power: platforms, code and contestation. Cultural Studies, 35:4-5, 814-832, doi: 10.1080/09502386.2021.1895250.

Finna. 2022. Finna. https://www.finna.fi/. Accessed 15 July 2022.

Fisher, Mark. 2009. *Capitalist Realism: is there no Alternative?* Winchester, UK: Washington [DC]: Zero Books.

Floridi, Luciano. 2020. The Fight for Digital Sovereignty: What It Is and Why It Matters, Especially for the EU. *Philosophy & Technology* 33 (3): 369–378. doi: 10.1007/s13347-020-00423-6.

Fouseki, Kalliopi and Kalliopi Vacharopoulou. 2013. Digital Museum Collections and Social Media: Ethical Considerations of Ownership and Use. *Journal of Conservation and Museum Studies* 11 (1): 5. doi: 10.5334/jcms.1021209.

Fricke, Christian. 2020. Missing Fairness: The Discriminatory Effect of Missing Values in Datasets on Fairness in Machine Learning. Master's Programme in Computer, Communication and Information

Sciences, Aalto University, Finland. https://aaltodoc.aalto.fi/handle/123456789/97501. Accessed 28 April 2021.

Fuchs, Christian. 2015. *Culture and Economy in the Age of Social Media.* New York: Routledge.

Fuchs, Christian. 2020a. Communicative Socialism/Digital Socialism. *tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society* 18 (1): 1–31. doi: 10.31269/triplec.v18i1.1144.

Fuchs, Christian. 2020b. The Ethics of the Digital Commons. *Journal of Media Ethics* 35 (2): 112–126. doi: 10.1080/23736992.2020.1736077.

Fuchs, Christian. 2022. *Digital Capitalism. Media, Communication and Society volume three.* Oxon: Routledge.

Fumagalli andrea, Alfonso Giuliani, Stefano Lucarelli and Carlo Vercellone. 2020. *Cognitive Capitalism, Welfare and Labour. The Commonfare Hypothesis:* Routledge.

Furman, Jason and Robert Seamans. 2019. AI and the Economy. *Innovation Policy and the Economy* 19: 161–191. doi: 10.1086/699936.

Fuster Morell, Mayo and Enric Senabre Hidalgo. 2020. Co-creation applied to public policy: a case study on collaborative policies for the platform economy in the city of Barcelona. *CoDesign*: 1–20. doi: 10.1080/15710882.2020.1854313.

Galani, Areti, Rhiannon Mason and Bethany Rex. 2019. Dialogues and heritages in the digital public sphere. In *European Heritage, Dialogue and Digital Practices*, ed. Areti Galani, Rhiannon Mason and Gabi Arrigoni. London: Routledge.

Gerlitz, Carolin and Anne Helmond. 2013. The like economy: Social buttons and the data-intensive Web. *New Media & Society* 15 (8): 1348–1365. doi: 10.1177/1461444812472322.

Giaccardi, Elisa. 2012. *Heritage and Social Media. Understanding Heritage in a Participatory Culture*, 1st edn. Abingdon, Oxon: Routledge.

Gill, Karamjit S. 2016. Architect or Bee? Mike Cooley: the human spirit. *AI & SOCIETY* 31 (4): 435–437. doi: 10.1007/s00146-016-0675-2.

Gill, Karamjit S. 2019. Holons on the Horizon: Re-Understanding Automation and Control. *IFAC-PapersOnLine* 52 (25): 556–561. doi: 10.1016/j.ifacol.2019.12.605.

Gillespie, Tarleton. 2010. The politics of 'platforms'. *New Media & Society* 12 (3): 347–364. doi: 10.1177/1461444809342738.

Gillespie, Tarleton. 2018. Regulation of and by Platforms. In *The SAGE Handbook of Social Media*, ed. Jean Burgess, Alice Marwick and Thomas Poell. London: SAGE Publications Ltd.

GitHub. 2022. GitHub. https://github.com/. Accessed 10 May 2022.

Glaser, Barney. 1978. *Theoretical sensitivity: Advances in the methodology of grounded theory.* Mill Valley: Sociology Press.

Glaser, Barney G. 2001. *The Grounded Theory Perspective: Conceptualization Contrasted with Description*. Mill Valley, Ca: Sociology Press.

Glaser, Barney G. and Anselm L. Strauss. 1967. *The discovery of grounded theory.* New York: Aldine de Gruyter.

Goldhaber, Michael H. 1997. The attention economy and the Net. *First Monday* 2 (4). doi: 10.5210/fm.v2i4.519.

Gorgels, Peter. 2018. Rijksmuseum mobile first: Rijksstudio Redesign and the new Rijksmuseum app. *MW18: MW 2018*. https://mw18.mwconf.org/paper/rijksmuseum-mobile-first-redesign-rijksstudio-the-new-rijksmuseum-app/index.html. Accessed 10 July 2020.

Greenberg, Jane. 2003. Metadata Generation: Processes, People and Tools. Bul. Am. Soc. Info. Sci. Tech., 29: 16–19. https://doi.org/10.1002/bult.269.

Gupta, Akhil and James Ferguson. 1997. Discipline and Practice: "The Field" as Site, Method and Location in Anthropology. In *Anthropological Locations: Boundaries and Grounds of a Field Science*, ed. Akhil Gupta and James Ferguson: University of California Press.

Hamilton, Hannah, Stefano de Paoli, Anna Wilson and Greg Singh. 2020. Open data platforms for a data commons, how to support the life of a data beyond release. *AoIR Selected Papers of Internet Research.* doi: 10.5210/spir.v2020i0.11226. Accessed 8 April 2021.

Haraway, Donna. 1988. Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies* 14 (3): 575–599. doi: 10.2307/3178066. Accessed 10 December 2020.

Haraway, Donna Jeanne and Thyrza Nichols Goodeve. 2018. *Modest_Witness@Second_Millennium.FemaleMan_meets_OncoMouse. Feminism and technoscience / Donna J. Haraway, Thyrza Goodeve.* London: Routledge.

Hayles, N. Katherine. 2017. *Unthought*. Chicago: University of Chicago Press.

