8

Museums and Technology for Value Creation

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Introduction

Museums as cultural organisations are using technology to involve the audience as users to contribute to cultural heritage knowledge. As organisations that use the Internet, social media, virtual and interactive technologies, museums should contribute to value co-creation as a source for knowledge sharing and creation, as well as learning and education within cultural ecosystems. Museums as educational institutions, information-based, knowledge-driven and learning-oriented organisations (Bagdadly, 1997; Freedman, 2000; Hein, 1998; Hooper-Greenhill, 2007; MacDonald & Alsford, 1991; Marty, 2007a) are embracing various technologies to develop user engagement and support the participation of the audience in cultural activities (Bearman & Gebra, 2008; Simon, 2010) promoting social innovation by following an audience-centred orientation (Consiglio, Cicellin, Scuotto, & Ricchezza, 2017) in order

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to develop value co-creation processes (Antón, Camarero, & Garrido, 2018). Museums as memory and cultural institutions collect, preserve, research and display cultural heritage connecting the past with the present and future and promoting social value and action (Burton & Scott, 2007; Hein, 2005). As audience-driven, production-centred, intensive-information and knowledge-oriented organisations (Bonacini, 2012; Freedman, 2000; Gilmore & Rentschler, 2002; Marty, 2007b), museums evolve coherently with technological developments as communities that contribute to creating value and constructing service experience within cultural ecosystems, involving the audience as active participants in the defining of cultural heritage contents and strengthening the relationships between technology, the public and the museum as an organisation that creates value by human resources (Ind & Coates, 2013; Minkiewicz, Evans, & Bridson, 2014; Prahalad & Ramaswamy, 2013; Vargo & Lusch, 2008). Museums contribute to sustaining value co-creation processes using technologies to develop interactive and dialogic communication and legitimise information and knowledge management (Antón et al., 2018; Capriotti & Kuklinski, 2012; Freedman, 2000; MacDonald & Alsford, 1991). As agents of social innovation (Castells, 2001), museums are open to cultural participation of users to generate and share their own museum content (Bonacini, 2012; Russo, 2011; Russo, Watkins, Kelly, & Chan, 2008; Simon, 2010).

Investigating research regarding the relationships between the use of technologies, user participation and involvement and museum staff, the idea of a museum as an organisation and value creation remains an unexplored area of study despite the increasing attention of scholars to the introduction of technologies within the cultural heritage field. This study helps to identify the trajectories that museums are following in order to create value in involving the audience as users in cultural heritage and developing the museum as a community-oriented means of value creation. This study aims to provide an interpretive view to identify how museums are changing by using the web, digital, interactive and virtual technologies and environments to create value involving the audience in defining cultural heritage contents. Studying the role of technologies within museums contributes to understanding how museums are changing to enable value co-creation in the cultural

heritage field. Museums contribute to developing and sharing knowledge and information about heritage within cultural ecosystems (Borin & Donato, 2015; Davies, Paton, & O'Sullivan, 2013). They are also embracing the Internet and interactive technologies in order to promote value co-creation, driving service innovation by opening to the participation of the audience in order to generate new knowledge to their audience and encourage new cultural experiences. Technologies help museums to serve the educational mandate, sustain learning experience and preserve cultural heritage by adapting to the changing world and involving potential visitors to take part in the production and value creation regarding cultural heritage (Anderson, 1999; Bautista, 2014; Hein, 1998; Hooper-Greenhill, 2007). Museums embracing technology cede authority, enabling staff and users to develop both cultural experiences and interactive-collaborative processes that rely on knowledge transfer and information sharing within the museum as a community (Crooke, 2006; Kelly, 2010; Schweibenz, 2011; Watson, 2007). Museums should pay attention to the social dimension of computer-based technologies and applications that support cognitive processes (Antinucci, 2007) and exert an influence on behaviour, experience and the integration of exhibits and visitors (Economou & Pujol, 2008).

This study aims only to provide an interpretive and qualitative framework. The research relies on considering the literature related to the advent and introduction of the Internet, social media and virtual-interactive technologies and environments within museums that are opening up to an increasing level of user involvement and participation in the definition of cultural heritage content. The selected contributions are summarised and interpreted (Denyer & Tranfield, 2006) in a narrative synthesis as a flexible approach to studies addressing a different aspect of the same phenomenon. A narrative approach helps provide a description of data in order to develop and present new perspectives on emerging issues and to advance theoretical models (Dixon-Woods, Agarwal, Young, Jones, & Sutton, 2004). Referred journal articles were selected from *Google Scholar* as the main web source and database.

