CROSS-SECTORAL COLLABORATIONS IN CULTURAL HERITAGE: BRIDGING THE TECHNOLOGICAL KNOWLEDGE GAP

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Abstract

The rapid growth and development of technology have changed the way in which museums and heritage institutions operate in this day and age. While the roles of preserving cultural heritage and conveying the stories of the objects in their possession have remained the same, the institutions now find themselves appealing to a different audience to what they were used to in the past. Digital innovations have brought new ways of presenting heritage through smartphones, smart apps, and other smart solutions.

In order to remain relevant and attractive for the new potential visitors, cultural institutions have turned to the world of immersive technologies, known as virtual, augmented and mixed reality (VR, AR, and MR). However, due to the infancy and specific characteristics of these technologies, and also lack technological knowledge, museums had to seek expertise and assistance outside their walls.

This study aims to show how Dutch museums and heritage institutions have tackled the issue of remaining relevant in a digitized world and attempted to bridge the gap between age-old heritage and state-of-the-art tech. Through ten in-depth interviews with officials from Dutch heritage institutions and representatives from the creative industries, this research argues that the implementation of immersive technologies in heritage is a result of cross-sector collaboration. Furthermore, it identifies key stakeholders, various types of collaboration and the advantages and disadvantages of them for the different parties involved.

Finally, this study researches the fairly unexplored area in the academic literature and therefore makes the case for further research to be conducted on the overlap of heritage institutions, creative industries and cutting-edge technology.

Keywords: Virtual reality, Augmented Reality, Heritage, Museums, Cross-sector collaboration, Creative Industries

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1. INTORDUCTION

In today's digitalized world, no cultural heritage institution is immune to the disruption caused by technological innovation. Human culture keeps evolving and changing, and in order to preserve the memories and culture, we have to ensure the legacy for future generations. Cultural heritage institutions and organizations have been aware of this for decades. However, due to continuous changes and technological advancements in the world these classical institutions were forced to reinvent and adapt to the current trends, in order to keep in step with time. The advances in digital technologies forced cultural heritage sites to look for new ways to attract visitors and provide public learning through new technologies.

Silverstone (1992) said that museums are in various ways similar to the contemporary media. They are here to entertain, inform, tell stories and construct arguments. They are trying to make the inaccessible accessible (Silverstone, 1992). That is the reason why cultural heritage shifted from a focus on individual objects to one on narratives, practices, representations, systems of knowledge, and broader socio-cultural contexts (Kalay, Kvan & Affleck, 2007). In the last years, different cultural heritage institutions, archives and museums, have been working on digitizing important cultural heritage collections and developing digital services (de Niet, Verwayen & van Kersen, 2009). The digital age has changed people's perceptions and turned innovation into a non-alien concept, blurring the boundaries between disciplines, which resulted in cultural heritage being more open to new ideas (Cho, 2015).

"While a trip to the museum might have sounded like a bore many years ago, today's museums are turning into interactive environments that encourage engagement with the material and bring history to life" (How Virtual Reality is Being Used in Museums, 2016). Nowadays, where many forms of entertainment are accessible with just a click, cultural heritage institutions have to constantly compete for visitors' attention. But on the other hand, the digital era has also created an array of opportunities for cultural heritage institutions to develop better experiences, new forms of exhibitions, communications, education and learning. The paradigm shift, driven by new media technologies, changed the way history and culture are presented, interpreted and accessed. New media technologies such as high-quality visual stimulations, gaming, 3-D interactives, holographs and simulations have changed the ways of presenting and understanding modern and ancient cultures (Stogner, 2009). The fact

that new technologies can enhance cultural heritage exhibitions is no longer a question. What remains a question now is how can they be used in order to provide a more entertaining experience for the visitor?

In fact, more and more cultural heritage institutions are taking up this challenge and embracing new forms of communication, storytelling, and engagement. They are embracing and implementing new technologies such as VR (Virtual Reality), AR (Augmented Reality) and MR (Mixed Reality) and trying to increase their digital proficiency. For example, last February, Media Monks a global creative production partner that has its headquarters in The Netherlands, joined forces with the World Wildlife Fund, Lenovo, the ArtScience Museum in Singapore and Google Zoo, to launch a large-scale mixed reality experience called "Into The Wild". The goal of this project was to present the devastating effects that deforestation has on nature and present the world's most endangered species and their habitats to the visitors (Bokhorst, 2017). Last year, artist Mat Collinshaw used Virtual reality technology to restage the world's first big exhibition of photography. He created Thresholds - a touring exhibition, which takes the visitor back in time to 1839, when British photography pioneer, William Henry Fox Talbot first publicly showed his photographs at King Edward's School in Birmingham. The equipment used for this exhibition was provided by HTC Vive, which made Thresholds the first UK museum-style exhibition to work with this kind of technology. Since then, another two exhibitions launched in the UK using the same equipment. One of them is The Modigliani exhibition currently on display at Tate Modern which uses HTC Vive to reimagine Modigliani's final Parisian studio. Some examples from the USA are Seattle's Center of Contemporary Art, where they worked in collaboration with 18 artists on an AR-enhanced art volume entitled "Pop-up (AR)t. This exhibition allows users to experience three-dimensional artwork coming to life on each page of the book (Kohles, 2017). Moreover, in the Smithsonian's oldest museum hall visitors can use an app to overlay skin and movements onto the bones of the displayed skeletons (Billock, 2017). Last but not least, these new technologies were also used to create new forms of experiential artwork. An example of this is the collaboration between HTC VIVE and the Royal Academy of Arts (the RA) (Vive, 2018).

As evident from the examples mentioned above, cultural heritage sites are trying to reach the constantly changing customer demographics and make cultural heritage more appealing and interactive. They are challenged to meet the demands of the not-easily amused visitors and put the primary commitment to education in secondary position (Tien, 2006). Even though some of these technological implementations are still in the experimental mode,

they continue to gain importance as they are making the role of cultural heritage in digital society more interesting and engaging (de Niet et al., 2009). Museums and heritage sites are nowadays in competition with every form of entertainment - for example, mobile games and thousands of news outlets that offer information at the tap of a finger (Murphy, 2015). "In this climate, collaboration has become an important element in most museums' management and marketing plans" (Tien, 2006, p. 2). Often this means that cultural heritage institutions have to make connections between different areas of digital expertise. The consequence of these changes results in the need for an increased level of expertise when it comes to technology, especially within the walls of cultural heritage institutions. Collaboration with technology experts has therefore become of great importance. As a matter of fact, very few cultural institutions have sufficient finances to employ an internal team designated and responsible for new technological development or perhaps VR and AR technologies. The need to bring technology into cultural institutions as an engagement tool has led to the establishment of new partnerships with service-providers and technology developers who are combining their passion for culture, technical and entrepreneurial skills to bridge a gap between the ever-evolving technologies and cultural heritage institutions (Murphy, 2018). As De Niet, Verwayen and van Kersen (2009) said that collaborations are becoming of indispensable importance for cultural heritage institutions, whether with other heritage organizations, different businesses, user groups, external companies or government. Even though the importance of these collaborations is growing steadily, cultural heritage studies are not paying a lot of attention to them specifically, they are more interested in understanding visitors' behavior. That is why the aim of this study is to explore and discuss this rather new phenomenon in order to provide an insight and stress the importance of knowledge sharing among different industries. The main goal of my thesis was to discover how different parties collaborate in the process of developing new technologies for cultural heritage and how these collaborations bring results and provide added value to the visitors' experience. Furthermore, I would also like to discover if there are any practical problems, such as high development and maintenance costs and limitations. In order to investigate this specific topic, I formed two research questions that are split in order to provide in-depth research and present different aspects of this topic.

RQ 1a: *Who are the different stakeholders involved in collaboration projects?*

RQ 1b: *What are their motives and interests when collaborating in the integration of VR and AR technologies in cultural heritage sites?*

RQ 1c: *How can this knowledge be implemented into improving future technological collaborations within cultural institutions?*

RQ 2a: *How are cross-sectoral collaborations set up?*
RQ 2b*: What are the different types of collaborations used in cultural heritage and how do they differ?*
RQ 2c*: What are the advantages and disadvantages for different stakeholders involved in those various collaborations?*

2. THEORETICAL FRAMEWORK

The theoretical framework of the thesis is split into two parts in order to address the two specific topics under analysis. In the first part, I discuss the digitization of heritage institutions, the creation of new space through new technologies and explain the taxonomy. The second part focuses on theoretical framework surrounding business collaboration, the creative industries and the collaborations with creative industries. Through this second part I look at business literature on firms and collaboration, to understand how cooperation can be beneficial for cultural heritage institutions.

2.1. Digitization of heritage institutions

Heritage institutions such as museums, archives, libraries represent the biggest storage of cultural, historical and research content. Usually, they are non-profit organizations with the purpose of preserving the heritage and educating (Borowiecki & Navarrete, 2017). They collect and preserve objects for the public to come and observe (Vermeeren, Calvi, Sabiescu & Stuedahl, 2018). In the earlier days the objects were exposed to the public with the sole purpose of showcasing them to the public, but not to tell or discover stories behind them. However, through the years heritage institutions changed their way of preserving and educating. A more visitor-oriented approach emerged, where the focus was more on the message rather than just on the objects. Storytelling and visitors' personal involvement in the learning process became more important than just preservation (Asghar & Nauman, 2010; Bedford, 2001). This switch, accompanied by technological developments, stimulated new adaptations. A clear example of this occurred in 1980 with the introduction of electronic media into museum exhibitions through music, video, lighting. Science and technology museums were the early adopters and they used this kind of new technology to inform visitors about the exhibits and to boost the attendance (Widmann, 2016). For example, The German Museum of Technology was one of the pioneers of interactive displays (Kernbach, 2016 as cited in Widmann, 2016). Another important technological feature introduced to heritage institutions were the audio guides (Christensen, 2011). Audio guides functioned as tools which provided additional information about the exhibited objects and they also represent an early introduction of storytelling into heritage.

The emergence of the World Wide Web forced heritage to rethink the ways in which it reaches its audience. With the capability to offer online experiences they started developing websites, online experiences, they digitized entire collections or offered online catalogs and other additional features (Laws, 2015; Widmann, 2016). Furthermore, the introduction of portable electronic devices and other interactive media signified an important step into implementing new technologies in heritage. For example, at the Victoria & Albert Museum in the UK, they used touchscreens to offer the visitors access to publications that were rare to find and instead of looking at the real book they could skim through it on a screen (Christensen, 2011). Moreover, one of the most common reactions to the popularization of smartphones and tablets was the development of various mobile applications which provided the visitor with additional information or served as personalized or unique experiences (Widmann, 2016). A good example is the *My Visit to Louvre* app which offers its users a 3D map of the entire museum to help them walk through it, find specific artwork, detailed and additional information and audio commentaries (Louvre, n.d). The rapid expansion and accessibility of new technological developments increased and improved access to heritage and allowed for it to be shared regardless of its location. Lately, museums and other heritage institutions started experimenting with Virtual Reality, Augmented Reality, 3D printing, holograms and sensory immersive experiences. Once again science and technological museums detected the usefulness of these technologies much earlier than other cultural institutions since they are strongly focused on edutainment (entertainment with an educational purpose) and providing a hands-on experience. On the other hand, traditional museums and heritage institutions seem to be less open to new technologies (Carrozzino & Bergamasco, 2010). However, even the more traditional heritage institutions are becoming more experimental. A great example of this is the recent exhibition that was located in The National Museum of Antiquities in Leiden, the Netherlands, where they tried to bring back to life the ancient town of Nineveh. In addition to life-sized computer animations of the ancient city, the exhibition displayed reliefs in 3D techniques and for one day they offered the possibility to experience it in VR.

In conclusion, it can be argued that all the aforementioned trends influenced the transformation that brought heritage institutions to a more user-centered technological direction, which gives priority to experience before education. Furthermore, the desire to involve the visitor more and more gave space to more creative experiments with technology (Vermeeren et al, 2018). However, even though more and more museums are trying to experiment with new technologies, they have rarely been seen as leading innovators

(Widmann, 2016). In fact, many heritage institutions are still staying close to the tradition with slow adaptation. Most technologies are still focused on presenting the information in a digital way through different multimedia channels, rather than making it interactive (Asghar & Nauman, 2010; Carrozzino & Bergamasco, 2010).