Heath, Christian and Dirk Vom Lehn. 2008. Configuring 'interactivity'. *Enhancing engagement in science centres and museums* 38 (1): 63–91. doi: 10.1177/0306312707084152. Accessed 13 January 2022.

Helmond, Anne. 2015. The Platformization of the Web: Making Web Data Platform Ready. *Social Media + Society* 1 (2): 205630511560308. doi: 10.1177/2056305115603080.

Henderson, Deborah and Susan Earley. 2017. *DAMA-DMBOK. Data management body of knowledge / DAMA International; senior editor, Deborah Henderson, CDMP; editor, Susan Earley, CDMP.* Basking Ridge, New Jersey: Technics Publications.

Hesmondhalgh, David and Sarah Baker. 2011. *Creative Labour. Media Work in Three Cultural Industries.* London: Routledge.

Hess, Charlotte and Elinor Ostrom. 2007. *Understanding knowledge as a commons. From theory to practice.* Cambridge, Mass: MIT Press.

Hoffmann, Anna Lauren. 2019. Where fairness fails: data, algorithms and the limits of antidiscrimination discourse. *Information, Communication & Society* 22 (7): 900–915. doi: 10.1080/1369118X.2019.1573912.

Holton, Judith A. 2007. The coding process and its challenges. In A. Bryant, & K. Charmaz (Eds.), *The Sage Handbook of Grounded Theory*. (pp. 265-289). Thousand Oaks, CA: SAGE Publications Ltd.

Hooper-Greenhill, Eilean. 1992. *Museums and the Shaping of Knowledge.* London: Routledge.

Hooper-Greenhill, Eilean. 2000. *Museums and the Interpretation of Visual Culture.* London: Routledge.

Huggett, Jeremy. 2018. Reuse Remix Recycle. Advances in Archaeological Practice, 6(2), 93-104. doi: 10.1017/AAP.2018.1. Accessed 22 April 2020.

Iliadis andrew, Wesley Stevens, Jean-Christophe Plantin, Amelia Acker, Huw Davies and Rebecca Eynon. 2020. Platformizing knowledge: mess and meaning in Web 3.0 infrastructures. *AoIR Selected Papers of Internet Research.* doi: 10.5210/spir.v2020i0.11128.

Jafari, Aliakbar, Babak Taheri and Dirk Vom Lehn. 2013. Cultural consumption, interactive sociality and the museum. *Journal of Marketing Management* 29 (15–16): 1729–1752. doi: 10.1080/0267257X.2013.811095.

Jaillant, Lise. 2019. After the digital revolution: working with emails and born-digital records in literary and publishers' archives. *Archives and Manuscripts* 47 (3): 285–304. doi: 10.1080/01576895.2019.1640555.

Jordan, Tim. 2020. *The digital economy.* Cambridge, Medford, MA: Polity.

Kapoor, Astha and Richard S. Whitt. 2021. Nudging Towards Data Equity: The Role of Stewardship and Fiduciaries in the Digital Economy. *SSRN Electronic Journal.* doi: 10.2139/ssrn.3791845.

Katifori, Akrivi, Sara Perry, Maria Vayanou, Angeliki Antoniou, Ioannis-Panagiotis Ioannidis, Sierra McKinney, Angeliki Chrysanthi and Yannis Ioannidis. 2020. "Let Them Talk!": Exploring Guided Group Interaction in Digital Storytelling Experiences. *J. Comput. Cult. Herit.* 13 (3). doi: 10.1145/3382773.

Kelly, Kristine. 2013. Images of Works of Art in Museum Collections: The Experience of Open Access. A Study of 11 Museums Prepared for The Andrew W. Mellon Foundation In: Washington, DC: Council on Library and Information Resources. Available at: http://www.clir.org/pubs/reports/pub157.

Kenney, Martin and John Zysman. 2016. The Rise of the Platform Economy. *Issues in Science and Technology* 32 (no. 3): 61–69. https://issues.org/rise-platform-economy-big-data-work/. Accessed 8 July 2020.

Kenney, Martin, Dafna Bearson and John Zysman. 2019. The Platform Economy Matures: Pervasive Power, Private Regulation and Dependent Entrepreneurs. *SSRN Electronic Journal.* doi: 10.2139/ssrn.3497974.

Kidd, Jenny. 2011. Enacting engagement online: framing social media use for the museum. *Information Technology & People* 24 (1): 64–77. doi: 10.1108/09593841111109422.

Kidd, Jenny. 2018. Public Heritage and the Promise of the Digital. In *The Oxford Handbook of Public Heritage Theory and Practice*, ed. Angela M. Labrador and Neil Asher Silberman. Oxford: Oxford University Press.

Kirshenblatt-Gimblett, Barbara. 2004. Intangible Heritage as Metacultural Production. *Museum International* 56 (1-2): 52–65. doi: 10.1111/j.1350-0775.2004.00458.x.

Kitchin, Rob. 2014. *The Data Revolution. Big Data, Open Data, Data Infrastructures and Their Consequences.* London: SAGE Publications.

Koch, Gertraud. 2013. Studying Heritage in the Digital Era. In *Understanding Heritage: Perspectives in Heritage Studies*, ed. Marie-Theres Albert, Roland Bernecker and Britta Rudolff, 169–182. Berlin: De Gruyter.

Koch, Gertraud. 2017. Ethnography of Digital Infrastructures. In *Koch, Gertraud 2017: Ethnography of Digital Infrastructures. In: Gertraud Digitisation: Theories and Concepts for Empirical Cultural Research*, ed. Gertraud Koch, 78–91. London and New York: Routledge.

Koch, Gertraud. 2018. How open are open cultural data? Some critical remarks on an ongoing discussion. In *{D1G1TAL HER1TAGE}*, ed. Samantha Jennifer Lutz. https://journals.sub.uni-hamburg.de/hjk/article/view/1197. Accessed 5 November 2019.

Koch, Gertraud. 2021. Memory Modalities Opening-up Digital Heritage Infrastructures. In *Culture and Computing. Design Thinking and Cultural Computing*, 240–252. Cham: Springer International Publishing.