The chapter is organised in the following way. After Introduction, in section "Museums as Information and Knowledge-Based, Education- and Learning-Oriented Organisations" museums are presented as

information- and knowledge-based, education- and learning-oriented organisations. In section "Driving Change Within Museums as Communities by Technologies", it is elucidated how technologies contribute to change within museums as communities. In section "Museums Contribute to Value Co-creation by Technologies", we look at how technologies drive museums towards value co-creation and involving users in cultural heritage content. Section "How Technologies Enable Value Co-creation Within Museums" outlines how technologies enable museums to promote value co-creation by revitalising user involvement and participation (from communication to sustaining learning and education), by rethinking virtual museums from managing collections to creating and sharing information and knowledge, rediscovering the role of museum information professionals as mediators between museum knowledge source and the needs of users as active co-producers of knowledge and a new source for value. Finally, conclusions are outlined.

Museums as Information and Knowledge-Based, Education- and Learning-Oriented Organisations

As institutions centred on the citizen, museums have a social role within contemporary world (Knell, 2019). As memory institutions and information-oriented organisations, as well as custodians of cultural heritage assets and values and storehouses of knowledge (Bagdadly, 1997; Freedman, 2000; Marty, 2007a), museums should "serve society by helping provide the knowledge its members need to survive and progress" (MacDonald & Alsford, 1991: 305). They contribute to sustaining the development of society; museums acquire, conserve, research, communicate and exhibit for the purposes of study, education and enjoyment, material evidence of people and their environment (*Icom*, 2004); they promote understanding and interpreting of the nature of objects, things and artefacts (Pearce, 2003); museums support interacting with the public, meeting various and different visitor experience expectations (Sheng & Chen, 2012), providing information, education

and recreation, promoting learning and shaping knowledge (Hooper-Greenhill, 1992, 2007).

As institutions that preserve values, identity and memory within a community, museums contribute to creating social value for the public by incorporating heritage as resources inherited from the past, history, continuity, values, beliefs, knowledge and traditions (Burton & Scott, 2007; Kurin, 2004). Museums as memory institutions are sites for critical reflection on the past (Hooper-Greenhill, 1992) and promote knowledge, guaranteeing the best conditions for public use and the fruition of cultural heritage as a concept that is changing over time (Council of Europe, 2005; Vecco, 2010) and evolving from considering monuments, objects and preservation to paying attention to people and functions, as well as sustainable use and development (Loulanski, 2006). "Museums are part of the fabric of societies and communities, and their value is both acknowledged and enhanced by seeking and strengthening relations, exchanges and activities within these nested ecosystems" (Sabiescu & Charatzopoulou, 2018: 330). The museum of the future should promote innovation, and strengthening the individual experience within a museum creates a new public sphere of knowledge where the visitor can admire the innovation of the artist and learn to become an innovative actor (Weibel, 2018).

As information-intensive organisations and bridges between information and knowledge (Freedman, 2000; MacDonald & Alsford, 1991; Marty, 2007a), museums contribute to developing, creating and sharing knowledge and information about heritage within cultural ecosystems (Davies et al., 2013; Borin & Donato, 2015). As organisations "concerned with generation, the perpetuation, the organisation and the dissemination of information" (MacDonald & Alsford, 1991: 306), museums should "help their audiences exploit effectively the information resources in their self-directed quest for knowledge" (MacDonald & Alsford, 1991: 306) because "the role of museums, in the future, that of the knowledge municipality, lies in legitimizing information and information processes and in being an advocate for knowledge as the province of the people" (Freedman, 2000: 303). They should use the information as what can be communicated to people and knowledge as

the result of the interaction within community (Orna & Pettitt, 2010) and to create understanding (MacDonald & Alsford, 1991). Museums focusing on the internal communities as museum professionals or on the external audience as visitors select different concepts of knowledge and understanding with meanings being constantly rediscovered or fixed. Museums maintaining a single narrative and interpretation focus on *visitors* only to *attract them* for accessibility and enjoyment, spreading knowledge. When the truth is dependent on context, museums open up to multiple and flexible interpretations of knowledge and understanding. The meanings are constantly rediscovered. The community outside as stakeholders *(forum)* encourages visitors in creating meaning from the collections actively contributing to civic society as a shared depository (Davies et al., 2013).

