Museum Professionals in a Digital World:

Insights from a Case Study in Portugal

by Ana Carvalho and Alexandre Matos
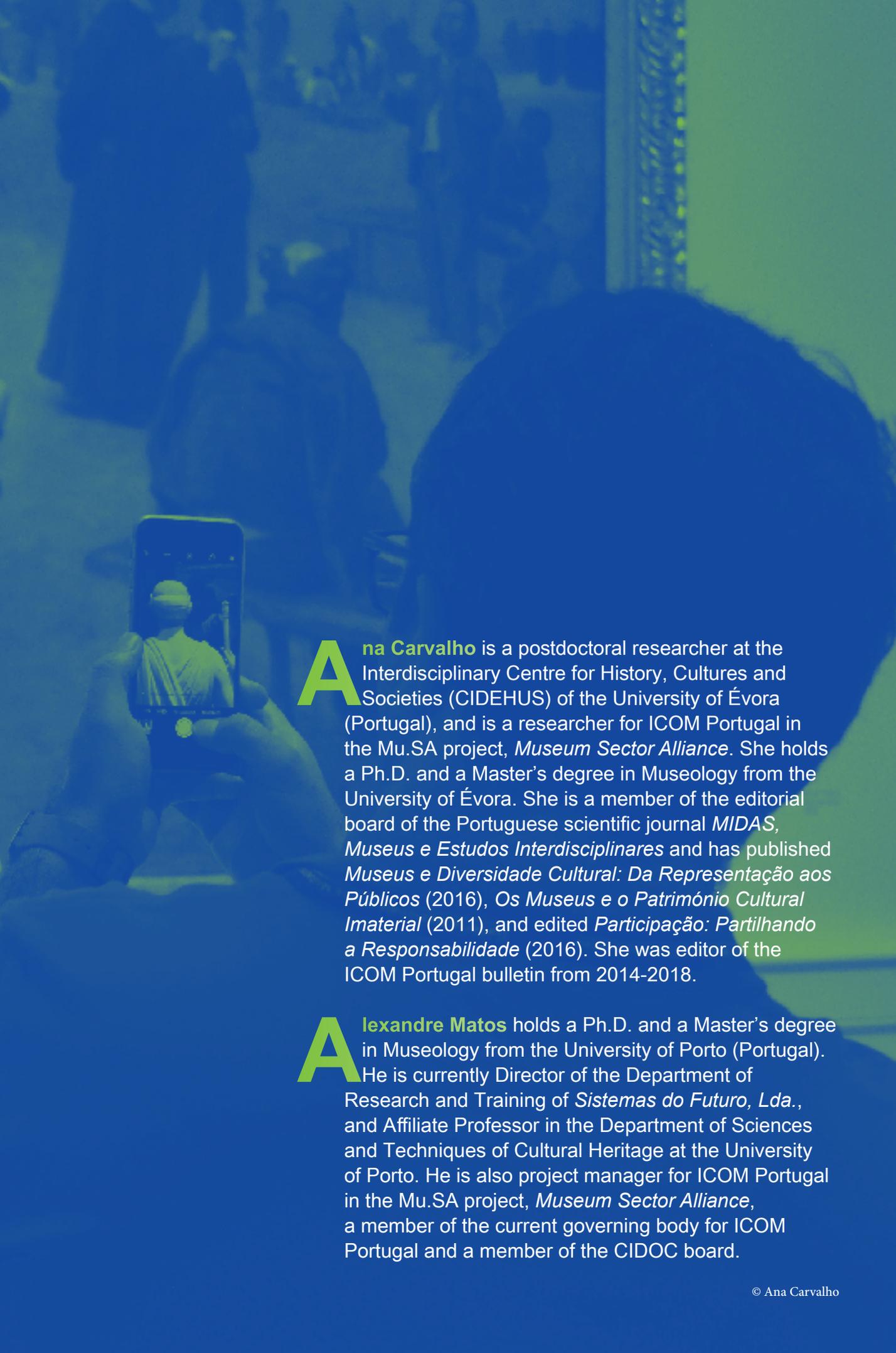
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As our society becomes increasingly dependent on digital technology, the inevitable consequences for the museum sector are becoming more evident. In the past four decades, museums have sought to adapt to this transformation. Their initial attitude towards 'new technology' was reserved and suspicious.[1] One of the underlying reasons was the fear that technology would reduce onsite museum visitor attendance numbers, and would adulterate the authenticity of experiencing objects, while also threatening 'real scholarship' (MacDonald 2006, p.555). The implementation of new technology in museums was also seen as an expensive and high-risk investment (Parry 2010, p.1). However, over the years, museums have come to embrace technology (digital and non-digital), and this choice has profoundly impacted many museum areas, in different levels of practice.[2] Research also shows that technology development is one of the factors most likely to affect museums in the future, as well as: demographic changes, increasing mobility, public policy retraction, sustainability and participation (Filipe and Camacho 2018).