Kotler, Neil and Philip Kotler. 2000. Can Museums be All Things to All People?: Missions, Goals and Marketing's Role. *Museum Management and Curatorship* 18 (3): 271–287. doi: 10.1080/09647770000301803.

Langley, Paul and Andrew Leyshon. 2017. Platform capitalism: the intermediation and capitalization of digital economic circulation. *Finance and Society*, 2017, 3(1): 11-31. doi: 10.2218/finsoc.v3i1.1936.

Lehtiniemi, Tuukka. 2020. *Imagining the Data Economy*. Turku: University of Turku.

Lehtiniemi, Tuukka and Minna Ruckenstein. 2019. The social imaginaries of data activism. *Big Data & Society* 6 (1): 205395171882114. doi: 10.1177/2053951718821146.

Lempert, Lora Bex. 2007. Asking Questions of the Data: Memo Writing in the Grounded Theory Tradition. In *The SAGE Handbook of Grounded Theory*, ed. Antony Bryant and Kathy Charmaz. Bryant, A., & Charmaz, K. (2007). The SAGE handbook of grounded theory. London: SAGE Publications Ltd.

LIBER. 2022. LIBER. https://libereurope.eu/. Accessed 10 April 2022.

Lingel, Jessa. 2021. *The Gentrification of the Internet. How to Reclaim our Digital Freedom.* Oakland, California: University of California Press.

Little, Roderick J. A. and Donald B. Rubin. 2020. *Statistical Analysis with Missing data*. Wiley series in probability and statistics. Hoboken, NJ: Wiley.

Local Contexts. 2022. TK Labels. https://localcontexts.org/labels/traditional-knowledge-labels/. Accessed 13 April 2022.

Lund, Arwid and Mariano Zukerfeld. 2020. *Corporate Capitalism's Use of Openness.* Cham: Springer International Publishing.

Lynch, Bernadette. 2017. The Gate in the Wall: Beyond Happiness-making in Museums. In *Engaging Heritage, Engaging Communities*, ed. Bryony Onciul, Michelle L. Stefano and Stephanie Hawke, 11–30: Boydell & Brewer.

Lynch, Bernadette, Sarah Smed, Adele Chynoweth and Klaus Petersen. 2020. *Museums and social change. Challenging the unhelpful museum / edited by Bernadette Lynch, Sarah Smed, Adele Chynoweth, Klaus Petersen*, 1st edn. Museum meanings. London: Routledge.

Macdonald, Sharon J. 2012. Museums, National, Postnational and Transcultural Identities. In *Museum Studies: An Anthology of Contexts*, ed. Bettina Messias Carbonell, 273–286. London: Wiley-Blackwell.

Madianou, Mirca. 2021. Nonhuman humanitarianism: when 'AI for good' can be harmful. *Information, Communication & Society* 24 (6): 850–868. doi: 10.1080/1369118X.2021.1909100.

Manovich, Lev. 2016. The Science of Culture? Social Computing, Digital Humanities and Cultural Analytics 1. doi: 10.22148/16.004.

Marazzi, Christian. 2008. *Capital and Language. From the New Economy to the War Economy:* Semiotext(e).

Marttila, Sanna. 2018. *Infrastructuring for cultural commons.* Aalto: School of Art and Design.

Marttila, Sanna and Andrea Botero. 2017. Infrastructuring for Cultural Commons. *Computer Supported Cooperative Work (CSCW)* 26 (1): 97–133. doi: 10.1007/s10606-017-9273-1.

Marttila, Sanna and Kati Hyyppä. 2014. Rights to remember? In *Proceedings of the NordiCHI '14: The 8th Nordic Conference on Human-Computer Interaction: Fun, Fast, Foundational: October 26–30th, 2014, Helsinki, Finland*, 481–490. the 8th Nordic Conference, Helsinki, Finland. New York: Association for Computing Machinery. doi: 10.1145/2639189.2641217.

MAXQDA. 2021. MAXQDA The Art of Data Analysis. https://www.maxqda.com/. Accessed 16 August 2021.

McCarthy, Douglas. 2021. What's the latest picture of Open GLAM? https://douglasmccarthy.com/2021/12/whats-the-latest-picture-of-open-glam/. Accessed 20 March 2022.

McCarthy, Douglas and Andrea Wallace. 2018. Survey of GLAM open access policy and practice. https://docs.google.com/spreadsheets/d/1WPS-KJptUJ-o8SXtg00llcxq0IKJu8eO6Ege_GrLaNc/edit#gid=1216556120. Accessed 20 March 2022.

McLaughlin, David. 2021. Facebook Hit by New U.S. Antitrust Case as FTC Seeks Do-Over. https://www.bloomberg.com/news/articles/2021-08-19/facebook-set-to-be-hit-by-new-u-s-antitrust-case-in-ftc-do-over. Accessed 10 October 2021.

Michael Adrian Peters and Ergin Bulut. 2011. *Cognitive Capitalism, Education and Digital Labor.* New York: Peter Lang Verlag.

Mills, Jane, Ann Bonner and Karen Francis. 2006. The Development of Constructivist Grounded Theory. *International Journal of Qualitative Methods* 5 (1): 25–35. doi: 10.1177/160940690600500103.

MIT, Initiative on the digital economy. 2021. Sinan Aral Calls for More Transparency from Facebook. https://ide.mit.edu/insights/sinan-aral-calls-for-more-transparency-from-facebook/. Accessed 10 October 2021.

Mohamed, Shakir, Marie-Therese Png and William Isaac. 2020. Decolonial AI: Decolonial Theory as Sociotechnical Foresight in Artificial Intelligence. *Philosophy & Technology* 33 (4): 659–684. doi: 10.1007/s13347-020-00405-8.

Mol, Annemarie. 2002. *The Body Multiple. Ontology in Medical Practice*. Durham: Duke University Press.

Morse, Nuala. 2021. *The Museum as a Space of Social Care.* Abingdon, Oxon: Routledge.

Moulier-Boutang, Yann. 2012. *Cognitive Capitalism.* Cambridge, Cambridgeshire: Polity Press.