2.2. The creation of a new space: Virtual Reality Augmented Reality and Mixed Reality

Due to exponential growth and technological developments, cultural heritage institutions continue to transform and adapt their core function to new technological inventions. In fact, not so long ago the visitors could only get additional information through printed boards. But since the invention of the World Wide Web, cultural heritage institutions have been investigating new ways of documentation, storytelling and implementation of new media technologies (Damala, Cubaud, Bationo, Houlier & Marchal, 2008). The move towards digital already brought significant changes to the way cultural heritage institutions source and display their content. New tools such as tablets, mobile phones and social media have already been integrated in a great number of cultural heritage institutions (Sedgwick, Luebkeman & Hargrave et al., 2013). But with the advent of immersive technologies lines have been blurred between physical places and the materials that represent the core of cultural heritage institutions. Modern cultural heritage exhibitions are slowly transitioning from static passive presentations of exposed objects to interactive, dynamic and immersive experiences. Technologies such as AR and VR have only recently gained in popularity, due to the fact that previously much of the focus was given to the revolutionizing features offered by immersive technologies, rather than exploring how to use them on a daily basis. Therefore, in order to provide a better understanding of the technological terms used in this research, this section will present a brief overview and explanation of the tools that represent the main focus of my research and are currently in use in cultural heritage exhibitions.

2.3. Virtual Reality

Virtual Reality (VR) is a simulation of a real or imaginary environment generated in 3D by digital technologies which is experienced visually and provides the illusion of reality (Styliani, Fotis, Kostas & Petros, 2009). VR technology has the ability to stimulate different senses depending on the usage. For example, in medicine, the use of VR has to be focused on

quality tactile feedback, while in heritage it can be focused on the visual and auditory aspects. It can be used for education and for entertainment, but the most popular field of use for VR continues to be gaming.

As explained by Guttentag (2010) VR systems usually follow the movements of hand-held objects or a user's body, after which the received motions are transformed into data that visualizes the user's view, movements and interactions. Yung and Khoo Lattimore (2017) identified three key elements that characterize VR. The first one is visualization, where the user with the help of a head-mounted display can look around himself. The second element is immersion, which creates a suspension of belief, and explains the extent of the isolation of the user from the real world. In this case, immersion is the element which makes the physical come to life. The third key element is interactivity, which usually accomplished through the use of tools such as joysticks and keyboards that serve as controllers over the experience (Yung & Khoo-Lattimore Kenyon, 2017). Through VR experience the participants get immersed into an artificially designed world. Immersion and interaction in this case serve to create the belief of actually being present in a new environment (Carrozzino & Bergamasco, 2010). There are various types of VR systems, which offer different levels of immersion and interaction from weak to total sensory immersion (Styliani et al., 2009). A good example of a total sensory immersion is the VR environment that uses the CAVE system, where the participant is present in a VR environment the size of 9 m2, which serves as a projector for the visuals (Styliani et al., 2009).

However, most VR experiences can be visualized through head-mounted displays and 3D polarizing stereoscopic glasses although "inertia and magnetic trackers are the most popular positional and orientation devices" (Styliani et al., 2009, p. 523). Headsets have been gaining popularity in recent years but surprisingly they are not recent innovations. The first developments already started in the 1960s and the first headset was created for military purposes. Three decades later they became popular in the gaming industry. Recently, VR technology hit media headlines due to acquisitions of firms involved in VR by tech giants such as Google, Facebook and Samsung. An example of this is Facebook's 2014 acquisition of Oculus VR and Oculus's partnership with Samsung. Right now, the most popular headsets available to the public are the following: Oculus Rift, HTC Vive, Samsung VR, Google cardboard and PlayStation VR. Oculus VR and HTC Vive offer the most high-quality experience, while Google cardboard presents the low-cost alternative but does not provide the same quality.

Furthermore, recent research has shown that VR technology has the ability to take over people's sensory controls through the immersion and delude the brain into perceiving a new fabricated memory. This showcases the potential of VR in transforming the way we learn, interact and entertain ourselves (Magyari, 2015). The development and creation of virtual environments have also become more affordable over the years and the cost of building virtual environments has fallen considerably. Nowadays the standard hardware components offer the development of relatively low-cost and highly interactive VR experiences that can also be offered to museum visitors (Styliani et al., 2009). Guttentag (2010) already addressed the potential of VR technology eight years ago. He said that it can be used as a tool to preserve heritage by offering an alternative way of access to threatened sites. An example of this is Google Arts and Culture's Lab Experiment called Bagan - Embracing the Future to Preserve the Past, that will be also addressed in the empirical section of this thesis. This project was made to preserve the temples of Bagan in Myanmar that were recently affected by the earthquakes. Through WebVR users can travel to Myanmar and step inside the temples, something they cannot experience without the technology since the sites are inaccessible to the public. Moreover, VR provides the ability to restore heritage that was lost in time. A good example of this is The Nineveh exhibition in the National Museum of Antiquities in Leiden, where they brought to life a recently destroyed Assyrian palace. Thus, it can be argued that the use of VR can bring awareness to heritage protection while mixing entertainment with education. And lastly, novel technologies such as VR help attract new and younger audiences (Lacey and DeRosia, 2018).

2.4. Augmented Reality

While VR offers a full immersion in a digital environment, Augmented reality (AR) overlays and enhances the real-life environment (Jung, Chung & Leue, 2015). "Augmented Reality can be defined as the enhancement of a real-world environment using layers of computer-generated images" (Jung et al., 2015 as cited in Yung & Khoo-Lattimore, 2017, p. 3). Augmented reality usually refers to a specific mode of interactivity in which a device acts as a lens through which a user experiences digitally enhanced physical surroundings through visual projections (Jung, Kim & Kim, 2013). These visual projections can either be static (such as a photograph or 3D graphic) or dynamic, when the object being projected moves, and is interactive (Craig, 2013). In order to experience AR, the following components are

needed: sensors that determine the physical world; a processor which serves to generate the signals needed to display the digital information; and lastly, a display for the user to experience the combination of the physical and virtual world (Craig, 2013)

There are two basic modes through which AR merges the digital world with the physical. In the first mode the information from the physical world is merged with digital through a computer. The second mode uses projections that are applied to the physical world (Craig, 2013). Moreover, in AR the user has an active role since the motions and activities affect the way the system responds (Craig, 2013). Han, Jung and Gibson (2013) said that the main feature which makes AR interesting for cultural heritage sites is the ability to not compromise the original landscape and architecture, since the information is merely projected onto them.

Shelley Mannion (Augmented Reality and Museums: Beyond the Hype, n.d.), the Manager of the Digital Learning Programmes at The British Museum identified the benefits that AR brings to heritage. AR can be used for virtual exhibitions, outdoor guides, storytelling mediations and new media art. She also emphasized the ability to showcase things at scale which serves for virtual reconstruction. Lastly, she pointed out the possibility of interaction between multiple viewers. In fact, in AR more users can look at the screen simultaneously, while this is still impossible in VR. Furthermore, Leue, Jung and Dieck (2015) discovered that the use of AR applications strengthens the learning experience, while Jung, Dieck, Lee and Chung (2016) confirmed that visitors have a positive experience in regards to AR enhancement of heritage experiences. Thus, it is crucial to continue with developments in order to discover all the benefits that can be generated through the use of this technology (Jung et al., 2016). For the purpose of this thesis, I will use the definition by Styliani, Liarokapis, Kostakis, and Patis (2009) where they specifically identify AR museum exhibitions. They define AR as “virtual information (usually 3D objects but it can also be any type of multimedia information, such as textual or pictorial information) overplayed upon video frames captured by a camera, giving users an impression that the virtual cultural artifacts actually exist in the real environment” (p.523). Recently the technology has been democratized enough to become more mainstream, even though expertise is still essential for further developments. Currently, mobile applications represent the most popular form of AR implementations in the mainstream public domain. For example, in 2016 AR become globally popular through the mobile game Pokemon Go. The success of this game also influenced future software developments. Apple and Google decided to implement AR technology as a core part of their next-generation operating systems and make it even more

commercial (Yung & Khoo-Lattimore, 2017). These recent developments have made AR even more accessible and therefore available to the cultural heritage sites that are investing in new technological implementations. However, AR, like VR, is still under the influence of changes in development. Thus, it is not completely clear what the future will bring in regards to sensing, visualizing and processing digital information through this technology.

2.5. Mixed Reality

"In the past decade Mixed Reality (MR) has emerged as an area of extreme interest for visualizing and interacting with three-dimensional (3D) information in context, while the cost of building suitable MR applications has fallen considerably." (White, Petridis & Liarokapis, 2007, p. 322). The interfaces, devices and interaction techniques are being developed at a fast pace, which consequently offers a more innovative and entreating way of representing cultural heritage in comparison to traditional windows style interfaces (White et al., 2007). This has on the one hand helped making culture more accessible and appealing to mass audiences, while on the other side led to the deserialization of cultural heritage institutions into the entertainment world.

Researches shows that 3D visualization tools such as Virtual Reality, which represents a simulated environment created by a computer which can be manipulated by a user or can be a form of interaction for the user, or Augmented Reality which represents superimposed, computer generated 2D or 3D virtual worlds to the user, help the process of preservation and presentation of cultural artefacts in museums' collections (Liarokapis, Sylaiou & Mountain, 2008). Consequently, this results in the creation of new hybrid spaces. What was previously experienced in a physical space has now moved to a hybrid space. De Souza e Silva (2006) defines these hybrid spaces as a transfer of the cyberspace to the physical space through the use of mobile technologies as interfaces. She writes that when there is no need to get out of a physical space to experience a digital environment, that is when a hybrid space happens. "Therefore, the borders between digital and physical spaces, which were apparently clear with the fixed Internet, become blurred and no longer clearly distinguishable" (de Souza e Silva, 2006, p. 264).

Furthermore, virtual reality has been defined through the years by different researchers in different ways. However, Milgrams and Kishino's definition has served as foundational for the AR/MR research community since 1994. Milgram and Kishino (1994), which explained the concept of having both *"virtual space*" and "*reality*" available within the

same visual display environment, defined Virtual Reality as “technologies that involve the merging of real and virtual worlds somewhere along the "*virtuality continuum"* which connects completely real environments to completely virtual ones” (p. 2). In their research, the authors (Milgram & Kishino, 1994) focused on VR related technologies that involve the merging of real and virtual worlds, which they define as Mixed Reality (MR). They tried to explain different ways in which the "virtual" and "real" aspects of MR environments can be realized. Furthermore, they also explained the concept of a “virtuality continuum" (see figure 1) which shows the relation between real environments in a Mixed Reality environment.

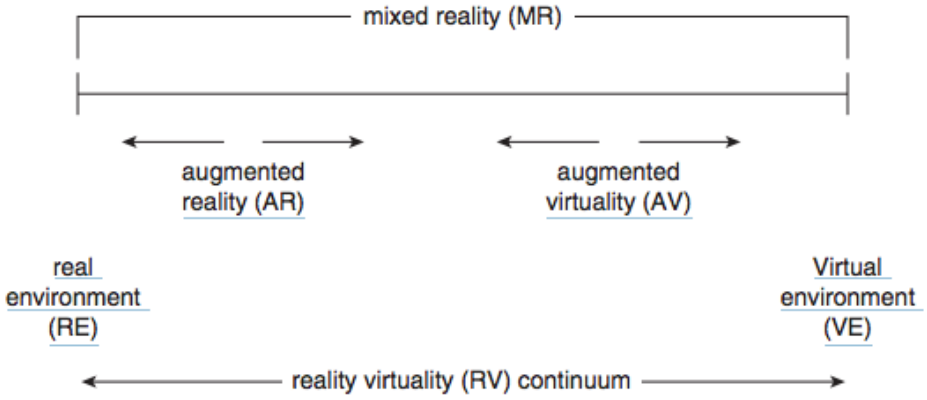

Figure 1: Definiton of Mixed reality by Milgram and Kishino (1994)

Ishii (1999 as cited in de Souza e Silva, 2016) continued the research and tried to demonstrate that our perceptions of digital and physical change through the interfaces available through virtual reality. Moreover, he emphasized the blurring of borders between physical and digital by experiencing mixed reality through wearable computer technologies. De Souza e Silva (2006) built this concept further and defined hybrid space as a “conceptual space created by the merging of borders between physical and digital spaces, because of the use of mobile technologies as social devices.” (p. 265). To emphasize, a hybrid space is built by the connection of mobility and communication and is not constructed only by technology. The consequences of the conversion from cyber spaces to hybrid spaces are: “(a) the blurring of borders between physical and digital spaces, (b) the redefinition of the concept of the digital, (c) the redefinition of the concept of physical space to include hybrid environments, and (d) changes in sociability and communication patterns” (De Souza e Silva, 2006, p. 27). This in the end shows that digital has never been disconnected from the physical and thus can work as a fundamental element for promoting sociability and communication in urban spaces

(de Souza e Silva, 2006). Similarly, as hybrid spaces, social and technological processes are also being developed in collaborative practices between the heritage sector and creative industries. And a consequence of this is the growing porosity between the heritage and creative fields.

3. BUSINESS COLLABORATIONS

Before exploring deeper into collaborative work practices between heritage institutions and the creative agencies and developers, I introduce the concept of creative industries and the connection to innovation. These two sections are followed by theory on collaborative strategies, factors for collaborations, and lastly, I address literature on reasons to form a collaboration.