As knowledge-based organisations (Bagdadly, 1997; Freedman, 2000), museums provide authentic knowledge to their audience (Russo & Watkins, 2007). They tend to manage and interpret collections, collect and provide information as organisations that use, disseminate and share knowledge and modify work practices and structures coherently with changing social, economic and political contexts and issues (Hooper-Greenhill, 1992; Leon, 2013). As institutions that communicate and interact with the public through exhibitions (Hooper-Greenhill, 1995), museums need to engage the public in the cultural value creation as participatory communities that promote social capital and identity, cohesion and exchange, public awareness and economic benefits (Burton & Scott, 2007; Murzyn-Kupisz & Dzialek, 2013; Scott, 2003, 2010). Museums as knowledge municipalities legitimise the processes of capture, management and dissemination of information and knowledge (Freedman, 2000) about cultural heritage as a source that gives citizenship and civic virtue content (Duncan, 2003), relying on understanding the values and beliefs of people to promote cultural diversity, creativity and continuity in the public sphere (Kurin, 2004). As sustainable institutions that achieve multiple goals, serving the interests of different kinds of public members, museums should develop and fulfil a cultural mission by driving local economic and cultural growth and improving the quality of life (d'Harnoncourt, DiMaggio, Perry, & Wood, 1991; Pop & Borza, 2014). As organisations open to

the public, museums are always educational institutions that preserve culture, promote social action (Hein, 2005), enable visitors to interact with object learning and facilitate learning experience as a social process of meaning construction, beliefs and values (Lord, 2007; Macfarlan, 2001). Museums as learning environments shape the knowledge and influence learning, enabling learners as proactive actors to engage in their experience, culture and emotions (Hein, 2006; Hooper-Greenhill, 2007), constructing meanings in the mind by interacting with objects, environment and users (Hein, 1999).

Driving Change Within Museums as Communities by Technologies

As interpersonal communicators (Hooper-Greenhill, 1995), museums should strategically promote interaction between museum staff, objects, artefacts and the public, engaging with a working audience and active participants in an interactive process (Balogun, Best, & Lê, 2015; Romanelli, 2017) within a community where museums and users share the same interests and goals (Rounds, 2012), and the audience is an active agent that influences how museums act and represent what a museum examines (Karp, 1992). Museums represent the community and reinvent themselves as a centre that supports community development and redefines the relationship between the museum and the public towards a shared authority (Burton & Scott, 2007; Duclos-Orsello, 2013) as an effective and legitimised institution in information provision and communication (MacDonald & Alsford, 1991; Schweibenz, 1998, 2011) that creates public value through promoting knowledge and awareness about cultural heritage (Holden, 2006).

Museums contribute to building inclusive and cohesive communities and promoting community development, collaboration and identity (Crooke, 2006). "Museums reflect the concerns of the society in which they are located, and their relationship with the communities they serve is renegotiated and reinvented as their purposes develop and change" (Watson, 2007: 13). They are becoming spaces of cultural innovation and cultural connectors that support identities, meanings

and values within society (Castells, 2001), promoting social innovation by following an audience-centred orientation (Consiglio et al., 2017). Rediscovering museums as communities implies redesigning their identity as social spaces living in contemporary society (Crooke, 2006). Rethinking a museum as a community helps reinforce its purposes more than interests involved in the museum (Watson, 2007) and helps it to empower the public (Freedman, 2000) and serve cultural and social functions because "no single museum has a monopoly on truth nor can present a complete picture of the human condition: no more should we imagine that all heritage can be encompassed by museums" (MacDonald & Alsford, 1991: 309). "Museums and heritage have been used to express community and to look at the role of objects in symbolizing community and expressing senses of belonging" (Crooke, 2006: 174).

As responsive, effective and trustable institutions in information society, museums use technologies in order to improve information management and provision (MacDonald & Alsford, 1991; Schweibenz, 2011) "making their information sources accessible to the public", "utilising all information and communication technologies now available" (MacDonald & Alsford, 1991: 310). Technology enables museums as institutions to become mass communication oriented (Hooper-Greenhill, 1995) to better exert a civilising influence and adhere to an educative mission within society (Keene, 1997). In the information era, museums develop and enhance cultural innovation, sustaining the participation of audiences in cultural heritage in order to develop better quality of life within communities (Castells, 2001) by promoting social and public value (Burton & Scott, 2007). Technologies enable the museum to abandon the exclusive role of a key intermediary of knowledge about collections and promote a shared authority on cultural heritage, democratising knowledge and adapting to changing and contemporary society (Bautista, 2014; Duclos-Orsello, 2013; Knell, 2019; Schweibenz, 2011). As organisations embracing social media and interactive technologies, museums are social platforms and ecosystems (Brown & Mairesse, 2018) that offer a "space for conversation, a forum for civic engagement and debate, and opportunity for a variety of encounters among audiences and the museum"