Mucha, Franziska. 2022. Co-creative events for engagement with digital cultural heritage collections, University of Glasgow. https://theses.gla.ac.uk/82754/. Accessed 12 April 2022.

Nanda, Amrita. 2020. Power Structures in the Data Economy. https://thedataeconomylab.com/2020/10/30/power-structures-in-the-data-economy/. Accessed 25 June 2022.

National Documentation Centre. 2022. National Documentation Centre. https://www.ekt.gr/en. Accessed 10 April 2022.

Nieborg, David B. and Anne Helmond. 2019. The political economy of Facebook's platformization in the mobile ecosystem: Facebook Messenger as a platform instance. *Media, culture and society* 41 (2): 196–218. doi: 10.1177/0163443718818384.

Nieborg, David B. and Thomas Poell. 2018. The platformization of cultural production: Theorizing the contingent cultural commodity. *New Media & Society* 20 (11): 4275–4292. doi: 10.1177/1461444818769694.

Nissenbaum, Helen. 2001. How computer systems embody values. *Computer* 34 (3): 120–119. https://nissenbaum.tech.cornell.edu/papers/embodyvalues.pdf. Accessed 4 June 2020.

Nixon, Brice. 2020. The business of news in the attention economy: Audience labor and MediaNews Group's efforts to capitalize on news consumption. *Journalism* 21 (1): 73–94. doi: 10.1177/1464884917719145.

O'Neill, Rebecca. 2021. Museums and Participatory Culture: Wikimedia and GLAM. In *Museums and the Challenge of Change: Old Institutions in a New World*, ed. Graham Black. London: Routledge.

Olson, Mancur. 2003. *The logic of collective action. Public goods and the theory of groups*, 21st edn. Harvard economic studies, vol. 124. Cambridge, Mass.: Harvard Univ. Press.

Ong, Aihwa and Stephen J. Collier (eds.). 2005. *Global assemblages. Technology, politics and ethics as anthropological problems.* Malden, Mass.: Blackwell.

Open Knowledge Foundation. 2021a. Open Definition: Defining open in open data, open content and open knowledge. http://opendefinition.org/. Accessed 18 July 2021.

Open Knowledge Foundation. 2021b. What is open? https://okfn.org/opendata/. Accessed 10 February 2021.

openGLAM. 2022. What. A space to spark a global conversation. https://openglam.org/what/. Accessed 12 January 2022.

Ostrom, Elinor. 1990. *Governing the Commons. The Evolution of Institutions for Collective Action.* Cambridge: Cambridge University Press.

Ostrom, Vincent and Elinor Ostrom. 1977. Public Goods and Public Choices. In *Alternatives for Delivering Public Services*, ed. E. S. Savas. New York: Routledge.

Pasquale, Frank. 2015. *The Black Box Society.* Cambridge, Massachusetts ; London, England Harvard: University Press.

Patino, Bruno. 2019. *La Civilisation du poisson rouge. Petit traité sur le marché de l'attention.* Paris: Bernard Grasset.

Peng, Ge, Nancy A. Ritchey, Kenneth S. Casey, Edward J. Kearns, Jeffrey L. Prevette, Drew Saunders, Philip Jones, Tom Maycock and Steve Ansari. 2016. Scientific Stewardship in the Open Data and Big Data Era — Roles and Responsibilities of Stewards and Other Major Product Stakeholders. *D-Lib Magazine* 22 (5/6). doi: 10.1045/may2016-peng.

Perry, Sara. 2019. The Enchantment of the Archaeological Record. *European Journal of Archaeology* 22 (3): 354–371. doi: 10.1017/eaa.2019.24.

Piketty, Thomas. 2014. *Capital in the Twenty-First Century.* Cambridge MA: Harvard University Press.

Plantin, Jean-Christophe and Aswin Punathambekar. 2018. Digital media infrastructures: pipes, platforms and politics. *Media, Culture & Society* 41 (2): 163–174. doi: 10.1177/0163443718818376.

Plantin, Jean-Christophe, Carl Lagoze, Paul N. Edwards and Christian Sandvig. 2018. Infrastructure studies meet platform studies in the age of Google and Facebook. *New Media & Society* 20 (1): 293–310. doi: 10.1177/1461444816661553.

Plotkin, David (ed.). 2014a. *Data Stewardship.* Boston: Morgan Kaufmann.

Plotkin, David. 2014b. Understanding the Types of Data Stewardship. In *Data Stewardship*, ed. David Plotkin, 23–35. Boston: Morgan Kaufmann.

Poderi, Giacomo. 2019. Sustaining platforms as commons: perspectives on participation, infrastructure and governance. *CoDesign* 15 (3): 243–255. doi: 10.1080/15710882.2019.1631351.

Poell, Thomas, David Nieborg and José van Dijck. 2019. Platformisation. *Internet Policy Review* 8 (4). doi: 10.14763/2019.4.1425.

Pollock, Rufus. 2018. *The open revolution.* London: A/E/T Press.

Proctor, Nancy. 2010. Digital: Museum as Platform, Curator as Champion, in the Age of Social Media. *Curator: The Museum Journal* 53 (1): 35–43. doi: 10.1111/j.2151-6952.2009.00006.x.

Riedler, Martina. 2017. The Role of Museums in Creating Social Change through Community Collaborations. In *Art & Design Education in Times of Change: Conversations Across Cultures*, ed. Ruth Mateus-Berr and Luise Reitstätter, 63–68. Berlin: De Gruyter.

Roberts, Huw, Josh Cowls, Federico Casolari, Jessica Morley, Mariarosaria Taddeo and Luciano Floridi. 2021. Safeguarding European values with digital sovereignty: an analysis of statements and policies. *Internet Policy Rev* 10 (3). doi: 10.14763/2021.3.1575.

Sandell, Richard. 2002a. Museums and the combating of social inequality: roles, responsibilities, resistance. In *Museums, Society, Inequality*, ed. Richard Sandell. New York: Routledge.