3.1. Introduction to business collaborations

To investigate the motives, interests and roles in these collaborations, which I addressed in my second research question, I will explore secondary literature discussing business collaboration and management. To better understand the context of the collaborations, the advantages and disadvantages, I will also look into the topic from the perspectives of the different stakeholders.

Nowadays. business collaborations are formed to achieve goals that organizations cannot achieve simply on their own. Collaborations are in this case, as defined by Anderson (1995 as cited in Kossen, van de Poel & Reymen, 2010), seen as "a strategic mode of integration in which two or more organizations co-operate on parts or all stages of production, from the initial phase of research to marketing and distribution". However, in order to better understand the topic, it has to be specified that there exist two types of collaborations: one is a collaborative relationship with organizations in the same sector (within-sector alliances) and the other is collaborative relationship between organizations in different sectors (cross-sector alliances)" (Wymer & Samu, 2003, p. 4). While Ridge and Birchall (2015) explain that in cultural heritage both of these options are possible, this research will focus on cross-sectoral collaborations, since the prominence of these types of collaborations was already established after the initial research and selection of interviewees. While researching the topic, I found that most of the heritage projects using Augmented

reality, Virtual reality or a mix of both were based on collaborations with creative industries and technological firms.

In the past decade, there has been an increasing number of collaborations between different sectors (Wymer & Samu, 2003). This trend already started in the 1980s as result of technological and economic development in the world. Different businesses felt the need to form an alliance in order to achieve competitive advantages and believed that collaborations would enable them to enter new global markets (Scheff & Kotler, 1996). The same happened in the cultural sector where collaborations became important due to new challenges posed by technological innovations and audience demands. Cultural institutions and businesses discovered that they can serve their own strategic goals in exchange for aid that is reachable through collaborations (Scheff & Kotler, 1996). However, as Wymer and Samu (2003) point out, there has been considerable amount of research literature focused on within-sector relationships while less attention has been dedicated to cross-sector relationships, even though they are getting highly popular. Past research has been mostly based on case studies, which turned out to be useful for the development of theoretical and practical insights (Austin, 2000).

3.2. Creative industries and collaborative creativity

In order to address collaborations that create new technological projects within cultural heritage the concept of creative industries has to be explained. Theodor W. Adorno was the first one to address the concept of cultural industries in the 1940s. However, regardless of the connection with critical theory, for the purposes of this research, I will use Moore's (2014) explanation of creative industries. She explains that creative industries have been influenced by technological innovations which led to the switch that put the emphasis on market commodities rather than on culture as an industry. Moore (2014) says that creative industries entail different industries competing for the same "disposable consumer income, time, advertising revenue and labor" (p. 741). Since the 1990s creativity was seen as an asset which formed part of economic policies that resulted in the creation of new terms such as creative sector, content industries, cultural and communication industries and media industries. Moreover, the term creative industries unifies industries that create, produce and commercialize creative content in digitalization and cultural context. The goods and services of creative industries are more than just functional, they are also seen as expressive and

valuable. Usually, they are goods or service protected by copyright. For the purposes of this research, I also tried to identify the activities that belong to the creative industries. Müller, Rammer and Trüby (2009) said that a business, in regard to skills and creation of intellectual property, qualifies as creative, if engaged in creative activities such as: content creation, architecture, design, advertising and software. Their definition is based on the list made by the British Department for Culture, Media and Sport. They specified the activities per each category:

– Content creation: film, computer games, journalism, authors, music, performing arts, photography, sound studios;
– Design: arts and crafts, design and fashion, graphic design, engineering design, web design;
– Architecture: architecture including landscaping and urban planning;
– Advertising: planning, creating and putting in place advertising campaigns, public relations management, market research, advertising services;
– Software: programming and computer services (excluding web design and computer games) (Müller, Rammer & Trüby, 2009, p. 9)

However, they also identified two often overlooked sectors, which show a number of similarities with regard to the creativity and skills. These two sectors are consultancy, which includes business consulting, business training and coaching, and engineering, which includes all types of engineering excluding engineering design. (Müller et al., 2009) Museums, libraries, and archives are excluded from this classification since they work as transmitters of creative content and rarely they take on the role of creators or producers. These definitions will later on serve to define the different stakeholders involved in the collaboration between creative industries and heritage.
Furthermore, it is important to acknowledge that creative industries are seen as providers of new knowledge, which in my case use new technological advancements for storytelling and introducing new ways of engagement to the public. With the expansion of creative industries and the latest technological advancements, collaborations across sectors started blooming. For instance, the gaming industry started exploring serious gaming, experts started collaborating with doctors, visual entertainment has become an educational and interactive experience, applications were developed to help people with integration problems (Licheva, 2016). By uniting different sets of knowledge new innovative projects were made. Bronstin

(2003) argues the sharing of knowledge in this case results in the development of better ideas and solutions. In fact, a collaboration is not just a sum of different tasks executed by members of a team, but it is rather a knowledge sharing process where ideas and inspiration are shared, which emphasizes the need for good communication and understanding between different stakeholders (Adler Paul & Chan, 2011). However, the coming together of knowledge from different industries does not lead to successful results. In order to stimulate visionary solutions and creative thinking, all the involved stakeholders have to have same goals and collaborative mindset regarding the final product or services (Bitter-Ripjekema, Sloep, Sie & Van Rosmalen et al., 2011).

3.3. Structures of collaborations

Collaboration can exist on many levels such as joint ventures, supplier and distributor agreements, licensing arrangements, just-in-time systems, or research consortia (Stafford, 1994). Although, in this particular case cross-sectoral collaborations will be addressed. Bryson, Crosby, and Stone (2006) define them as "the linking or sharing of information, resources, activities, and capabilities by organizations in two or more sectors to achieve jointly an outcome that could not be achieved by organizations in one sector separately" (p. 648).

In order to achieve strategic alliances, Yoshino and Rangan (2005) identified three objectives that have to be met. They say two or more partners have to be legally independent after a partnership is formed. Furthermore, they have to share benefits and managerial control over the assigned tasks and perform continuous contributions in one or more strategic areas of the value chain. These three criteria show that strategic alliances have a consequence for the stakeholders involved in the matter. The consequence, in this case, is interdependency, which stimulates new benefits among partners in the form of intangible assets (Todeva & Knoke, 2005). In my case interdependency is a very important aspect because it guarantees knowledge sharing. Without interdependency, the development of projects that bring innovation to cultural heritage institutions would not be possible or would perhaps be exposed to major difficulties.

Since most of the cultural heritage institutions are non-profit organizations, close attention was paid to the research conducted by Austin (2000) where he defined that such collaborations can be envisioned as a collaboration continuum. He defined three stages of

strategic collaborations between business and nonprofits. He identified the philanthropic, transactional, and integrative stage of collaboration. The philanthropic stage describes the collaborations where the relationship among stakeholders is based on charitable donations. These reflect the majority of the nonprofit–business relationships today. However, Austin (2000) also acknowledges that an increasing number of nonprofit–business collaborations is shifting to the next stage level. The transactional stage is based on resource exchanges focused on specific activities, such as marketing, event sponsorships, service arrangements and cause-related marketing. The third stage, which represents the highest strategic level of collaboration, is called integrative. At the integrative stage partners' missions, people, and activities begin to merge into more collective action and organizational integration (Austin, 2000). However, this continuum does not represent a normative model (Austin, 2000). That movement along the stages is possible and can be a result of conscious decisions and explicit actions by the partners (Austin, 2000). These stages represent a useful framework for cultural heritage institutions which are trying to form a collaboration with a different sector (Tien, 2006).

3.4. Strategies and factors for fruitful collaborations

Moreover, when an organizational partnership is formed, a collaboration strategy has to be established. Collaboration strategies are gaining popularity in the business world since they are considered to bring effectiveness. Partnering can be an efficient way to develop new goods, services, technologies and explore new markets. When forming collaborations each value chain activity is important for success. Stafford (1994) named three strategies that businesses can engage: the hand-over strategy, the trade strategy and the pool strategy. The handover strategy is the simplest. In this case one of the partners hands over a resource to the other - it is a one-way transfer of resources. Firms usually decide for a hand-over strategy in order to secure outlets for final products. During this co-operation each partner works on specific tasks or parts of the value chain, which can result in specialization but restricts knowledge-sharing among partners. An example of this in the heritage world is the use of a ticketing software. By doing so museums and heritage institution rely on specialized services selling tickets for them, which allows them to focus on other tasks (Murhpy, 2017).

The second strategy is the trade strategy, which represents a two-way exchange between partners. Partners are expected to rely on each other's distinctive competencies,

which demands integration and adaptation. Typically, partners have different competencies, but they are trying to learn from each other through the co-operation. Thus, knowledge sharing is present. For example, The British Museums and Samsung have collaborated on several project and established a technological hub within the museum called *The Samsung Digital Discovery Centre*. There is a two-way exchange between Samsung and The British Museum. Samsung brings new technology to the museum and helps with storytelling and interpretation while taking advantage of the collaboration to improve or develop new technological products. Thus, it can be identified as trade strategy.

Lastly, the strategy where partners share the same value chain activity or have a resource in common is called the pool strategy. It usually involves firms with the same strengths and weaknesses. For example, partnerships between museums can be classified as pool strategies, since they can share services, collections, teams and facilities to improve visitors' experience and profits. In my case, I assume that the most prominent strategy is the trade strategy since "partnering organizations in such alliances are typically weaker in areas where their partners have strength" (Stafford, 1994, p. 66), since cultural heritage institutions and their personnel do not have the same knowledge as technology developers. It can be argued that this kind of cross-sectoral cooperation influences and stimulates the knowledge-sharing and helps overcome the lack of qualified and diversified human resources (Saur, Marques & Alves, 2005).

Furthermore, collaborations appear as desired among businesses, however previous research shows that they cannot be achieved with ease. It can be argued that strategic collaborations can help participants achieve their objectives. As Scheff and Kotler (1996) point out, the success of such collaborations depends on a number of different factors which serve to optimize the benefit and prevent the risk. The first step in establishing a successful collaboration is the careful selection of the collaborative partner. Scheff and Kotler (1996) argue that the organization initiating the collaboration should decide on its goals and objectives and then decide which collaborator to pick. However, goals should also be set for each participating organization, which can ultimately lead to the formation of shared vision in the end. Secondly, a consensus has to be established in order to start working for a common goal. In this part, each collaborating organization has to define how will it reach the requirements established by the alliance (Scheff & Kotler, 1996). Furthermore, Scheff and Kotler (1996) argue that trust is also an important part of a successful collaboration. "Participating organizations must learn to understand one another's culture and way of doing business" (Scheff & Kotler, 1996, p. 57). Nevertheless, communication is also of great

importance. Regular meetings serve to keep partners updated on the developments, recent changes or improvements, and gives them the ability to respond. The authors (Scheff & Kotler, 1996) also emphasize the importance of establishing boundaries and defining leadership. Leadership roles must be allocated according to core competencies and collaborators best interests. However, each alliance should work together to create a win-win situation. Furthermore, collaborations also require a lot of time and commitment from all of the parties involved. This is the reason why it is important to dedicate enough funds to administrative costs (Scheff and Kotler, 1996). Similarly, Ostrower (2005) identified factors which can lead to successful collaborations. She argued that the vision and mission of the partners have to be complementary, their actions have to be collective, different resources have to be brought together in order to achieve a common goal, and lastly, partners have to be fully committed to the cause they are working for. Austin (2000) also wrote about elements that play a significant role in the creation and developments of a collaboration. He stated that is important to have a strategic fit between organizations, understand the strategy of collaboration and put the focus on generating value. Lastly, similarly to what Scheff and Kotler said, he (Austin, 2000) also stressed the importance of managing the relationship among the partners involved in the project.

3.5. Reasons to collaborate

After discovering what kind of strategies are used in collaborations it is also important to touch upon the motives that start such collaborations. As stated by Iyer (2003) the main motivation to pursue a collaboration is the belief that success can be achieved with greater ease by unifying knowledge and skills with other experts. Even though collaborations unite different stakeholders with different skills, this does not guarantee instant success. In order to create outstanding projects that bring immersive technologies to heritage, a collaborative mindset needs to be established among collaborators. This mindset has to be properly integrated throughout all stages of the process and among all team members (Bitter-Rijpkema et al., 2011).

Cross-sectoral collaborations are seen as convenient because they bring together new knowledge and enable the solving complex issues or the discovery of new areas (Head, 2008). Furthermore, in my case collaborations also improve the quality and effectiveness of the implementation of new technologies, since museum and heritage institutions do not have

enough knowledge and skills that businesses specialized in AR and VR have. Several researchers have identified some of the most common factors that influence the establishment of collaborations. For example, Webster (1999 as cited in Todeva & Knoke, 2005) discovered that firms decide to collaborate to enhance their capacities, to reduce risks internally or externally, to increase profit or to gain new business opportunities.