(Proctor, 2010: 36). They should pay attention to the collection of objects for storing and managing information creating and sharing new knowledge rather than using it in terms of communication and dissemination of knowledge. As a community that relies on trust-based active participation of users, museums shape knowledge using technology to develop two-way communication to empower the public as a key actor to promote cultural value creation and enhance the experience of visitors as co-creators of public value and producers of information and knowledge working in collaboration with museum staff as a community (Kelly, 2010; Schweibenz, 1998, 2011; Scott, 2010). As organisations that are undergoing the transition from Web to Web 2.0 and embracing virtual-interactive and digital technologies, museums are evolving from being consumption-centred, custodial-oriented and collection-driven institutions designed for preservation to becoming production-centred/audience-driven organisations that sustain active participation of users in cultural content creation, fostering museum staff–visitor and user interactions and creating a visitor-friendly environment that relies on dynamic information, passion and emotion, dialogic interaction, connected and collective expertise, bidirectional and participatory communication and collaboration, as well as cultural contents sharing (Bonacini, 2012; Capriotti & Kuklinski, 2012; Gilmore & Rentschler, 2002; Schweibenz, 2011). Technologies are socially shaped (Williams & Edge, 1996) in order to drive meaningful communication within museums (Antinucci, 1998). "Digital technology presents great opportunities for cultural heritage communities to reach a broader audience in new ways" (Tang, 2005: 51). Digital technologies and digital objects help museums as meeting places and contact zones to communicate and interact with audiences, to promote meanings and dialogue and encourage audiences to become active participants involved with cultural heritage (Pallud & Straub, 2014; Pruulman-Vengerfeldt & Aljas, 2011; Srinivasan, Becvar, Boast, & Enote, 2010). In embracing advanced virtual technologies following a constructivist view, museums exploit their educational potential, delivering results to a global audience and supporting public awareness and entertainment by involving the audience as active participants (Addison, 2000; Roussou, 2002, 2008).

Museums Contribute to Value Co-creation by Technologies

Value co-creation relies on sustaining the interaction between consumers and firms involved in joint creation of value that is unique to the individual (Prahalad & Ramaswamy, 2013). Service systems are considered as value co-creation configurations of people, technology, value propositions that connect internal and external service systems, and shared information (Maglio & Spohrer, 2008). Museums contribute to value co-creation using technologies to support the participation of audiences and encourage user involvement and sustained learning and education by providing interactions and communication between the user and museum information professionals as user-centred mediators (Marty, 2011; Marty, Sayre, & Fantoni, 2011). In particular, technologies as operant resources help museums to develop service innovation and improve economic, financial and social performances (Camarero, Garrido, & Vicente, 2011), involving the customer to act as a co-creator of value, recipient of service provision and value and a proactive user to design accessible, effective and productive services and processes (Caridà, Colurcio, & Melia, 2014; Magnusson, Matthing, & Kristensson, 2003). Value creation is interactive and networked. The value is always subjective, experiential, contextual and determined by the beneficiary. Technologies are driving museums to embrace a service-centred paradigm, promote actor-driven service innovation and value co-creation following customer-oriented and relational service-centred views to emphasise the intangible aspects of the museum experience (Alcaraz, Hume, & Mort, 2009; Antón et al., 2018; Padilla-Meléndez & del Àguila-Obra, 2013; Vargo & Lusch, 2008; Vargo, Maglio, & Akaka, 2008). Museums contribute to co-creating the experience of the consumer and the value as a derived outcome, promoting active participation and physical interaction, enabling cognitive and emotional immersion, and tailoring the experience with the museum staff and technologies (Minkiewicz et al., 2014). The Internet and other social and collaborative technologies are leading museums to co-create value, building participative processes and meanings with people

(Ind & Coates, 2013; Padilla-Meléndez & del Àguila-Obra, 2013). Technologies enable museums to sustain user-led innovation for knowledge sharing and creation (Russo et al., 2008), engaging audiences in the co-creation of cultural interactive experiences and content (Russo, 2011), reshaping the process of learning (Russo & Watkins, 2007), employing the input of the public as a central contribution (Arnold & Geser, 2007) and developing new applications for user-generated content and the creation of web-based communication in cultural heritage (Silberman, 2007). Museums use technologies that make the collections more accessible to the public and promote innovations that support learning and educational orientation, mediating between market orientation and social performance (Camarero & Garrido, 2008; Garrido & Camarero, 2010). Museums promote value co-creation and support service experience interactions with audience to actively encourage user involvement and participation, enhancing the learning experience (Hazan, 2007) and enabling the creation of an emotional space, leading the visitor to re-understanding, re-interacting and re-reading the objects (Bearman & Gebra, 2008; Schweibenz, 2011; Witcomb, 2007). Virtual technology and digital applications enable museums to involve the users in the co-creation of digital cultural heritage (Marty et al., 2011; Russo et al., 2008), building co-creative environments for value co-creation and sharing (Russo & Watkins, 2007) developing a many-to-many model of communication that enables the interpretation of collections from a visitor perspective (Russo et al., 2007).