Sanderhoff, Merete. 2013. Open Images. Risk or opportunity for art collections in the digital age? *The Journal Nordic Museology* 2. doi: 10.5617/nm.3083.

Sanderhoff, Merete. 2014. This belongs to you: On openness and sharing at Statens Museum for Kunst. In *Sharing is caring: Openness and sharing in the cultural heritage sector Editor*, ed. Merete Sanderhoff. Copenhagen: Statens Museum for Kunst.

Sanders, Elizabeth B.-N. and Pieter Jan Stappers. 2008. Co-creation and the new landscapes of design. *CoDesign* 4 (1): 5–18. doi: 10.1080/15710880701875068.

Sandler, Todd. 2015. Collective action: fifty years later. *Public Choice* 164 (3-4): 195–216. doi: 10.1007/s11127-015-0252-0.

Scharf, Nicholas. 2017. Creative Commons-ense? An analysis of tensions between copyright law and Creative Commons. *Journal of Intellectual Property Law & Practice* 12 (5): 376–383. doi: 10.1093/jiplp/jpx023.

Scharmer, Otto and Katrin Kaufer. 2014. Transforming Capitalism and Self: From Ego-system to Eco-system Economies. In *From Capitalistic to Humanistic Business*, ed. Michael Pirson, Ulrich Steinvorth, Carlos Largacha-Martinez and Claus Dierksmeier, 190–205. London: Palgrave Macmillan UK.

Schneider, Ingrid. 2020. Democratic Governance of Digital Platforms and Artificial Intelligence?: Exploring Governance Models of China, the US, the EU and Mexico. *eJournal of eDemocracy and Open Government (JeDEM)* 12. doi: 10.29379/jedem.v12i1.604.

Scholz, Trebor. 2016. *Platform Cooperativism: Challenging the Corporate Sharing Economy*. New York City: Rosa Luxemburg Stiftung.

Schwab, Klaus. 2016. The Fourth Industrial Revolution: what it means, how to respond. https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/. Accessed 20 October 2021.

Seravalli, Anna. 2012. Infrastructuring for opening production, from participatory design to participatory making?: ACM. http://dl.acm.org/ft_gateway.cfm?id=2348161&type=pdf. doi: 10.1145/2348144.2348161.

Sharing is Caring. 2021. Sharing is Caring 2021. http://sharecare.nu/. Accessed 6 July 2022.

Simon, Herbert Alexander. 1969. *The Sciences of the Artificial*. Cambridge, MA: MIT Press.

Simon, Herbert Alexander. 1971. Designing organizations for an information-rich world. In *Computers, communications and the public interest*, ed. M. Greenberger. Johns Hopkins Press: Baltimore.

Simon, Nina. 2010. *The participatory museum.* Santa Cruz, California: Museum 2.0.

Simon, Nina. 2016. *The art of relevance.* Santa Cruz (California): Museum 2.0.

Smith, Laurajane. 2006. *Uses of heritage.* London and New York: Routledge, Taylor.

Smithsonian Institution. 2021. Smithsonian Open Access. https://www.si.edu/OpenAccess. Accessed 16 December 2021.

Smithsonian Institution. 2022. Because of Her Story. https://womenshistory.si.edu/about. Accessed 8 February 2022.

Srnicek, Nick. 2017. *Platform capitalism*. Theory redux. Cambridge, UK, Malden, MA: Polity.

Stapleton, Larry, O'Neill Brenda and McInerney Patrick (eds.). 2020. *Intelligent control and automation systems: Mike Cooley's Vision of Socially Responsible, Human-Centred Technology.* 21st IFAC World Congress, Berlin, Germany, July 12-17. Pre-print.

Star, Susan Leigh. 1999. The Ethnography of Infrastructure. *American Behavioral Scientist* 43 (3): 377–391. doi: 10.1177/00027649921955326.

Star, Susan Leigh and Anselm Strauss. 1999. Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work. *Computer Supported Cooperative Work (CSCW)* 8 (1): 9–30. doi: 10.1023/A:1008651105359.

Stark, David. 2009. *The Sense of Dissonance. Accounts of Worth in Economic Life*. Princeton and Oxford: Princeton University Press.

Strathern, Marilyn. 2007. The Tyranny of Transparency. In *The Anthropology of Organisations*, pp. 309–21, ed. Alberto Jiménez Corsín. London: Routledge.

Strauss, Anselm and Juliet M. Corbin. 1990. *Basics of qualitative research: Grounded theory procedures and techniques*. Basics of qualitative research: Grounded theory procedures and techniques. Thousand Oaks, CA : Sage Publications Ltd.

Taffel, Sy. 2019. *Digital media ecologies. Entanglements of content, code and hardware / Sy Taffel.* New York, NY: Bloomsbury Publishing.

Tan, Leon. 2013. Museums and cultural memory in an age of networks. *International Journal of Cultural Studies* 16 (4): 383–399. doi: 10.1177/1367877912460615.

Tanner, Simon. 2016. Open GLAM: The Rewards (and Some Risks) of Digital Sharing for the Public Good. In *Display at your own risk: an experimental exhibition of digital cultural heritage*, ed. Andrea Wallace and R. Deazley. https://displayatyourownrisk.org/tanner/. Accessed 7 August 2021.

Targetti, Ferdinando. 1992. *Nicholas Kaldor: The Economics and Politics of Capitalism as a Dynamic System.* Oxford and New York: Clarendon Press.

Terras, Melissa. 2015a. Opening Access to collections: the making and using of open digitised cultural content. *Online Information Review* 39 (5): 733–752. doi: 10.1108/OIR-06-2015-0193.

Terras, Melissa. 2015b. So you want to reuse digital heritage content in a creative context? Good luck with that. *Art Libraries Journal* 40 (4): 33–37. doi: 10.1017/S0307472200020502.

Thanem, Torkild and David Knights. 2019. Embodied Immersion and Ethnographic Fieldwork. In *Embodied Research Methods*, ed. Torkild Thanem and David Knights, pp. 54–77. London: SAGE Publications Ltd.

The New organs. 2021. The New organs. https://neworgans.net/. Accessed 10 January 2021.