Moreover, Todeva and Knoke (2005) say that a decision to collaborate is a strategic choice that aims at future improvements and not just a responsive action to reduce risks. Ultimately, they establish that the motives can be divided into 4 categories: organizational, economic, strategic and political. Organizational motives are connected to learning and competence building. Organizations start collaborations to learn new things from their partners, to create new products or services, to improve performance, to access new means of distributions and to develop new standards in order to achieve competitive advantage (Todeva & Knoke, 2005). The economic motives to collaborate are reduce risks and diversification, to seek new market opportunities, profit, productivity and market share. Strategic motives are technology related. Collaborations are in this case established to diversify, to gain access and to develop new technologies and to follow industry trends (Todeva & Knonke, 2005). Lastly, political motives are based on market developments and firms form collaborations in order to tackle legal and regulatory issues, and to develop new market and technological standards (Todeva & Knoke, 2005). In their recent empirical research about collaborations in performing arts Langeveld, Belme and Koppenburg (2014) confirmed the above mention factors. Furthermore, they discovered that when financial matters stimulate collaborations the focus is not based on profit but rather on cost-cutting and increased efficiency. Another thing they identified that was not highlighted in previous research is the importance of previous collaboration, trust and openness. In fact, previous partnerships can serve as an additional motive to take a risk and explore the potentials of new technologies, and in order to take risks trust and openness are needed.

Moreover, Ostrower (2005) specifically researched the motives for nonprofits to start collaborations. He discovered that nonprofits engage in collaborations to build organizational capacity and expand resources, engage new audiences, build organizational networks, to obtain efficiency (reduce costs and time consumption) and last but not least, to obtain grants. Collaborating has been increasingly popular among grant-makers in order to encourage innovation and expansion. But a consequence of this has become the view of collaborations as enforced partnerships. However, Todeva and Knoke pointed out (2005) that motives are

not enough to bring success to collaborations. There is a need to have mutual understanding of capacities, differences, trust, and mutual goals between collaborators.

4. METHOD – RESEARCH DESIGN

The purpose of this chapter is to present and discuss the research method and methodology. In addition, this chapter will also present the design and analysis as well as the methods used to provide reliability and validity of the research.

4.1. Research strategy

The design planned for this study can be described as exploratory with a descriptive element (Saunders, Lewis, & Thornill, 2009). The explorative nature of it asked for a strategy that would give me insight into the chosen topic. Therefore, I chose to conduct qualitative research in order to provide in-depth understanding of the topic. A qualitative approach was chosen because it provides valuable data and information through which I could discover patterns of how collaborations work in cultural heritage and seem the most appropriate because it offers the exploration of the participant's point of view, motives and interpretations of the researched subject (Bryman, 2008). Furthermore, it can be also argued that the intersection and complexity of different disciplines, that will be explored in this study, can be better addressed through a qualitative approach because it offers a more in-depth look to the phenomenon in question (Ritche et al, 2013). Good qualitative research also gives the ability to listen to participants' explanations and observe them in their natural environment. "The interpretation of these experiences is called an emic perspective" (Field & Morse, 1992 as cited in Orb et al., 2001). This aspect is especially important considering the diversity of the stakeholders involved in the development and implementation of VR and AR technologies in cultural heritage. The different aspects of their involvement in the process of creation would be hard to quantify.

For the purpose of this study, I decided to conduct in-depth interviews in combination with audio recording and observation of the parties involved in the process of developing and implementing VR and AR technologies into cultural heritage. This method was chosen because interviews tend to be particularly useful when it comes to discovering the story behind a participant's experiences (McNammara, 1999 as cited in Boodhoo & Purmessur, 2009). Moreover, through qualitative interviews the researcher gains unique access to the lives, knowledge and experiences of the subjects in question, and they represent a key venue to explore the way of their reasoning of a specific topic. Interviews are conversations

between human beings involved in the research, and they represent a way of obtaining systematic knowledge (Kvale, 2007). They are used as a scientific data-collection method which helps the respondent provide answers to the main research question, sub-questions and fulfill the object of the study (Saunders et al., 2009). As Kvale (2007) says, qualitative interviews are a principal method for generating scientific and professional knowledge. In my study, I conducted semi-structured interviews, which are a setlist of questions and themes that the researcher plans to discuss with the participants in a flexible way by adapting them to each interview case based on the provided answers (Saunders et al., 2009). I believe that this works best because semi-structured interviews allow the interviewees freedom of expression, they have the possibility to explain their thoughts and to highlight their areas of expertise and their interests (Horton, Macve & Struyven et al, 2004). Furthermore, as Horton, Macve, and Struyven (2004) semi-structured interviews enable certain responses to be questioned in greater depth and bring out and resolve apparent contradictions, which I found relevant for my research. The flexibility of this method allows for adaptation to the flow of the conversation and expertise of the respondents. Semi-structured interviews are thus an excellent way to explore the state of collaborations between content creators, developers and cultural heritage institutions because they offer the advantage of a more tangible insight to the current situation with specific examples.

Last but not least, the time span also plays an important role in the research aspect. As Saunders, Lewis and Thornill(2009) said, when it comes to time horizon, a research can be cross-sectional or longitudinal. Through cross-sectional study the researcher investigates and tries to understand a specific phenomenon during a specific time frame, while in a longitudinal study the researcher captures and tries to comprehend the changes that happen over time. The time horizon of this research implies that a phenomenon is studied in a specific time frame through the interviews, therefore we can consider it a cross-sectional study. In fact, the data for this study was gathered during the months of April 2018 and May 2018.

4.2. Participants selection

The people of interest for this research were professionals involved in the creation and implementation of new technologies in cultural heritage. Specifically, the respondents were selected based on their endeavors in VR and AR, through which I tried to maximize the depth

and richness of the data to address the research question (DiCicco-Bloom & Crabtree, 2016), and the aims of this study, which is to discover cross-sectional collaborations in cultural heritage. The specific topic of this research also posed a major challenge while contacting potential interviewees. The representatives from the creative industries where quick to respond with enthusiasm. While getting in contact with heritage institutions presented a bigger challenge. Since February several heritage institutions or municipalities were contacted but never replied back or did not have experience with projects involving AR/VR technology. However, when selecting the interviewees, I relied on help offered by Media Perspective, which had a partnering role during this study. Media Perspectives is a merger between IMMovator and Hilversum Media Campus, which aims to become a media partner and bridge between different organizations in the Dutch media sector. They are trying to help and educate different stakeholders on the latest innovation, and bring together different businesses in the creative sector. In order to obtain contacts, I researched different projects that applied for *FieldLab: Virtual Worlds track* in 2017, which was coordinated by CLICKNL, Media Perspectives, Meertens Institute, and the Netherlands Institute for Sound and Vision. Personal contacts of the winners of *FieldLab: Virtual Worlds track* were given to me by Media Perspectives. Two of the interviewees were selected after attending the Cross Media Café event hosted by Media Perspectives in Hilversum. Others were contacted after an exhaustive internet research about projects that involve VR and AR in the Netherlands.

In the time span of 6 weeks I interviewed 7 representatives from cultural industries and 3 representatives from the heritage side. From the project *Time Windows* I interviewed the CEO and co-founder of Novitas Heritage, Marc van Hasselt. From the project *Rembrandt Prive* I interviewed Pepijn Borgwat, co-founder and creative producer from Synergique, and Ludger Smit, head of presentation at the Amsterdam City Archives. For the project *EQUES I* interviewed VR and AR developer Steven Bos from Geodan. I talked about the *Nineveh* exhibition with Anne de Wit, a project leader at The National Museum of Antiquities Leiden. With Avinash Changa, the founder and WeMakeVR CEO, we talked about their project *Meeting Rembrandt: Master of Reality*. At Dutch Rose Media I talked with Alex van Happen who is responsible for marketing and sales. He spoke of their collaborative project with the Prehistoric Village, where I also interviewed a representative that wanted to remain unnamed. In regards to their project with Google Arts and Culture I talked to senior project manager Dennis de Rooij from Media Monks. And lastly, I interviewed Cyril de Vroom, co-founder of Wij doen dingen, where we talked about their AR/VR app *Luxe Achter De Limes*. All the mentioned participants are currently working in The Netherlands, which makes this research

valuable for the collaborations that might be established in the future in the Netherlands. Furthermore, it has to be acknowledged that all participants agreed to the consent form and the audio recording of the interviews. Only one of the interviewees wanted to remain unnamed but did not mind being audio recorded. The participants' agreement to full disclosure made the interviewing process less formal and resulted in open discussions about their work, projects, technologies and future. On average the interviews lasted around 40 minutes, which resulted in 415 minutes of audio that was later on transcribed verbatim.

4.3. Operationalization

Since interviews are not a spontaneous exchange of opinions, but are structured conversations, an interview guide had to be developed. The interview guide was designed to reflect upon the main topics acknowledged through the theory and the research questions. Even though there is a lack of literature on cross-sectoral collaborations between heritage and creative industries, I tried to draw connections from other areas of research. Moreover, this is also the reason why I tried to address cross-sector collaborations in a broader way to help me discover each step gradually, while allowing the respondents their freedom of expression. The topics addressed in the interviews were establishment of cross sector collaborations, factors, motives and challenges, and future perspectives. However, the first set of questions served as an ice breaker and it helped me discover who the interviewees are, and what are their roles. The interviewees were asked to introduce themselves, their firms, their roles and talk about recent projects.

The next set of questions focused on the establishment and structure of cross-sector collaborations. For instance, the following questions were asked to address the above stated: What was your last project that was in anyway related to heritage?; Who was your partner during this collaboration?; What was the role of your organization? (for more see Appendix A). Through these questions I tried to address and explore the types of collaborations according to the framework provided by Tien (2006) and Austin (2000).

Furthermore, the next set of questions relied on the works of Todeva and Knoke (2005), Ostrower (2005) Austin (2000), and Langeveld, Belme and Koppenburg (2014) who developed useful frameworks that can be applied into cultural heritage. Questions such as: What were the motives to work together?; Were your missions and vision complimentary?; What were the challenges during this project?; Where there differences in communication

because of lack of knowledge? (see Appendix A) helped me discover the dynamics behind the researched collaborations. Specifically, in this part I inquired about sharing knowledge, learning from the collaboration and which are the differences between disciplines.

The last three questions dealt with the future of collaborations and heritage and served to explore participants' personal opinions. For example, interviewees were asked to express their views about the claim that heritage is competing with other forms of entertainment and to voice their opinion about the future of collaborations in heritage (see Appendix A). The last set of questions provided subjective opinions and personal views of the interviewees. In total 20 questions were asked and all the participants provided a positive feedback afterwards. Some of them also expressed appreciation in regards to the researcher's interest about the topic.

4.4. Data Analysis

To secure the reliability of my data, I transcribed each interview integrally. In order to analyze the data, I used grounded theory. The use of grounded theory enables to develop an effective and compelling analysis (Charmz, 1996). It serves to analyze interpretative analyses which try to understand and describe the life experiences or particular groups of people that are under investigation and explain relationships between concepts (Charmz, 1996). Grounded theory is usually used in studies that have the aim to understand people's relationships, interactions, thoughts and actions (Charmz, 1996). It consists of a set of inductive strategies that can help with the data analysis. For example, a specific characteristic of grounded theory is that the analysis phase starts already with data collection. The codes derive from the data and are not from preconceived ideas and hypotheses (Charmz, 1996).

Furthermore, an important part of grounded theory is also the memo-making phase. Memos are analytic notes written by the researcher and represent a crucial step during the initial coding. In my case I created memos after each interview to collect my observations and specific insights, which later on served as additional material when coding. The simultaneous involvement made with the data me adapt and evolve the initial interview guide in order to provide more fruitful and specific data.

However, in order to write the analysis, I started with the coding process, which gave meaning to the gathered data (Charmz, 1996). Unlike in quantitative analysis during this process, I was the one to create the codes that emerged in the data. I started my analysis by

rereading the interviews in order to guarantee that each answer given by the respondent can earn its way into the findings. The initial codes represented a wide variety of topics and themes but as the process continued the similarities started to show more prominently. Through this phase of the research I set aside my research questions in order to avoid any preconceived notions influencing the coding process. Firstly, I compared the open coding for each transcription. While doing so, similarities, differences and common patterns already started showing up. Codes were classified in regards to their frequency and importance. For instance, when discussing the encountered challenges, the respondents provided examples of the obstacles they had to tackle. Their answers ranged from technological illiteracy, trouble with software developments, technical bugs, data processing and electronic devices. Thus, the findings had to be narrowed.