How Technologies Enable Value Co-creation Within Museums

Technologies enable museums to offer new opportunities for public fruition and the definition of cultural contents of heritage, information and knowledge management, sharing and creation. Technologies help museums as knowledge- and information-oriented organisations to store and manage information sources to create, communicate, share and disseminate knowledge involving the audience as proactive users

and co-producers of value in cultural heritage (Schweibenz, 2011). Technologies enable museums to sustain value co-creation by following some directions: rediscovering the user involvement and participation ranging from communication to sustaining education and learning; rethinking virtual museums along a *continuum* from managing collections to creating and sharing knowledge and information; rediscovering the role of museum information professionals as user-centred mediators that interact with museum information resources and meet the changing needs of users.

Rediscovering the User Involvement and Participation: From Communication to Sustaining Learning and Education

Technologies help people view the museum collections (Bearman & Gebra, 2008) and provide information on web databases (Schweibenz, 2011), making museums audience-oriented and social institutions that enable the users to actively participate in cultural content definition (Bearman & Trant, 2008). "The Internet is a great opportunity which the museums should use to broaden its audience" (Schweibenz, 1998: 194). As participatory institutions that support user engagement (Bonacini, 2012; Simon, 2010), museums are using social media and moving from a one-to-many communication in which curatorial expertise is broadcast to the community via a two-way participatory communication system (Russo et al., 2008). Museums are strategically embracing the Internet and selecting a social media strategy to engage the audience in order to develop a loyalty relationship over time (Padilla-Meléndez & del Àguila-Obra, 2013; McGrath, 2018).

Museum websites and web interfaces act as information sources and a communication channel should help reinforce a strategic link between the website and the physical place (Wilson, 2011), opening new ways of dealing with multiple users, sustaining the generation of story-based environments and driving record searches about the collection database (Dyson & Moran, 2000). Thereby, museums should provide more efficient e-services and searching tools for content- and theme-based

facilities (Lazarinis, 2011). They are still privileging a one-way channel (Capriotti & Kuklinski, 2012) that involves top-down communication and limited user involvement and dialogic engagement (Bonacini, 2012; Fletcher & Lee, 2012).

As a trusted partner that provides reliable information in participatory communication on the web, museums "should use social media to create a positive online museum experience for virtual visitors" (Schweibenz, 2011: 11) where museum staff and users develop a dialogue, interact, communicate and learn (Kelly, 2010; Schweibenz, 2011). They should drive the visitor as an active participant that contributes to creating knowledge (Mancini & Carreras, 2010) and generating and sharing their own museum-centred content (Simon, 2007). Museums are embracing digital and interactive information technology to involving participants, developing a multi-directional collaboration with the public (Capriotti & Kuklinski, 2012; Simon, 2010). Web 2.0 facilitates interactive information and knowledge management and sharing and feedback, as well as collaboration and user-centred design, unlike Web 1.0, which was used as a tool mainly focused on information provision (Bonacini, 2012). Web 2.0 is open to decentralisation of knowledge and democratises cultural production, taking into account the perspectives of the different users that interact between them (Russo & Watkins, 2007). In embracing social media, museums act as a trusted network that engages online participants to distribute community knowledge, becoming a custodian of cultural content (Russo et al., 2007). In using social networking services, museums develop *awareness* to increase the diversity of the audience, *comprehension* to enhance visitor understanding and knowledge about collections to strengthen the relationship between museums and visitors, promoting *engagement* in order to connect visitors and museum staff and reinforce the relationship between the visitor and museum (Chung, Marcketti, & Fiore, 2014).