Tzouganatou, Angeliki 2021. On Complexity of GLAMs' Digital Ecosystem: APIs as Change Makers for Opening up Knowledge. In: Rauterberg, M. (eds) Culture and Computing. Design Thinking and Cultural Computing. HCII 2021. Lecture Notes in Computer Science, vol 12795. Springer, Cham. https://doi.org/10.1007/978-3-030-77431-8_22.

Tzouganatou, Angeliki. 2022. Openness and privacy in born-digital archives: reflecting the role of AI development. *AI & SOCIETY*. doi: 10.1007/s00146-021-01361-3.

Tzouganatou, Angeliki and Jennifer Krueckeberg. 2021. From monopolizing memory to co-creating it: openness and equity in the digital ecosystem. *AoIR Selected Papers of Internet Research* 2021. doi: 10.5210/spir.v2021i0.12255.

United Nations Development Programme. 2022. What are the Sustainable Development Goals? https://www.undp.org/sustainable-development-goals. Accessed May 2022.

Valeonti, Foteini, Melissa Terras and Andrew Hudson-Smith. 2020. How open is OpenGLAM? Identifying barriers to commercial and non-commercial reuse of digitised art images. *Journal of Documentation* 76 (1): 1–26. doi: 10.1108/JD-06-2019-0109.

van Dijck, Jose. 2013. *The Culture of Connectivity.* Oxford: Oxford University Press.

van Dijck, Jose, Thomas Poell and Martijn de Waal. 2018a. *The Platform Society: Public Values in a Connective World*. New York: Oxford University Press.

van Dijck, José. 2007. *Mediated memories in the digital age*. Cultural memory in the present. Stanford, Calif.: Stanford University Press.

van Dijck, José. 2020a. Governing digital societies: Private platforms, public values. *Computer Law & Security Review* 36: 105377. doi: 10.1016/j.clsr.2019.105377.

van Dijck, José. 2020b. Seeing the forest for the trees: Visualizing platformization and its governance. *New Media & Society*: 146144482094029. doi: 10.1177/1461444820940293.

van Dijck, José and David Nieborg. 2009. Wikinomics and its discontents: a critical analysis of Web 2.0 business manifestos. *New Media & Society* 11 (5): 855–874. doi: 10.1177/1461444809105356.

van Dijck, José, Thomas Poell and Martijn de Waal. 2018b. The Platform Society. Oxford Scholarship Online: Oxford University Press. doi: 10.1093/oso/9780190889760.001.0001.

Wallace Andrea and Ellen Euler. 2020. Revisiting Access to Cultural Heritage in the Public Domain: EU and International Developments. *SSRN Electronic Journal.* doi: 10.2139/ssrn.3575772.

Wilkinson, Mark D., Michel Dumontier, I. Jsbrand Jan Aalbersberg, Gabrielle Appleton, Myles Axton, Arie Baak, Niklas Blomberg, Jan-Willem Boiten, Luiz Bonino da Silva Santos, Philip E. Bourne, Jildau Bouwman, Anthony J. Brookes, Tim Clark, Mercè Crosas, Ingrid Dillo, Olivier Dumon, Scott Edmunds, Chris T. Evelo, Richard Finkers, Alejandra Gonzalez-Beltran, Alasdair J. G. Gray, Paul Groth, Carole Goble, Jeffrey S. Grethe, Jaap Heringa, Peter A. C. ‘t Hoen, Rob Hooft, Tobias Kuhn, Ruben Kok, Joost Kok, Scott J. Lusher, Maryann E. Martone, Albert Mons, Abel L. Packer, Bengt Persson, Philippe Rocca-Serra, Marco Roos, Rene van Schaik, Susanna-Assunta Sansone, Erik Schultes, Thierry Sengstag, Ted Slater, George Strawn, Morris A. Swertz, Mark Thompson, Johan van der Lei, Erik van Mulligen, Jan Velterop andra Waagmeester, Peter Wittenburg, Katherine Wolstencroft, Jun Zhao and Barend Mons. 2016. The FAIR Guiding Principles for scientific data management and stewardship. *Scientific data* 3: 160018. doi: 10.1038/sdata.2016.18.

WIPO. 2022a. Copyright: What is copyright? https://www.wipo.int/copyright/en/. Accessed 10 February 2022.

WIPO. 2022b. What is Intellectual Property? https://www.wipo.int/about-ip/en/. Accessed 10 February 2022.

Ziewitz, Malte. 2016. Governing Algorithms: Myth, Mess and Methods. *Science, Technology, & Human Values* 41 (1): 3–16. doi: 10.1177/0162243915608948.

Zuboff, Shoshana. 2015. Big other: Surveillance Capitalism and the Prospects of an Information Civilization. *Journal of Information Technology* 30 (1): 75–89. doi: 10.1057/jit.2015.5.

Zuboff, Shoshana. 2019. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. New York: Public Affairs.

Appendices

Appendix A: summary of research results

A.1. Kurzfassung der Ergebnisse

Diese Dissertation untersucht die Beteiligungsdiskrepanz innerhalb kultureller Wissensproduktion in Bezug auf die Dominanz großer kommerzieller Plattformen. Sie untersucht Richtlinien, Motivationen, sozio-technische Arrangements sowie die Rolle der digitalen Wirtschaft - Themen, die in der Vergangenheit im Bereich des digitalen Erbes oft übersehen wurden. Die Dissertation zeigt neue Praktiken auf, die angewandt werden könnten, um die zunehmende Monopolisierung des Wissens durch große kommerzielle Plattformen abzuwenden. Sie umfasst Praktiken, die auf Offenheit und Fairness beruhen und die Menschen ermutigen und fördern um sich aktiv an der Koproduktion von Wissen im Internet zu beteiligen.