The second stage of analysis consisted of focused coding, which is less open-ended and more conceptual. By doing so I managed to categorize my data more accurately. In between I was relying on memos, which represent the intermediate phase between coding and the first draft of the findings (Charmz, 1996). Focused coding was split in two steps. Codes that had a similar meaning were merged to form one, more relevant code. In the meantime, I also relied on memos, which served as a constant comparative method between respondents, and helped with theoretical sampling and the development of emerging theories. To demonstrate better, when trying to identify the motives for collaborations the respondents mentioned the desire to grow, expand to new markets, to find new work opportunities and specialize in the field. These codes were merged in the two new categories: gaining new knowledge and new business opportunities, which can be classified as motives of economic and strategic nature. Theoretical saturation was reached when no additional details in data were discovered and thus the coding process was finalized. However, the final findings and interpretations are explained more in-depth in the results chapter with specific interpretation and argumentation.

4.5. Credibility, validity and reliability

Nevertheless, the topics that need to be acknowledged in relation to this kind of research is credibility, validity and reliability. The validity of a study that uses semi-structured interviews can be constructed through the manner in which questions are designed (Grey, 2004). The questions have to have a direct relation to the research objectives and get as much information and knowledge as possible from the respondents. A clear link between the

questions and the theoretical framework must be established, showing how the theory informs and illuminates the question asked. Furthermore, the interviewees showed interest in reading the results and conclusions of the research, which proves the validity of the addressed topic. Thus, a short summary of the research will be written for the interviewees and Media Perspectives.

Saunders, Lewis & Thornill (2009) emphasized the importance of interaction between the interviewer and the respondents in order to generate valid findings. The interviewees have to speak freely to guarantee valid data. Moreover, the fact that the respondents are all professionals working in heritage or creative industries confirmed the validity of the study. Another important aspect is external validity - the extent to which we can generalize the results. In my case external validity was moderately restricted since all the interviewees work in the Netherlands. However, two of the researched projects were developed in collaboration with internationally recognized brands, such as Oculus VR and Google Arts and Culture. Thus, it can be argued that this minimizes the issue of external validity.

Moreover, in order to guarantee the reliability and to minimize interviewer bias as established before, an interview guide was developed (Saunders et al, 2009). However, even though the guide was followed through the interview process, some of the questions changed or took a different direction depending on the conversation. Furthermore, secondary data was used to strengthen the reliability of the present study. Different sources of secondary literature were used to provide reliable and relevant sources of information that could be applied to the research.

4.6. Ethical considerations

Lastly, I have to acknowledge ethical considerations since interviews are in a way an intrusive method of collecting data (Saunders et al., 2009). In the design part of the research ethical considerations were addressed through the subjects' informed consent, which was handed to the participants prior to the interview in order to guarantee validity and reliability. Through briefing and debriefing clear information was provided to the participants about the purpose, objectives and procedure of the research. However, as Ritchie, Lewis, Nicholls and Ormston (2013) say, there has to be balance when providing information to the participants. "Giving too much may deter potential participants or curtail their spontaneous views by being over-specific about the objectives and subject matter" (Ritchie et al, 2013, p. 67). Moreover,

ethical considerations were also addressed through other stages of the research, such as the interviewing and transcribing phase, where I had to stick to the confidentiality and loyalty to the expressed statements (Kvale, 2007). However, only one of the interviewees expressed the desire to keep its identity anonymous and out of the research.

Moreover, as a researcher I was exposed on the spot decisions about what implications of questions to follow up. For instance, some of the projects were still in their initial phase. Therefore, the respondents could not give illustrative answers in regards to challenges and developments of the collaboration. Thus, new questions had to be asked, while still following the theory. For example, instead of inquiring about the current collaboration, which was not yet concluded, I started asking about previous collaborations or respondent's expectations for the future. Moreover, it is important to acknowledge that the interactions during the interview affected the interviewees and the knowledge acquired through this process. My academic background also had to be taken into consideration, since I investigated the topic exhaustively and gained expertise. When asking questions, I had to be careful not to influence answers or lead the respondent to answer certain questions in such way that it would confirm my previous knowledge. Furthermore, I also reflected upon my personal characteristics and how have they influenced my research.

Lastly, since the topic and aim of this thesis were developed together with Media Perspectives, a relationship had to be established in terms of access and rapport. In fact, Media Perspectives (previously IMMovator) was also one of the partners of the *FieldLab: Virtual Worlds track*, which provided a grant for two of the analyzed projects. Therefore, in order to guarantee unbiased results, I had to assume the role of an independent researcher

5. RESULTS

5.1. New wave of disruption and emerging creativity – The rise of specialized creative agencies

Nowadays we are continuously exposed to new digital innovations that are disrupting tradition in every aspect. Digital tools are currently setting the trend of mass-innovation in the 21st century. Augmented reality, virtual reality and other new technologies are positively impacting the economy, our social lives and culture. They are pushing all relevant stakeholders to reinvent themselves and implement new developments in their businesses (Abbasi, Vassilopoulou, & Stergioulas, 2017). It can be argued that creative industries are becoming technology-driven and deeply influenced by the aforementioned technological trends. Thus, a clear link can be drawn between the expansion of the creative industries and the interlinking with Information and Communication Technologies (ICT). The result of this intermix are new jobs opportunities, new ventures, new services and products that have a positive impact on the economy as a whole (Abbasi Vassilopoulou, & Stergioulas, 2017). Technologically and creatively skilled groups of people are discovering and creating new opportunities, and by doing so they are enriching the industry.

One of the aims of this research was to identify who are the different, important stakeholders involved in the creation of AR and VR projects for museums and heritage institutions. Through the in-depth interviews I discovered that they range from small to larger creative businesses, from commercial to research-focused organizations to different size heritage institutions, nonprofit organizations and online platforms. In order to define the different stakeholders, I relied on research conducted by Müller, Rammer and Trüby (2009) who specified the focus of creative industries and identified that creative businesses can have a commercial focus, but at the same time they also work for non-profit activities, which also includes heritage institutions. In their research they divided creative industries into 7 groups: content creation, design, architecture, advertising, software, consultancy and engineering. This division was useful when identifying the specific focus of the researched creative businesses. During my data collection I interviewed 7 representatives from creative industries and 3 representatives from heritage institutions. My first interviewee was Avinash Changa, founder and CEO of *WeMakeVR*, which is identified on Google as a video production service, while on their website they identify themselves as Cinematic VR production agency.

During the interview Changa provided additional explanation of their work and emphasized on the use of VR beyond gaming:

> We are not about technology, we are about applying technology to create valuable user cases to create content that actually matters to people. That improves quality of life, that helps the educational process which (that) helps social struggles in society, and we balance that out of course with commercial productions because we need to pay the bills.

Based on respondent's answers and literature we can identify *WeMakeVR* as a creative business with the focus on content creation and design with specific knowledge of VR technology. Furthermore, Müller, Rammer, and Trüby (2009) also wrote that in order to classify as a creative business your product has to contain some sort of originality which gives it the creative advantage. This applies to what Changa said about their pioneering developments in the industry:

> So, 5 and a half years ago we created a camera system that allows to capture reality and reproduce it in a way that is quite true to the human vision. So, it's very different from a 360 video which you can see a lot of, and because the technology was so novel we were awarded a patent, which emphasizes that we did something that nobody else did.

While talking about their recent projects in heritage we discussed *Meeting Rembrandt: Master of Reality*, that was created in collaboration with *Oculus VR*, a technology company specialized in the creation of VR hardware and *Force Field*, a Dutch VR and AR development studio. Another creative business that identifies with the same set of skills is *Wij doen dingen* from 's Hertogenbosch. On Google it is marked as a graphic design agency, while on their website they say that they are working in marketing innovation and innovative experience design. While talking with CEO and founder Cyril de Vroom he identified his company as one specializing in augmented, virtual, mixed and sensory reality – the latter being a new field which they created. They work for different companies, commercial projects, art projects and non-commercial organizations such as museums, heritage and governmental organizations. Therefore, based on the work showcased on their website and the conversation with Cyril de Vroom it can be qualified a creative business focusing on content creation, design and advertising, since they are also involved in marketing. While

discussing their latest heritage project we talked about *Luxe Achter De Limes*, a cycling route app through which users can discover Roman history and objects hidden along the route. For example, while biking around the location, users get a notification that there is a hidden object in their proximity. By pressing or swiping on the screen they can see these hidden objects and discover the stories behind them with the help of AR technology. They created this app for the municipalities of Neijmegen, Heumen and Wijchen in collaboration with Wennekes Multimedia.

Another business with a similar focus is *Media Monks*. They are a creative digital production company focusing on the production of games, films and other digital projects, but they also work in collaboration with different advertising agencies. They define themselves as a creative production partner. Therefore, they can be identified as a creative business with the focus on content creation, design, software and consultancy. When talking with Dennis de Rooij, a senior development manager, we discussed their latest collaboration with Google Arts and Culture, an online platform that was created in order to provide people access to art and heritage images, and CyArk, a nonprofit organization which focuses on digitally recording and archiving cultural heritage. Together they launched the Arts & Culture experiment in 3D and VR, where users can discover the temples of Bagan. Another company that I visited that had a lot of expertise on the engineering level was *Dutch Rose Media*, an Augmented reality agency, where I talked with Alex van Happen. At Dutch Rose Media they combine technology with creativity. They specialize in location-based storytelling and apps that use AR technology and can be identified as content creators, designers and engineers. During the interview we talked about their recent heritage AR project - *Tijdkijker 2.0* they did for *Stichting Eindhoven Museum*, specifically *The Prehistoric Village* in Eindhoven. They created this project in collaboration with another video company that remained unnamed during the interview process. Through the app the visitors of The Prehistoric Village have an additional experience while visiting the open-air museum. Based on provided data some similarities between the four above-mentioned companies can be drawn. They all have in common the expertise with VR/AR technology, and immersive technologies represent the core of their business.

However, while conducting the interviews I also talked to representatives of creative agencies that were not directly involved in the engineering processes while creating AR or VR projects. For example, Pepijn Bogwart from *Synergique*, an exhibition planning business explained their work as:

> […] we're focusing on exhibition design basically. And with exhibition design we usually start with the storytelling aspect. So, if there is a collection they want to display, we usually look for a storyline and then find time to find interesting ways to tell the story, and we often use interactive installations to do that, which usually results in digital interaction.

Their main focus is design and content creation. However, they decided to also explore AR technology. They are currently producing a project in collaboration with *Amsterdam City Archives* that will bring to life old documents about Rembrandt. Bogwart stated that this is their first real world endeavor in augmented reality. That is the reason why they resorted to a freelancer, expert in AR in order to fill in the knowledge gap. Another business that does not directly work with AR or VR is *Novitas Heritage*, which also relies on different freelancers with expertise in AR or VR field. After talking to the co-founder Marc van Hasselt, I discovered that his business mainly focuses on gamification and serves as a communication bridge between museum and heritage institutions and developers. He explained his work in the following way: "We are between the heritage institutions and the makers and we, we help translate, what the one wants and what the other can achieve, to each other." *Novitas Heritage* can be therefore identified as a creative business with a focus on content creation and consultancy since they also offer assistance in organization and planning. Their uniqueness is that they focus specifically on heritage. In comparison with other creative businesses that put technology at the center of their business, they decided to start a niche business with heritage at the center of the attention. On their website they identify themselves as "new kids on the block that provide a refreshing view on the heritage business" (Novitas Heritage, n.d.).

The last representative from the creative industry that I interviewed was Steven Bos from *Geodan*, a geo-ICT company. He was the only engineer that I interviewed during the data collection process. When asked about his job he said the following:

> I work as a senior research engineer at Geodan and research. My main job is building 3D worlds that are viewable, intractable in, for example, VR and AR […] Usually I work on stuff that is going to see the market maybe two, three years in a future or will never see the light.

Moreover, we also discussed his involvement with an AR/VR research project in collaboration with the *Vrije University Amsterdam*, *SPINlab and Radboud University*. The result of this collaboration was a research instrument for archaeologists. Another project that was similarly created in collaboration with universities was part of the Nineveh exhibition in the *National Museum of Anitquites* in Leiden. The *Nineveh* project was by far the most diverse one since it entailed many different partners from universities to a business specialized in the recreation of Assyrian palaces. Anne de Wit, historian of antiquities and project leader at the Museum of Antiquities explained that there were various partners involved in the creation of the exhibition that included 3D printing and a one-day VR exhibition:

> Delft University and also the University of Leiden were (was) involved for the color research and then we had a company called Mr. Beam. They made the color projections. So, then of course the pictures were made by an Italian expedition of experts and then our own curator. And then we also had a volunteer here, one day a week and he did all the 3D images […] we did have VR with the Nineveh exhibition, but it was created by an American company […]Well, they are based in America and they are specialized in recreating Assyrian palaces.