Museums are providing an increasing amount of opportunities for accessible and flexible education and learning, developing new interactive technologies (Lòpez, Margapoti, Maragliano, & Bove, 2010) and building virtual environments as independent of physical spaces that enable the user to have new experiences while interacting with

virtual humans and accessing to information created during the interaction (Machidon, Duguleana, & Carrozzino, 2018; Schroeder, 2008). Technologies and multimedia applications help the museum to reinvent the educational and cultural role in the society (Hein, 2005; MacDonald & Alsford, 1991) and redefine learning processes and spaces (Miller, 2010). Technologies contribute to enabling the creation of learning and emotional spaces and leading to a re-reading of those displayed objects (Witcomb, 2007), improving the quality of museum experiences and learning (Lehn & Heath, 2005) and valuing the message in terms of technical, aesthetic and pedagogical implications in the presentation and interpretation of objects (Economou, 1998). Visual objects should help reinforce and experience effective communication, investigation and learning (Du Terroil, 1975). Interactive, advanced and virtual technologies drive museums to sustain the learning and educational process, supporting individual psychological and cultural growth and sustaining both leisure, recreation, entertainment and education as complementary aspects while driving the audience to actively participate in and determine their own experience (Addis, 2005; Falk, Moussouri, & Coulson, 1998; Roussou, 2002). Virtual heritage helps to provide formative educational experiences and disseminate knowledge through electronic manipulations of time and space (Roussou, 2002; Stone & Ojika, 2000), enabling the user to interact with virtual humans (Machidon et al., 2018) and providing virtual environments that contribute to increasing educational purposes, as well as the learning and motivation of participants that interact with digital objects and personalise learning activities (Carrozzino & Bergamasco, 2010; Ott & Pozzi, 2011). Technologies enable museums to provide context-aware ubiquitous environments that help learning processes and self-learning activities (Chen & Chen, 2018; Chen & Huang, 2012; Chiou, Tseng, Hwang, & Heller, 2010).

Rethinking Virtual Museums: From Managing Collection to Creating and Sharing Information and Knowledge

New technologies that are computer-based and rely on informatics lead museums to add a digital dimension and form to traditional and

physical dimensions reconciling and combining authority and participation for the definition of contents about cultural heritage by building a virtual museum (Tsichritzis & Gibbs, 1991) as a place without the barriers of space and time, as hypothesised by Malraux (1965) in *Le Museè Imaginaire*. This type of museum is an interactive and virtual space that allows each artefact to be displayed, and people can operate and play with artefacts for providing information and exhibiting cultural objects in digital formats (Schweibenz, 1998, 2011). Virtual museum refers to a museum that "will deal with virtual artefacts, in a virtual setting accessible from telecommunication network in a participatory manner. Such museum is a service not a location" (Tsichritzis & Gibbs, 1991: 18). Virtual museum exhibitions provide a great amount of information that helps virtual visitors to understand museum information sources (Styliani, Fotis, Kostas, & Petros, 2009). In particular, the features of the virtual museum are well defined and described by Schweibenz (2004): "it can offer real objects to its visitors, as the traditional museum does. But it can extend the ideas and concepts of collections into the digital space and in this way reveal the essential nature of the museum. At the same time the virtual museum will reach out to virtual visitors who might never be able to visit a certain museum in person". In a virtual museum, digital media aids in the exhibition, education and research functions, leading users to play an active role by changing views or objects by interactive interfaces. The exhibition is displayed in multiple platforms on users' demand, the representation occurs by digital movies and data. The virtual museum without real place or space "is a logically related collection of digital objects composed in a variety of media, and, because of its capacity to provide connectedness and various points of access, lends itself to transcending traditional methods of communicating and interacting with the visitors being flexible toward their needs and interests; it has no real place or space, its objects and the related information can be disseminated all over the world" (Schweibenz, 1998: 191). The strength and authenticity of the virtual museum is focused on being information Internet-centred and communicative projection: its objects and the related information are disseminated everywhere (Antinucci, 2007; Schweibenz, 2011). New technologies help virtual museums to manage

and deliver information in any form and at any time (Qarabolaq, Inallou, Hafezi, & Tabaei 2013). Three categories of virtual museums are identified: the *brochure* museum aiming at informing future visitors containing administrative and general information about the museum; the *content* museum, which acts as a database containing detailed information about the museum collections, with the content presented in an object-oriented way making information available about the museum collections; the *learning* museum, establishing a personal relationship between the virtual visitor and museum, with a website offering different points of access to the virtual visitors, presenting the information in a way that is context-oriented, educationally enhanced and linked to additional information. This invites the visitor to learn more about a subject and visit again (Styliani et al., 2009). Designing a virtual museum helps foster cultural participation, and engagement promotes inclusion and diversity through experiences engendered for the visitors and users (Niccolucci, 2007; Robles-Ortega, Feito, Jiménez, & Segura, 2012). Virtual museums should be designed in order to strengthen user-constructed experiences based on content, structure, functionality and interaction (Deshpande, Geber, & Timpson, 2007).