Die Ergebnisse dieser Studie heben ein Kontrollproblem hervor, welches durch die Praktiken der digitalen Öffnung von Kulturdaten und Einrichtungen des Kulturerbes entsteht. Die Forschungsergebnisse zeigen, dass Institutionen des kulturellen Erbes zögern, kulturelle Daten online zugänglich zu machen, weil sie befürchten, die Kontrolle über kulturelle Daten zu verlieren. Diese Zurückhaltung hängt mit der hierarchischen Struktur dieser Institutionen zusammen. Die Studie zeigt, dass Offenheit nicht mit hierarchischen und monolithischen Infrastrukturen vereinbar ist. Sie zeigt außerdem, dass Digitalisierungsstrategien und die Bewegung für offenes Wissen eine Schlüsselrolle dabei gespielt haben, Museen dazu zu bewegen, ihre Perspektive von der "absoluten Autorität" zu ändern und dezentralisierte Praktiken in Bezug auf die Kontrolle kultureller Daten einzuführen. Darüber hinaus hat meine Forschung gezeigt, dass der Begriff des offenen Zugangs als begrenzt angesehen wird, während es bei der Öffnung von Wissen nicht nur darum geht, Zugang zu gewähren, sondern dass dieser (offene) Zugang selbst ein Teil des Prozesses ist. Es wurde deutlich, dass der entscheidende Punkt für die Offenheit darin besteht, dass die digitalen Bestände für und durch die Öffentlichkeit zugänglich und (wieder-)nutzbar sind.

Wiederum machen die Forschungsergebnisse deutlich, dass die Praktiken großer kommerzieller Plattformen die sinnvolle Beteiligung von Menschen am Prozess der Wissensproduktion durch Undurchsichtigkeit, z. B. durch unverständliche Algorithmen oder durch die Umsetzung wettbewerbsfeindlicher Strategien, die andere Initiativen daran hindern zu gedeihen, behindern. Darüber hinaus stellen die Ergebnisse andere Arten von (Daten-)Logiken in den Vordergrund, die auf dezentralisierte Formen der Verwaltung und dem Austausch von Wissen beruhen, um sich das volle Potenzial der Offenheit zu erschließen. Praktiken digitaler Datensouveränität wurden als Bestandteile eines fairen und offenen digitalen Ökosystems betont. Es wurde auch gezeigt, dass das *de facto* Dateneigentum möglicherweise kein nützliches Konzept für die Ausweitung der (Wieder-)Verwendung oder die der Datenrechte ist und es wurde herausgestellt, dass ein Vermittler hilfreich wäre, um die

Verwendung und Qualität von Daten zu erweitern um Machtverhältnisse umzuverteilen. Ein weiteres Ergebnis dieser Studie zeigte, dass die verschiedenen Ebenen der Offenheit oder Schließung, die erforderlich sind, um den unterschiedlichen und vielseitigen Bedürfnissen von Kulturgütern und den dahinterstehenden Menschen gerecht zu werden, derzeit von größter Bedeutung sind. Es zeigte sich also, dass Offenheit kontext- und situationsabhängig ist und in Bezug zu der vorangegangenen Geschlossenheit steht, daher ist es möglich verschiedene Ebenen der Offenheit einzurichten.

Da Offenheit untrennbar mit dem Aspekt der (Wieder-)Verwendung verbunden ist, schlage ich ein Knowledge-Stewardship-Modell vor, das auf zwei Arten verwendet werden kann, a) innerhalb eines partizipativen Stewardship-Rahmens und b) innerhalb eines kollektiven Ansatzes zur Wissensstewardship. Beide Prototypen fördern die Beteiligung an der kulturellen Wissensproduktion durch offene Praktiken, indem sie die Nutzer*innen zur „guten" (Wieder-)Verwendung von Daten befähigen. Außerdem unterstützen sie es Daten außerhalb des Modells der Kommerzialisierung von Daten zu betrachten, welches sich in der aktuellen digitalen Wirtschaft durchgesetzt hat. Der erste Prototyp schlägt Wissensverwalter*innen als potenzielle Vermittler*innen und Moderator*innen zwischen den Institutionen kulturellen Erbes und den Nutzer*innen vor. Der zweite Prototyp empfiehlt die Anwendung eines Wissensverwaltungsrahmens innerhalb kollektiver Organisationen in der Form einer Kooperative vor. Außerdem wird vorgeschlagen ein neuentstehendes verteiltes sozioökonomisches Modell zu implementieren, um die verschleiernden Praktiken groß angelegter kommerzieller Plattformen zu bekämpfen.

A.2. Summary of research results

This dissertation investigates the participation gap in cultural knowledge production in the context of the domination of large-scale commercial platforms. It studies policies, motivations, sociotechnical arrangements, as well as the role of the digital economy, issues that have often been overlooked in the digital heritage domain in the past. The dissertation highlights that new practices could be adopted to diverge from the increasing monopolisation of knowledge by large-scale commercial platforms. It embraces practices towards openness and fairness that could encourage and foster people to be active in the co-production of knowledge online.

The findings of this study foreground an issue of control that is emerging through practices of opening up cultural data online and CHIs. The findings of the research reveal a hesitancy of CHIs in opening up cultural data online, due to the risks associated by losing control over cultural data. This hesitancy is linked to the hierarchical structure of CHIs. The study demonstrates that openness is not compatible with hierarchical and monolithic infrastructures. It shows that digitisation strategies and open knowledge movement have played a key role in nudging museums to shift their perspective from "absolute authority", to embrace decentralised practices towards the control over cultural data. Moreover, through my research it has been evident that the term open access has been regarded as limited, while opening

up knowledge, is not merely to provide access, but that (open) access is precisely one part of the process. It was evident that the crucial part for openness is that the digital assets can be accessible and (re)usable for and by the public.

The research findings make evident that large-scale commercial platforms practices impede the meaningful participation of users in being active in the process of knowledge production due to opacity e.g. intelligible algorithms or by implementing anti-competitive strategies that are hindering other initiatives to flourish. Moreover, the findings forefront other kinds of (data) logic, which dictate decentralised modes of managing and sharing knowledge, that could tap into the potential of openness. Digital and data sovereignty practices have been accentuated for a fair open digital ecosystem. It was demonstrated that the de facto data ownership might not be a useful concept in amplifying the (re)uses or rights of data and underlined that an intermediary would be helpful to amplify the (re)uses and quality of data, as well as distributing the power. Also, another finding shed light on realising the different levels of openness, or closure that is required to accommodate the different and versatile needs of cultural assets and their people behind it, is most pertinent currently. Therefore, it demonstrated that openness is contextual and situational to what is not open and that different levels of openness can be put in place.