Based on the above stated it can be clearly seen that new technologies such as AR and VR are creating new business opportunities. Which is in line with Müller, Rammer and Trüby's (2009) findings, where they identify creative industries as a promising field that can contribute to wealth and job creation. Furthermore, something similar already occurred in the past with the rise of web development and website design companies, products and services during the boom of the World Wide Web. Thus, it can be argued, that this trend will repeat in the next years, with the rise of businesses and expertise focused on immersive technologies. In 2016, Goldman Sachs reported that by 2025 AR and VR are expected to grow into a $95 billion market (Hall and Takahashi, 2017), while Tim Merel founder and director of Digi-Capital, said that AR and VR are "the fourth wave of technology, after computers, the internet, then mobile" (Bloomberg, 2016). Furthermore, the versatility and potential of new immersive technologies influenced some recent investments from tech giants such as Google, Facebook, Samsung, HTC and Sony, which confirms the idea that immersive technologies

will become the “next big thing” and foster the expansion of this new branch of knowledge and expertise.

Based on data, I can conclude that stakeholders involved in the creation of VR and AR projects in heritage range from creative industries, technological companies, research universities to nonprofit organizations and heritage institutions. Furthermore, an interesting discovery during this research was the role of freelancers. They represent important stakeholders (AR/VR experts, copy writers) which based on Müller, Rammer and Trüby (2009) still belong to creative industries. Burke (2012) says they serve to drive innovation and help overcoming the challenges imposed by the uncertainty of new technologies. Furthermore, they also enable to lower expenses because they work on time-limited project and usually are experts in their domains (Burke and Cowling, 2015).

5.2. The merging of tradition, creativity and new technologies

5.2.1. Establishing collaborations

As already stated before, the heritage sector went through noticeable changes that made them rethink and improve their management, effectiveness, economic and administrative balance (Izzo, Graziano & Mustilli, 2018). Furthermore, as discovered by Vermeeren, Calvi, Sabiescu and Stuedahl (2018) they also switched their focus from individual objects to “designing experiences around the museum as a whole” (p. 5). With the implementation of new technologies, the possibilities of cultural consumption broadened (Potts, 2014). Consequently, collaborations of any kind became essential. Museums and heritage institutions started networking with other museums, partnerships between museums and universities started growing (Vermeeren et al., 2018). The influence of new technologies has clearly disrupted traditional way of working, and that is the reason why cross-sectoral collaborations emerged in order to provide new efficiencies and competitive advantages, while avoiding both uncertainties and lack of knowledge. The degree of sophistication and knowledge needed to create immersive experiences forced museums and heritage institutions to look for external experts instead of discovering it on their own. Thirty years ago, museums and heritage institutions were not dependent on external help when it came to providing their services and showing exhibits. But because of the growing competition in the leisure-time sector, managers recognized that collaborations are a way to gain new support, new

audiences and also new experiences (Tien, 2006). Based on the data collected from the in-depth interviews there are four common ways of establishing these collaborations: open pitches/open calls, direct contact, previous working experience and networking. When it comes to collaborating, both, creative industries and heritage can be clients or contractors. In fact, some of the researched collaborations were initiated after an open pitch, or an open call announced by a heritage institution. That is how Dutch Rose Media started their collaboration as reported by van Happen: "They got in contact with some companies and one of the company was us […] We pitched it and lucky for us we got the assignment." An open pitch was also the starting stage of the collaboration between Media Monks and Google Arts and Culture. Moreover, the interviewees also acknowledged the importance of network connections. Which confirms Schweitzer's (2017) statement that no matter the industry, business connections are always helpful when looking for new opportunities. For example, networking and previous connections were important for the *Meeting Rembrandt* project that WeMakeVR did for Oculus VR in collaboration with Force Field (previously Vanguard), as explained by Changa the previous work connections they had with Force Field served as a basis for the establishment of the collaboration:

> So, they got in touch with us […] we had a couple of meetings and they were like: Hey we want to do this project where we combine our strengths, which is creating digital assets, digital world and gaming environment with what you can do which is creating incredible photo realistic simulations.

A similar story was brought up when talking to Anne de Wit, a representative from the Museum of Antiquities. She explained that most of the stakeholders involved in the project were recruited through networking and previous experience. The partnership with Delft University was established through mutual connections between a coworker and a professor at the University. The projection company was chosen based on previous experience while the 3D expert offered to do his job as a volunteer. Networking was also a way of getting into the collaboration for Steven Bos from Geodan. He was invited to collaborate on the project because of Geodan's CEO connections with VU Amsterdam. Moreover, the collaboration that was established during a previous work experience was the one between the Amsterdam City Archive and Synergique. They had already worked together for an exhibition and they were both satisfied with the outcome. This is the reason why they decided to continue

working together. Bogwart from Synergqiue also confirmed this, and provided further details on how they relied on recommendations to get in contact with the freelancer that will be working with them on the project:

> So, one of the partners, of course, is the City Archives, but the partner that we're doing the augmented reality part with is called Dorik. He is solely focused on augmented reality applications, he did a bunch of those. We asked around as we looked it up online and eventually we found three partners who we were interested in. We talked with them, and we were just most confident in him.

The only project that was established by direct contact from the client was *Luxe Achter De Limes* a cycling route app, made by Wij doen Dingen and the municipalities of Weijchen and Nejimegen. However, direct contact was also one of the strategies for Novitas Heritage to get in contact with museums and other heritage institutions. Sending press releases was their way of approaching possible clients. This is how they got in contact with Museum of Antiquities in Leiden. This first collaboration served as basis for their partnership, and since both parties were happy with the outcome they decided to continue working together.

Furthermore, the analyzed collaborations can be classified based on Austin's (2000) work, where he researched the flow of synergy between nonprofits and its collaborators. He specified that the synergy between a nonprofit and a collaborator can be envisioned as a collaboration continuum, meaning that the collaboration can evolve or diminish (Austin, 2000). The interactions can move from low to high or they can advance to the next stage. The first stage Austin (2000) identified was the philanthropic stage where the relationship is bounded by resource exchange. The relationship is formed on benefits that the collaborator offers to the nonprofit organization, in our case, cultural heritage institutions. Only one of the collaborations has partially some of the characteristics that belong to the philanthropic stage. The Nineveh exhibition at the Museum of Antiquities involves a lot of collaborators, but the majority of the exhibition relied on the relationship between TU Delft, University Leiden and the museum. And since there is no monetary compensation between the above-mentioned stakeholders it can be classified as philanthropic.

The second stage identified by Austin (2000) is the transactional stage, which is characterized as a reciprocally beneficial collaboration with a two-way flow. During this stage mutual exchange characterized by value creation takes place (Austin, 2000). Collaborators form a partnering mindset that serves as competency exchange. At this stage,

projects have limited scope and risk with a focus on specific activities. In comparison to the philanthropic stage, the scope of giving becomes wider, since both partners give and benefit from the collaboration. This is the stage where all other collaborations fit, since they share similar mission and values, exchange and gain knowledge from the collaboration.

The third identified stage is the integrative stage, where missions, people and activities become one, and it represents the highest strategic level of collaboration (Austin, 2000). In this stage the culture of each organization involved in the process is influenced by the other. Thus, it can be identified as the pre-stage of a joint venture. Due to this characteristic none of the mentioned collaborations fits this stage, but they might in the future, if their relationship somewhat evolves.

What is more, collaborations can be also classified based on co-operative strategies themselves based on the value chain activates. Stafford (1994) divided them into hand-over, trade and pool strategy. In a hand-over strategy there is only one-way value chain activity. An example of this can be a long-term supplier relationship. Partners in this case perform specific tasks and by doing this they have the ability to specialize and develop distinctive competencies in their field (Stafford, 1994). However, this can also have a negative consequence because a specific specialization does not allow collective economies of scale and prevents knowledge sharing. A connection can be drawn between the description of a hand-over strategy and the way Novitas Heritage first tried to establish its collaboration for their Time Windows pop up escape project. Van Hasselt reported that:

> Initially we had a plan to rent this out to a museum that was interested. That they will pay us money. And they said no, we don't want this. We want you, we will give you a space to use and we will help with the promotion. You take care of the rest. We want you to have this.

Their initial plan was to sell their product, but eventually they decided to use the museum's environment to showcase their product. Therefore, theoretically there would not be any knowledge sharing with the museum, but since the museum of Antiquities wanted to be involved in the content creation, this collaboration cannot be classified just as a hand-over strategy. In fact, we can see some characteristics that belong to trade strategy. A trade strategy occurs when a two-way exchange happens between partners and they perform complementary tasks (Stafford, 1994). In this kind of collaboration one of the partners excels in the area where the other lacks. Resulting in an interdependency. Like in a hand-over

strategy, a trade strategy allows partners to capitalize on their own strengths but it also demands integration and a good fit among partners (Stafford, 1994). Stafford (1994) also explained that co-operative strategies can be combined without making each other ineffective. Thus, it can be argued that Novitas Heritage and The Museum of Antiquities adapted a mix between both strategies for their collaborative project. Another collaboration project that fits under the same category is *Meeting Rembrandt* that WeMakeVR developed with Force Field for Oculus. Oculus was in this case the client that demanded specific tasks, while the collaboration between WeMakeVR and Force Field was a two-way flow with knowledge sharing. A similar pattern can be seen in the collaboration between Media Monks, Google Art and Culture and CyArk. But as de Rooij explained they were constantly in connection with each other sharing their developments and concept creations:

> We had a lot of back and forth with CyArk, and especially Google, just to make sure that we were on the right path. That we didn't go in a direction they didn't want to go. Basically, because the concept evolved constantly.

Therefore, due to the constant developments the collaboration cannot be classified under one strategy. Furthermore, de Rooij specified that Google decided to work with them because of their specific knowledge, which also connects to the statement made by Stafford (1994) where he says that in trade strategies one of the partners is usually weaker in the area that the other excels. All the other researched collaborations seem to have more characteristics of a trade strategy because of knowledge sharing, two-way communication, involvement of all the collaborators while allowing capitalization. However, none of the analyzed collaborations fit under pool strategy, which is the last one identified by Stafford (1994). A pool strategy occurs at the point where partners share a common resource or a value chain activity and form an alliance. It evolves between firms that work in the same field or have similar goals and marketing objectives (Stafford, 1994). Since museums and heritage institutions are usually nonprofits, they do not work with the same goals as creative commercial agencies.

5.2.2. Motives for collaborations

In the previous chapter I discussed how are the collaborations are set up, at what stage they are established and in what kind of strategies they partake. However, it is also important to acknowledge the reasons and motives to embark such partnerships. The empirical research conducted showed that there is a slight difference between the motives of creative businesses in comparison to heritage institutions. The most common motives to engage in collaborations for the creatives are: to gain profit, to gain new knowledge and expertise, to get new business opportunities. For example, Bogwart from Synergique said that their motives are of economic and strategic nature: "Our motive to work with them is basically because it's money." He then corrected himself and explained that working together means a new opportunity for their business to grow and be more recognized. De Rooij from Media Monks pointed out that such collaborations push the development teams to discover more and expand their knowledge.

The motives that both creatives and heritage have in common are: competitive advantages, previous knowledge and the need to create something meaningful. An example of this is the explanation that de Vroom gave, when asked about the motives to collaborate: "My motivation really is to throw the information on the streets, to make it available. Everybody's googling, but if you really want to create an emotion, that has to be in an experience". Therefore, it's clear that creative industries do not see this just as a profit opportunity but also as a way of gaining new experiences, presenting their skills to new potential clients and also as a contribution to society.

On the other hand, the most common motives for museums and heritage institutions to decide to collaborate with a creative agency were: to gain funds, to engage new audiences, to fulfil their social responsibilities, to offer new experiences, and to keep up with latest trends. Anne de Wit form Museums of Antiquities explained that when deciding with whom to collaborate they put the visitors to first place:

> The motive is always the question, if we can give our visitors a new experience or give, give more clarity about what the history is, what's the background of the objects is. So that's always a thing. We don't want to use new technologies just because they're new technologies.

While talking specifically about The Nineveh exhibition she also added that in this specific case the motive was even bigger, because they were trying to preserve and save heritage that was recently destroyed in the war in Syria.

As seen above, creative businesses and heritage institutions do not always share same motives, however they strive to achieve the same goals through these collaborations. While co-creating they usually try to understand each other's culture, they try to share knowledge and respect the differences.