Rediscovering the Role of Museums as User-Centred Mediators

Technologies enable museums to function as modern knowledge-oriented and intensive-information organisations that legitimise information and knowledge processes using information sources to create new knowledge about cultural heritage (Freedman, 2000; Marty, 2011). "A museum offers a unique environment from which to study the way in which knowledge is accumulated, analysed, and distributed by information professionals" (Marty, 1999: 1083). In any information society, museums should integrate technology and human resources in order to set information policies, manage information resources and promote changes in work and the roles of museum informational professionals in order to generate new knowledge for their audience (Marty, 2007a). In particular, the advent of new and

advanced technologies and museum informatics implies that museum information professionals should adapt to changing capabilities and act as user-centred mediators in order to provide successful interactions between museum and users, understanding what visitors are looking for on websites, making information resources available and meeting the changing information needs and expectations of museum information resource users (Marty, 2006a, 2008). Technologies contribute to enhancing museum professionals as information professionals that develop new methods of information organising and access to the collections, integrating new technologies in the exhibits using virtual environments to personally tailor the experience for each individual visitor and user (Marty, 2006a, 2007b, 2011). Museums are knowledge enablers that integrate knowledge, content acquisition and organisation to develop applications in academic research, exhibition and education for users (Hsu, Ke, & Yang, 2006). Web 2.0 technologies support knowledge sharing and collaborative learning through social interaction (Barak, Orit, Zvia, & Dory, 2009). Information technology helps improve information and knowledge management within museums, encouraging collaboration among museum professionals and museum users (Marty, 2011). New technologies help museum staff experts and motivated individuals or interested communities to reconstruct and reinterpret knowledge and information about collections (Verboom & Arora, 2013). The Internet is enabling museums as information utilities (MacDonald & Alsford, 1991) and service-oriented information organisations (Marty, 2006b) to actively use information in terms of generation, perpetuation, organisation and dissemination to generate new knowledge to their audience. The information is embedded in both the organisational memory and its collections and the documented information resources (Huvila, 2013). Museum educators play a proactive role in guiding virtual experiences for learning enabling museums to respond to visitor needs, providing multiple and different experiences (Roussou, 2004). Web 2.0 technologies enable museum professionals to connect with the public involving general people in the museum environment (Duff, Carter, Howarth, Ross, & Dallas, 2010). Museums as repositories of knowledge and information utilities sustain social and financial performances, and they should improve the organisational

processes by strengthening the work and skills of museum professionals as curators and educators, meeting the needs of visitors and acting as user-centred mediators. The Internet and interactive and virtual technologies drive museums as information-based organisations (Marty, 2006a, 2007a) to enable museum professionals to concentrate their efforts on using information technology to meet the needs of visitors through new forms of interactivity, working to improve the museum experience for users by focusing on digitisation technologies, information policy and collaboration initiatives (Marty, 2011). Museum educators and staff facilitate co-creation beyond the traditional view of holding and disseminating knowledge, enhancing the museum's educational potential in their work. Museum professionals can use a variety of new technologies in order to support the changing needs and expectations of online visitors (Marty et al., 2011). New technologies help museum professionals to bridge information and technologies to serve as user-centred mediators, enabling users to interact positively with museum information resources and behave as advocates that represent and meet the changing needs of users, creating personal collections as active participants in the co-construction of digital knowledge and cultural heritage (Marty, 2006b, 2007b, 2011).

Conclusions

As organisations that embrace technology, museums have become communities that promote dialogue, develop meanings and rediscover knowledge and information sources and capabilities for value creation about cultural heritage. Museums contribute to designing a community within cultural heritage and ecosystems, promoting value co-creation, service and social innovation using the Internet, embracing social media and developing interactive and virtual technologies and environments in order to support participatory engagement and involve the users as co-producers of knowledge in cultural heritage content. Museums empower museum information professionals as user-centred mediators, developing core competencies in managing museum information and knowledge sources, as well as interacting, communicating and

collaborating with users as active co-producers of knowledge and value in regard to cultural heritage. As communities that develop a shared authority on cultural heritage, museums are embracing technologies and encouraging the participation of users in defining cultural contents on collections. Today, museums as communities utilise the Internet, as well as virtual and interactive technologies to promote and reinforce interaction between objects, information and users, but they also encourage and accept new information from visitors to the community.