As openness in inextricably linked to the (re)use aspect, I propose a knowledge stewardship model, which can be used in two ways, a) within a participatory stewardship framework and b) within a collective approach to knowledge stewardship. Both frameworks encourage participation in cultural knowledge production through open practices, by empowering users to make (good) (re)use of the data, as well as aid in treating data beyond the current data commodification model that has been prevailed in the current digital economy. The first prototype suggests KS as potential mediators and facilitators between the CHI and the user. The second prototype proposes a stewardship framework for collective organisation, in a form of a co-operative and puts forward an emerging distributed socioeconomic model to tackle the obfuscate practices of large-scale commercial platforms.

Appendix B: list of earlier publications resulting from this dissertation

Ideas presented in the section 4.2.2 and 5.2.4 were further developed in the following publication:
Tzouganatou, Angeliki. 2021. On Complexity of GLAMs' Digital Ecosystem: APIs as Change Makers for Opening up Knowledge. In: Rauterberg, M. (eds) Culture and Computing. Design Thinking and Cultural Computing. HCII 2021. Lecture Notes in Computer Science, vol 12795. Springer, Cham. https://doi.org/10.1007/978-3-030-77431-8_22

The following conference publication references some of the main issues surrounding the impact of large-scale commercial platforms in the digital ecosystem as derived through my research:
Tzouganatou, Angeliki and Krueckeberg, Jennifer. 2021. From monopolizing memory to co-creating it: openness and equity in the digital ecosystem. AoIR Selected Papers of Internet Research 2021. doi: 10.5210/spir.v2021i0.12255.

Ideas presented in the section 7.2.3 where further developed in the following publication:
Tzouganatou, Angeliki. 2022. Openness and privacy in born-digital archives: reflecting the role of AI development. AI & SOCIETY. doi: 10.1007/s00146-021-01361-3.

Appendix C: consent forms and information sheets

C.1. Information sheet for participants

Who is doing the research?

The research is being conducted by Angeliki Tzouganatou, a PhD fellow of the POEM (Participatory Memory Practices, https://www.poem-horizon.eu/) network, who she is based at the University of Hamburg, at the Institute of European Ethnology/Cultural Anthropology. Her research is focusing on the conditions of the openness of cultural data and the emergence of new business and social models that will be sustainable and open compatible.

How will I be asked to contribute to the research?

You will be asked to participate in the following activity aimed at collecting data:

- Interviews that I will conduct with you in person or online.

Data from these activities will be recorded online, on paper, by audio recording, by video recording, by photography and/or by screen capture. Your permission for this will be asked before data collection begins through the signing of the project´s consent form.

Your participation will be voluntary and no compensation, economic or of any other sort, will be provided.

Will my participation be confidential?

All information, collected for the purposes of this research, will be kept confidential and will only be used for the purpose of this research.

What will happen to my data?

The data will be recorded and, transcribed for use in my PhD thesis. In addition, it may be included in POEM's project outputs, including POEM's scientific publications, reports, conferences and project's forms of media, as its website. This will include making the data available to other researchers within the POEM network, via a secure online server provided by the University of Hamburg. Complete datasets will be archived and made public in the online server Zenodo, at the end of the project in October 2021.

Under the General Data Protection Regulation (GDPR), you have the right at any time to have general access to your data, a right to rectification, erasure, restriction, or portability and a right to withdrawal by contacting me (see contact details below).

Can I withdraw from the project?

You can choose to withdraw from the research at any point without any consequence by contacting the researcher (see contact details below), even after your data have been collected. Your participation is optional.

Responsible for the analysis and storage of the data is Angeliki Tzouganatou, based at the Institute of European Ethnology/Cultural Anthropology of the University of Hamburg. Should you have any questions or concerns, please contact the researcher via the email; angeliki.tzouganatou@uni-hamburg.de.

C.2. Consent form for participants

I am aware of the nature, significance and scope of the planned research "Internet ecologies of open knowledge as future memory modalities". I have read and understood the project Information Sheet and have had the opportunity to ask questions about the research. I agree to take part in the research project and for data collected by the researcher and be used for the project's scientific purposes and publicity.

I understand my participation is voluntary and I can withdraw my consent at any time without giving reasons and without the incurrence of any disadvantages for me. For the processing of the provided data, I can also revoke my consent at any time without giving reasons. I am aware that I can no longer withdraw my consent after completion of the study, which means the obtained data from the study can no longer be destroyed.

I give consent for my data (including photos, video or other visual records) to be used in research, presentations, publications and other media and publicity arising from POEM, both print and online.

I grant permission to the researcher to collect the data by

☐ audio recording,

☐ video recording,

☐ photography,

☐ by screenshot,

With regards to being quoted (please mark **only one** as appropriate):

☐ I give consent for my answers to be cited directly in the project´s outcomes. I understand that my identity will be disclosed.

☐ I give consent for my answers to be cited indirectly, in aggregate or anonymous statements.

☐ I don´t give consent to the researcher to use any direct or indirect quotations from my interview.

I grant permission to the researcher to use the data collected in

☐PhD thesis, scientific publications, conferences

☐Dissemination of POEM outputs, including project´s forms of media (e.g. its website)

I understand that my data will be retained and made available to other researchers in a secure online server provided by the University of Hamburg.

I understand that complete datasets will be archived and made public in the secure online server Zenodo, for use in future academic research and publicity at the end of the project, in October 2021.

_____ _____

Name of the participant (in block letters) Signature of the participant

Date:

I believe the interviewee is giving informed consent to participate in this study

_____ _____

Name of the researcher (in block letters) Signature of the researcher

Responsible for the analysis and storage of the data is Angeliki Tzouganatou, based at the Institute of European Ethnology/Cultural Anthropology of the University of Hamburg. Should you have any questions or concerns, please contact the researcher via the email; angeliki.tzouganatou@uni-hamburg.de.