5.2.3. Encountered challenges

During the empirical research the interviewees also talked about the challenges that occurred during their collaborative projects. Through the coding process the following four concepts stood out: lack of knowledge, technical problems, finances and time. As Li (2015) pointed out, new technologies often bring added value, extend or enhance user experience. Therefore, it can be argued that new technologies bring new opportunities but at the same time they might also represent a challenge. In fact, the different set of skills and knowledge shared among the stakeholders involved in collaborations presented one of the main challenges. For example, Changa from WeMakeVR explained that in order to present the possibilities offered by VR or AR technologies, the clients have to experience it beforehand. He said that this is not something that can be comprehended through an email:

> What we often get when we reach to cultural heritage institutions or other institutions, even museums. We call them or we email them. It is always the same response. Oh yeah, that might be interesting or maybe not, just send us an email, send us a PDF or movie so we can see what you want to do and then we will decide if we want to talk. Now, that of course does not make any sense because you cannot convey what VR or AR does in a 2D film or an email.

Furthermore, he addressed the importance of sharing the knowledge and showcasing the technology with the client, in order to guarantee a better collaboration:

> We give them AR demonstrations. We also explain a bit out the production process how it differs, but what is more important is that we explain how the experience is

> fundamentally different from creating something for a 3D film for online use, film or TV, and that is something that is really hard for people to understand.

Dutch Rose Media and Wij doen dingen also adopted a similar approach. For example, de Vroom emphasized the importance of explaining VR and AR to the clients:

> Each time a customer comes or we invite them, we have a kickoff here. They get the HoloLens, they get from the Google glass to the augmented, they experience everything […] my experience is that when you have people that are not really technical and you explain something, they have totally different understanding of what you're actually saying, even if for you it's very obvious, for them it's not. So, you have to experience it.

Furthermore, de Rooij said that when collaborating with Google, the lack of technological knowledge is never a problem, but he noticed the knowledge gap through other collaborations, with other firms and brands.

When talking to heritage representatives, the lack of knowledge in regards to technology was also mentioned as a challenge. Ludger Smit from the Amsterdam City Archives said that in order to better understand, how the exhibition can benefit from AR technology, he was introduced to the IKEA app: "They showed me this app from IKEA, which I liked very much. When you want to buy something and you can see it (through the app) in your own room. They will use the same technique in our exhibition room." De Wit from Museums of Antiquities also expressed some struggles with comprehending how the technology works. She said that when attending meetings, she struggled when decisions had to be taken: "And then I had to make choices like, you want this one or this one? Then I thought, well, I can only decide on what looks pretty." But she also pointed out that now she feels more confident when attending meetings with technological experts, since she gained new knowledge through the collaboration. Which is in line with Saur and Alves' (2005) discovery, that collaboration among different fields facilitates innovation and knowledge sharing between members. The representative from Prehistoric Village also said that lack of technical knowledge presented a challenge during their meetings. He said that bridging the gap was not easy:

> Sometimes you have a meeting, you talk about things and you think you mean the same thing but you don't. Or somebody says something and you think you understand it but basically you don’t know the implication. So, bridging the languages between let's say historical content driven organization, like a museum, and a more technical driven, that's sometimes a thing to look, look into.

Furthermore, he also explained how the new technology presented a challenge for the employees. The employees at The Prehistoric Village were not technological savvy but because they are the ones who sell the experience to the visitors, they had to learn how to use it. This clearly shows how daunting technology can be if the user has no previous experience with it. Thus, when creating such projects, it has to be taken into consideration that the user’s experience is made as simple as possible. It should not present a distraction but it should encourage visitor engagement through friendly instructions (Izzo et al., 2018; Pedersen, Gale, Mirza-Babaei & Reid, 2017).

On the other hand, while talking about the challenges the interviewed stakeholders also spoke about positive sides of their partnerships. They all expressed mutual understating of roles during the collaborations. When asked about their differences, they stated that there were obvious differences in regards to the way of working, skills and knowledge, but they also emphasized the mutual involvement, open mind and the dedication to make the collaboration work. This echoes Adler Paul and Chan (2011) discovery that collaborations are more than just partnerships that facilitate the development. Collaborations are knowledge sharing process where partners have the ability to learn, share and inspire through good communication and understanding. All the respondents confirmed they had complementary visions and mission, they tried to be collective, and lastly, they were committed to achiving the same goal – a successful project, which connects to the factors for successful collaborations identified by Ostrower (2005). The representative from Prehistoric Village said the following about their collaborators – *Dutch Rose Media*: “They were very enthusiastic, very eager to make this a success. And it's very nice, you could also feel it and they reacted fast to the problems we encountered”.

The second main challenge, mentioned mostly by the creative side, were technical problems. When developing new technologies there is a greater possibility to encounter technical difficulties due to the novelty and constant development. When asked about challenges during the collaboration van Happen said:

> So, there was a technical challenge for us. It was the first time for such a big project. We worked with a partner who made the videos for us and I think that was the hardest challenge for us during the whole project, because we were living in a total different world to theirs.

Their video partner struggled to understand AR technology and did not want to adapt to the technological demands. This confirms what Todeva and Knoke (2005) and Ostrower (2003) said in regards to dividing roles. Partners need to have mutual respect and accept each other's differences, otherwise tension and frustration affect the collaboration. Furthermore, as also expressed by van Happen, this was their first time working on a big project, which also brought some uncertainties on their side. Technological difficulties also represented the main challenge for Media Monks. As explained by de Rooij they struggled when trying to develop realistic visuals. Their biggest challenge was converting data into a format that can be experienced by an average user, who owns a VR device. Testing and improving the bugs in the app also caused major stress for Wij doen dingen. De Vroom said that challenges and complex projects go hand in hand. "It's just like building a new building, you know. You never build a building and everything runs smoothly, but it's just a matter of how you communicate with each other to get it working". Thus, it can be said that challenges can occur but as long as other factors for a successful collaboration are obtained the collaboration can still work, even with some drawbacks.

Other challenges that were mentioned by the heritage representatives were time and finances. The representatives from Prehistoric Village and Museum of Antiquities both mentioned that implementing new technologies brings new risks. The representative from Prehistoric village said that: "Next time I'll think, I'll wait a little bit and let others make mistakes before we do." Anne de Wit said that time is always a challenge, for every exhibition. Furthermore, as Ostrower (2005) discovered, grants often do not cover the full cost of partnership. Which was confirmed also in the interviews. For instance, de Wit explained that getting grants to implement new technologies is not popular anymore. For example, more and more grants demand a collaboration between international museums. But as de Wit explained, when creating exhibitions with international partners the budget split has to be very specific. They have to dedicate most of their budget to specific tasks such as transport, rent and insurance to guarantee the execution of the exhibition, which leaves little or no finances for a technological addition to the exhibition.

5.3. Future directions

In the previous subsections I discussed and analyzed the establishment of collaborations and the challenges that they bring. But while talking with creative industries and heritage representatives we also touched upon their more personal views about AR and VR technology, the current situation in the heritage sector, the competition and the future.

We are now living in the era of smartphones, mobile apps, immersive technology and thousand other forms of entertainment that seem to pose a threat museums and heritage institutions. The entertainment market is growing increasingly every year, and museums and heritage institutions are well aware of their competition. For example, Mr. Sreenivasan chief digital officer at the Metropolitan Museum of Art in New York, said that Met's biggest competitors are Netflix and Candy Crush (Shu, 2015). When discussing their competition all the interviewees agreed with the statement, that heritage is in competition with other forms of entertainment, when it comes to attracting visitors. The representative from the Prehistoric Village said: "We compete with Ikea. We compete with shopping, we compete with Efteling (amusement park)". The Swedish company was also mentioned by Smit from The Amsterdam City Archives when he was asked about their competition. He said that his most important competitor on Saturday and Sunday is IKEA. Which brings us to the importance of spatiality and providing an experience that captures all the senses, and creates a memorable experience (Pine and Gilmore, 1999 as cited in Balloffet, Courvoisier, & Lagier, 2014). The digital era provided new opportunities to inhabit virtual spaces. People perform social interactions in spaces, they shop, talk and create new memories, therefore it was only a matter of time that people would try to experience the same in a virtually created space. Creating a virtual space is not just a new mean of communication, but it becomes a place itself, a place and space where activities can occur (Kalay et al., 2007). This has stimulated museums to explore a new area where the acquisition of knowledge and immersive, memorable experiences are united. Providing immersive experiences and entertaining content has become essential to grab people's attention. Previously, the richness of a heritage institution was measured based on the objects it possessed, while now the focus and the value are switching to the form of information dissemination in relation to the exposed objects (Balloffet et al, 2014). "The museum has become a hub of information, filled with objects that can be digitized and governed by the principle of edutainment" (Balloffet et al, 2014, p. 9). In fact, culture can be shared in various ways, therefore, implementing interactive, immersive technologies can be helpful. Rheingold (as cited in Balloffet et al., 2014) already

stated in 1992, that new communication technologies will have a high impact on the convergence between education and entertainment. Thus, the implementation of new technologies should not be seen as something museums and heritage institution do just to stay in touch with the trend, but it has to be connected to a greater purpose. Otherwise, they can deviate into a "technology trap" which puts technology at the center of attention and disrupts the core educational value offered by heritage institutions. VR and AR for example can serve as tools to transmit stories behind objects, paintings buildings but at the same time, close attention has to be paid to prevent that technology overshadows the presented objects or stories.

All the interviewees expressed similar opinions when asked, if they believe that VR and AR are making heritage more interesting. They agreed that if used right it can give additional layers to exposed objects and help with storytelling. The heritage representatives specified that technology per se does not make heritage interesting but, if used right it can add additional value. For example, Smit from Amsterdam City Archives said: "It doesn't make heritage itself more interesting. Heritage is interesting but it can be a mean to give some extra explanation." The creative industries representatives have also expressed similar opinions. They all see VR and AR technology as tools that can help convey more specific messages and help with understanding. Cyril de Vroom said: "I think that augmented reality and virtual reality is a great learning tool […] it's a great tool to easily visualize and understand." This somewhat echoes what Izzo, Graziano and Mustilli (2018) said about the added value of technological implementations in heritage. Technology should not be intrusive and it should not present a distraction from the displayed items or environment. Working on skillfully developed content represents an important factor when trying to give your visitors the best cognitive, emotional and functional experience (Izzo et al., 2018).

While discussing the future of heritage and the implementation of new technologies we also addressed the future of collaborations. As already established in the first section of the results, the "need" for implementing new technologies has opened the market for new creative businesses with a specific technological focus. The desire to create new immersive experiences pushed museums and heritage institutions to seek expertise outside their walls. They started collaborating with developers, technological experts, entrepreneurs and other creatives. However, they also started looking for options that could be placed within their walls. Recently, a few museums around the world tried to bring together developers, cultural experts and entrepreneurs by establishing hubs, accelerators and incubators. An example of

this is the New Museum in New York, where they launched their own incubator, which brought experimental coworking directly to the museum (Ciecko, 2017). However, even though taking risk can bring a positive outcome, it can also have a negative impact. When focusing too much on innovation, and perhaps being too ambitious, museums and heritage institutions can deviate from their purpose and economic efficiency. A great illustration of this is again the Met, which recently tried to expand in various areas, including emerging technologies. The consequence of this overly ambitious plans was a deficit of $10 million (Pogrebin, 2016). When asked about the idea of creating new departments the heritage representatives stated that they find it too risky and therefore they do not see it as an efficient solution for now. There are still many uncertainties when it comes to VR and AR. The representative form Prehistoric Village addressed this topic and said the following:

> I can imagine that in Van Gogh museum or Rijksmuseum they might have its own VR department, but I believe at the same time you see more and more organizations turn into agile working. Things change so fast. Why would you set up a separate department if you can just have really good professionals? And for employers it's … especially with the Dutch labor laws, you don't have an incentive to hire more people. It's much more interesting to hire just professionals, and once the job is done, you go home, you don't have to risk.

Ludger Smit from Amsterdam City Archive expressed similar concerns regarding capacity and the uncertainty of VR and AR, he said: “I don’t think we have the capacity to do it ourselves and to follow all the new trends. It's better to use specialists for that. I don't know whether or not it will be successful”.

Therefore, it is evident that heritage institutions are seeking external expertise to diminish the risk they are taking. With collaborative projects they try to capitalize on resources offered through their partners to complement their own deficiency or to further develop their strengths (Tien, 2006). External expertise seems to be essential to implement novel technology in heritage, which confirms the statement made by Tien (2006) that museums are acknowledging that they cannot reach their objectives in isolation. Anne de Wit from The Museum of Antiquities confirmed this by specifying their use of external collaborators for parts of exhibitions:

> […] For our exhibition design for instance, we also, we always hire external experts so we can have different, uh, companies and then every exhibition will look new and they have new ideas all the time. So, I think for this museum we will keep doing that.

By doing so they benefit from external knowledge which is essential for collaboration between sectors (Saur et al., 2005). By leveraging on external knowledge, they create useful ground and facilitate the implementation of innovative projects, while taking smaller risks in time management, cost and revenue.