As shown in Fig. 8.1, museums using information technology and moving from traditional web technologies to building virtual-interactive technologies and environments support the user involvement and participation proceeding towards a shared authority on the definition of cultural contents about heritage in relation to the changing user role, which is evolving from merely being consumers to becoming co-producers of knowledge about cultural heritage. In developing the potential of information technology to promote new cultural experiences and involve users as co-producers and co-creators of new knowledge, museums contribute to expanding the *value co-creation area* transitioning from being communication-oriented institutions to becoming completely participatory. Museums evolve from maintaining authority on cultural heritage to involving the audience and communities to defining cultural contents and sustaining a shared authority on cultural heritage. As organisations dealing with information as a key source, museums should engage the users as co-producers and active participants and promote technology-driven innovation to develop processes and communication that encourage user participation, rediscovering the participation

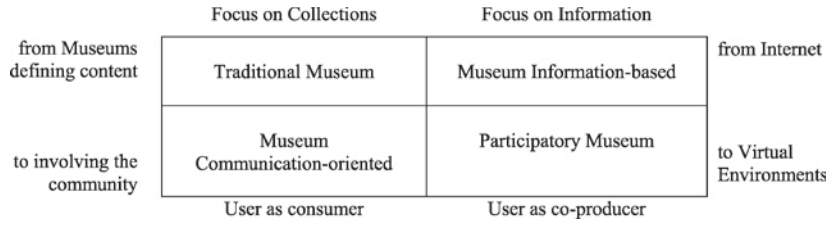

Fig. 8.1 Changing museums encouraging participation by technologies

about cultural contents definition as a source for value co-creation within museums as communities.

The contribution of this study is to elucidate how museums identify different pathways for value co-creation. Museums as audience- or collection-driven organisations use technologies to develop information provision sources or support communication and interaction, fostering user involvement and participation in cultural heritage by relying on museum human resources as information museum professionals and developing the potential provided by new technologies that drive museums to be participatory and social-oriented, learning-based and educational communities.

As collection-based institutions, museums contribute to promoting value co-creation and service innovation by embracing virtual and interactive technologies paying attention to the role of human resources and organisation redesign for developing and improving communication and interaction by involving the audience in knowledge sharing and creation, as shown in Fig. 8.2.

Museums as repositories of knowledge and information-intensive organisations should always be improving their organisational processes and enhancing human resources, sustaining active user participation in defining cultural contents and promoting knowledge and value co-creation. As audience-driven organisations, museums develop the potential of new technologies in order to support communication and interaction. Museums as collection-based and technology-driven organisations distribute information on cultural artefacts, providing

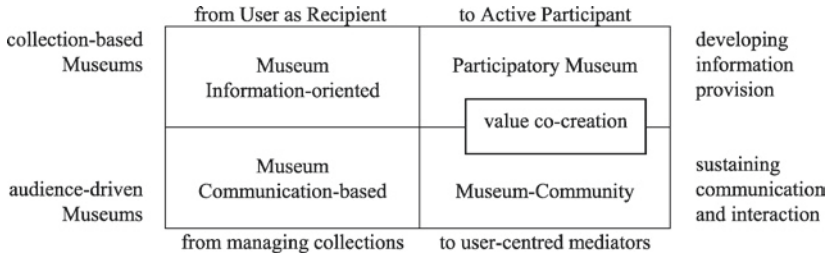

Fig. 8.2 Creating value within museums: a framework of analysis

information about collections to the user as mere recipients. As meeting places and social platforms for knowledge sharing and innovation, museums sustain value co-creation by embracing new technologies to involve the audience, engaging the user to participate in developing informative and social spaces for creating knowledge and managing information.

Museums should become cultural and social institutions that contribute to value co-creation developing the potential offered by virtual environments and interactive technology in order to promote human-centred design and vision, new service innovations and business models. Technologies contribute to enabling user involvement, active participation, co-production and personalisation of individual experiences, and they help information museum professionals to develop information and knowledge sources to interact with users leading the museum as an organisation to become a community within social and cultural ecosystems and society. Museums as communities support interactive, virtual and advanced technologies, relying on human resources, museum capabilities and user knowledge in order to develop information and knowledge management strategies, seeking solutions for participatory engagement and involving the users in managing information and knowledge about collections of digital materials, as well as to create value in the field of cultural heritage.

Future research perspectives imply to investigate how museums are facing the challenge of change and innovation driven and supported by technology in order to create new knowledge, social and public value by involving the users that interact with museum information professionals to develop the museum as a community that proceeds to generate knowledge, create value and ensure the wealth of communities within society.

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