Creative industries representatives were sharing the same opinions as their heritage collogues. Bogwart from Synergique said that heritage institutions are project-based organizations and relying on external help seems to be the most effective way of working. Marc van Hasselt from Novitas Heritage shares a similar view. He pointed out that taking advantage of external expertise is a smart and cost-effective decision:

> I also think from a business point of view, it's better for the museums to focus on what they do best, and which is to conserve knowledge, or objects, to share knowledge and then if they are looking for new techniques on how to do this, to find the people who are best at doing that. Also, it's more cost effective, I would think.

Bos from Geodan, as the only interviewed developer, addressed the fact that VR is becoming more and more accessible but he still stressed on the importance of specific expertise. While talking he said the following:

> So even with limited knowledge, you can start and, you know, build your initial prototype, build your initial app, but if you want to have elaborate experiences, if you have these highly complex interactions, these narratives, for sure you need an expert, for sure!

Moreover, van Happen said that in his opinion the future of new technological implementations will rely on cross sectoral collaborations. He specified the importance of all of the involved partners in the collaboration. He argues that implementation of new technologies should be based on knowledge and specific skills provided from all the partners involved.

Therefore, it can be concluded that the stakeholders involved in AR/VR projects for heritage see their future as a collaborative future. Even though AR/VR technology is not seen as mainstream yet, research conducted by Chan (2016 in Widmann) predicts that in 5 years things will change. Thus, heritage institutions have to stay in touch in order to satisfy the more and more specific consumer demands and make use of immersive technologies by providing new forms of experience that will help them differentiate from other competitors.

However, due to lack of founds dedicated to new technologies it seems like cross-sectoral collaborations will not become a mainstream way of working very soon. Only museums that have enough finances will be able to experiment at this stage. Thus, grants that specifically target collaborations between creative industries specialized in immersive technologies and heritage can be of great help to stimulate museums and heritage institutions to take a step forward, experiment and take risks. Not to forget, besides generating a higher influx of visitors and spreading awareness, a higher demand for projects that include immersive technologies could also stimulate the growth of creative businesses in this area, and consequently influence the creation of new jobs. Therefore cross-sectoral collaborations can bring significant competitive advantages for all sectors, and through this research it was confirmed that the heritage field is not an exception to it.

Through this research I gained knowledge that can be used for the establishment of future collaborations. The analysis showed that the following factors have to be achieved for fruitful collaboration. Firstly, common objectives and goals have to be established. For example, museums and heritage institutions need to elaborate why they want to implement new technologies and creatives have to see a common goal for their business in that. As Scheff and Kotler (1996) wrote, the next thing that collaborators should focus on is understanding each other's culture. Through the interviews I discovered that the collaborators focused on what they knew best and there was no interference, which prevented misunderstandings and skepticism. Trust and boundaries need to be established. Furthermore, it is important that all the involved stakeholders share mutual respect and accept the skills and knowledge of each participant. And lastly, good communication and a strategic fit have to be developed to strive for the best outcome.

All the above stated can be used as a guide for future collaborations. Moreover, this research also offers insights for grant makers and government institutions, since supporting cross sectoral collaborations has intrinsic value and can boost the national economy. Furthermore, grants facilitate the implementation of novel technologies in Dutch museums and heritage institutions, and by doing so they showcase the innovativeness of the

Netherlands. In order to help stimulate cross-sectional collaborations, grant makers should focus on creating grant criteria that inspire collaboration, helps focus on common goals and visions (Ostrower, 2005). Grant makers should prevent that cultural heritage institutions start thinking about the implementation of new technologies just to obtain the finances, or that they collaboration is established just on paper. It should be developed in way that the applicants see collaboration as a tool and not a strategy. Furthermore, grant makers can also help by supporting collaborations in their initial stage. This can be more beneficial to parties that never worked together and have no experience in cross-sectoral collaboration. By providing additional guidance and stimulating reporting in the beginning phases it can help avoid incomprehension between collaborators. Furthermore, since the implementation of new technologies is time consuming, a good way of helping could be presenting the funds in different stages (Ostrower, 2003).

Another way of stimulating collaborations could be through specific events, where heritage institutions and creative agencies interested in collaborating would meet. For instance, a heritage institution could present its goals with new technologies. And the creative businesses would provide a possible solution. Avinash Changa from WeMakeVR also proposed focused funding for creative projects that implement VR and AR technology in heritage. In this way he said, creative agencies are able to directly approach heritage institutions and museums with already pre-confirmed budgets, which makes the decision process faster, according to Changa. During the interview he spontaneously addressed this topic and said:

> So, I would agree, or I would argue that it's a lot more affective approach if we come up with a concept […] We submit it, the board sees it and evaluates and sees the merit of the concept, and they say: Ok, this will get potential funding, once you find a right cultural heritage partner. So, then you can go to an institution and say: Hey, we want to talk but we are not just wasting your time, we have the potential or a preapproval on a budget. So, that makes the time spent for the organization a lot more efficient, and it will make the conversations easier. They are a lot more willing to talk if you say: Hey, this is not going to cost you money, we are actually going to give you content and is going to be sponsored by this program.

6. CONCLUSION AND RECOMMANDATIONS

The aim of this research was to highlight the behind the scenes of implementing new technologies in heritage, who the involved stakeholders are, which strategies they choose when they collaborate, what are their motives, what kind of challenges do they encounter on their way and lastly, how can this knowledge be used in the future, since this is a rather unexplored area of research. This research presents a significant first step in filling the gap in the literature. It demonstrates how digital technologies disrupt the way museums and heritage institutions operate these days. Nowadays, museums and heritage institutions have to compete with various forms of entertainment, from amusement parks, video games to on demand video content. Even though this disruption at first appeared as an inconvenience, it eventually brought a vast amount of new possibilities to heritage institutions by revolutionizing storytelling and merging education with entertainment. New technologies such as AR and VR have stimulated heritage institutions to step out of their comfort zone and explore collaborations in partnership with experts in the field. The research showed that when implementing new technologies, due to lack of knowledge and expertise, heritage institutions rely upon knowledge provided by external experts, which usually belong to the creative industries. Results showed that the stakeholder involved in the implementation of VR and AR technology in heritage come from creative industries, technological companies, research universities and nonprofit organizations. A particular discovery of the analysis is the boom of new thriving businesses, stimulated by this recent paradigm shift, specialized in AR/VR technology and cultural heritage consultancy.

Furthermore, through this research I also investigated the establishment of collaborations. The four most common ways to start collaborations are: participating to an open pitch/open call, by directly contacting the collaborators, relying on previous working experience and networking. The exhaustive investigation also focused on the flow of synergy between the collaborating parties by relying on Austin's (2000) framework, which showed that the analyzed collaborations in most cases belong to the transactional stage, characterized by mutually beneficial exchange between collaborators, while only one belongs to the philanthropic stage, where there is no monetary exchange between collaborators. What is more, this research also classified collaborations based on co-operative strategies defined by Stafford (1994) that analyze value chain activities. Even though this framework seems to be old and more relevant when researching traditional business collaboration, it also resulted as the only one applicable to the collaborations addressed in this research. A mix of hand-over

strategy and trade strategy was identified for one of the analyzed collaborative projects, while the most common co-operation strategy seems to be trade strategy, where a two-way exchange happens between partners while performing tasks (Stafford, 1994).

When investigating why are these collaborations formed, I found that creative businesses and heritage institutions do not always share same motives. When it comes to implementing new technologies the motives that guide heritage institutions to collaborations are: getting funds, engaging new audiences, social responsibility, offering new experiences, to keep up with latest trends and to achieve competitive advantages. On the other hand, creative businesses decide to take part to gain profit, to gain new knowledge, expertise, to get new business opportunities. However, even if the research showed that the motives may differ, it was made clear that they still aim to achieve the same goals. While co-creating the involved stakeholders usually try to understand each other's culture, they try to share knowledge and respect their differences. Which confirms the results of previous research conducted by Scheff and Kotler (1996) and Ostrower (2005) that highlighted the factors for a successful collaboration. Therefore, to strive for a successful collaborations partners have to be selected after careful consideration, their missions and visions should be complimentary, there should be trust and mutual understating, boundaries have to be established and lastly, there has to be constant communication in order to avoid misunderstanding.

When it comes to novel technologies and novel practices obstacles are always expected. The challenges addressed in the research ranged from, lack of knowledge, technical problems, finances to time management challenges. Even though this research acknowledges benefits for both heritage and creatives through collaborations, it can be clearly seen that heritage institutions are sometimes put in awkward positions because of lack of technological knowledge. However, the imposed technological advancements are forcing them to gain knowledge by taking risks.

Lastly, a noteworthy development that can be seen through the highlighted discoveries is that museums and heritage institutions are accepting their new roles as entrepreneurs, visionaries and innovators besides their already established role as guardians of heritage. Thus, we can conclude that the emergence of new technologies such as AR and VR is making the potential outreach of museums and heritage even bigger. Through the empirical analysis it was established that AR and VR can be used not only for recreation and reconstruction of heritage, but they can also have the capacity to become tools that provide lasting experiences of culture merged with entertainment. Furthermore, headsets, glasses and other mediums through which AR and VR can be experienced are getting more accessible as

well the familiarity of the users. Thus, it can be expected that the popularity of the technology will increase and stimulate the development and funding of heritage projects that entail new technologies and collaborations with creative industries.

6.1. Limitations and suggestions for future research

Due to lack of scholarly literature addressing the specific topic, different area of academia had to be researched and taken in consideration. The secondary literature ranged from business, arts management, culture, the economics of innovation, information and communication technologies and tourism. This presented a primary challenge because instead of focusing on one area, different areas of research had to be taken in consideration to assure a relevant theoretical framework and argumentations.

Secondly, even though the research instrument -semi structured in-depth interviews was established as relevant, it also posed a limitation in regards to validity or accuracy. The small sample size presents a limitation because the findings cannot be generalized, especially in regards to heritage institutions. As already established in the methods section, getting in touch with heritage institutions and municipalities was very difficult. Thus, only three heritage representatives were interviewed, which influenced the results. Although, the results cannot be generalized due to the small sample size, they still highlight crucial aspects of collaborations between heritage and creative industries and can therefore present a basis for future research. Moreover, the language used in this research might have influenced how the respondents expressed themselves, since English is not their first language. What is more, the exploratory essence of this research might have influenced the way of researching and presents a limitation in regards to some of the addressed concepts, since they have not been examined exhaustively enough.

However, it is important to emphasize that the lack of academic literature also provides new grounds for future empirical research about collaborations within the heritage sector and within new creative businesses specializing in immersive technologies. The topic can be further examined in regards to the economic aspect of projects implementing new technologies in heritage. Moreover, the user's aspect should also be taken in consideration. Future research can inquire about the motives that stimulate visitors to visit heritage institutions offering immersive technologies or inquire about visitors' experiences with new technologies. Furthermore, one of the interviewees addressed the evident cultural differences

between museum visitors, which could also be a relevant topic for future investigation. Lastly, when technologies such as AR and VR become mainstream, comparative studies can be a great way of exploring the topic. It can be concluded that there are plenty of areas to explore in regards to heritage, collaborations and implementation of new technologies, which will hopefully become a more popular area of research in the next years to come.

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Appendix A - Interview guide:

General opening questions

1. Could you please introduce yourself, explain where do you work and what is your current job position?
2. How long have you been working in this field?
3. What is the last project you have been working on?

Cross-sector collaboration

4. With was your last project that was in any way related to heritage?
5. Who was your partner and why did you decide to collaborate?
6. What was the role of your organization and intention of this collaboration?

Factors, motives and challenges

7. What were the motives to collaborate?
8. Was the goal of the project clear from the beginning or was it an evolving process?
9. Was this collaboration based on resource exchange, meaning that a part of the project was completely done by your organization as if you were hired to do just a part of the project and you were not involved in the whole process?

a. If no, was this collaboration based on constant collaboration, meaning that the project needed collective action throughout the whole process?

9. Does your organization also collaborate with other cultural heritage institutions outside this project? If yes, with whom?
10. What are the differences between you and your collaborators?
11. How did you try to understand each other's culture and way of working?
12. Were your mission and vison complementary?
13. How did the communication go during the project?
14. What were the challenges encountered during this process?

a. How did you solve these challenges?

15. Where there any difficulties communication because of lack of knowledge from both sides?

a. How did you approach this collaboration if there was little knowledge of the technology that was used?

16. Did you have to present and explain VR and AR to the cultural heritage organization and the other way around?

Future

17. What do you think about the claim that museums are in competition with other forms of entertainment, and therefore need to implement new technologies in their business?

18. Do you believe VR and AR are making cultural heritage more interesting to the visitors?

19. How do you see the future of cross-sectoral collaborations in cultural heritage?

a. Will cultural heritage institutions keep outsourcing or will they create their own tech departments?

20. Would you like to say, explain, share anything else?