The need for museums to adapt

Nowadays, embracing digital technologies has become a necessity.[3] It is part of people's daily lives, especially the younger generation (digital natives), who already engage with new ways of accessing information. Adapting accordingly thus has a twofold advantage: it will attract younger audiences and make it possible to keep up in a competitive environment (Fig. 1). It is also argued that digital technology may pave the way for a democratisation of museums, opening the knowledge they hold to a diversity of interpretations, thus decentralising the authority of holders (i.e. subject specialists) on the matter, by creating spaces for visitors and, furthermore, by providing more constructive environments so that visitors decide on their own learning (Masson 2017, p.164). Moreover, it may present opportunities to shape more flexible and creative experiences for visitors (Parry 2010, pp.1-2).

It has become necessary to acknowledge the need to update museums by incorporating new forms of communication that enable knowledge sharing on museum collections and ensure that museums establish relevant connections in today's society (Keene 2004). The theme for International Museum Day 2018, *Hyperconnected Museums: New Approaches, New Publics*, also followed this direction (Fig. 2).

The two main implications for museums are: firstly, the need to implement more agile and efficient management processes within the museum for collection management systems and archives, as well as day-to-day workflow, and secondly, the need to provide meaningful experiences, whether actual or through the use of digital technology. Many areas of activity, from back-office to front-of-house, are involved: management, communication, education, exhibition, collections management, and visitor engagement.

However, museums have not responded unanimously to this digital transformation and are not equally endowed with the same means. In fact, recent findings reveal that most museums are far from reaching full digital maturity (Price and Dafydd 2018). The demand for digital transformation carries added complexity, requiring informed thinking about the role to give technology (digital or otherwise), as well as the need to frame it within the mission and strategy of each museum.

We do not suggest that digital transformation should be considered a mission in itself, but rather one of the means available to a museum to fulfil its mission and strategic aims.[4] Inevitably, digital transformation is also closely related to the availability and allocation of investments in human, financial, and technological resources, all of which must be coordinated to be effective.
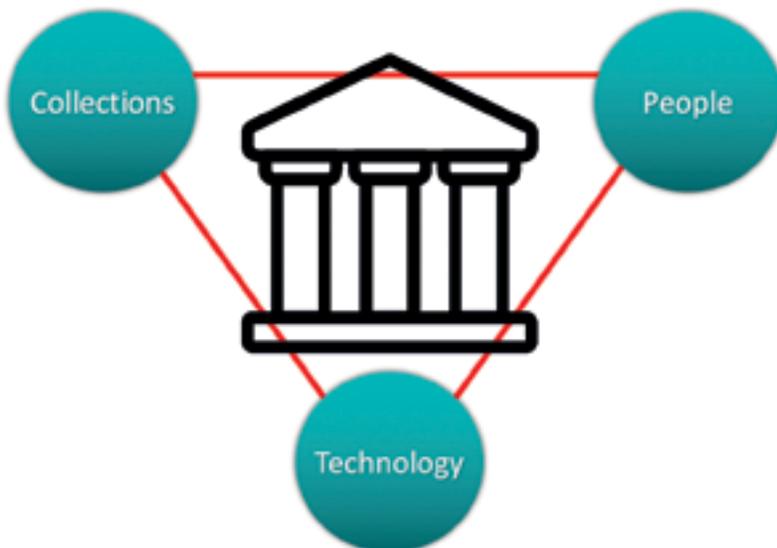

Fig. 2. Collections, people and technology. © Alexandre Matos

A time for reflection

To recognise the rise of digital technologies as one of the challenges currently facing contemporary museums means stepping back to reflect upon how to orchestrate the acquisition of new knowledge, competences and mindsets (White 2016; Gainon-Court and Vuillaume 2016; Filipe and Camacho 2018; Price and Dafydd 2018). In this regard, professional development remains a central issue, as it has been since ICOM's foundation in 1946, and a key feature of the work carried out by ICOM's International Committee for the Training of Personnel (ICTOP) from the 1960s onwards.5 Whether through formal training, such as a university degree, or non-formal training, professional development will need to address new competences related to digital technologies as part of the changing dynamics and expectations of contemporary society.

Increasing digital literacy and confidence among museum professionals is a crucial aspect of supporting the digital transformation of museums and enabling change, as argued by the Museums Association report, entitled *Working Wonders: An Action Plan for the Museum Workforce'* (2013) and more explicitly by the on-going UK project 'One by One: Building Digitally Confident Museums' (Parry et al. 2018).6

Ten years ago, *The Museum Professions – A European Frame of Reference*, developed in 2008 by ICTOP, offered a list of 20 museum professions with the descriptions of each, including the basic training and additional qualifications required; among these, only two professions mentioned Information and Communications Technology (ICT): the 'web manager' and the 'IT manager' (Ruge 2008). We might add a third, indirectly: the 'inventory co-coordinator,' whose training specifications foresaw a need for 'proficiency in computerised inventories' (Ruge 2008, p.17).

A decade later, how is this transformation affecting the job descriptions of museum professionals? Are there changes or up-skilling to be made to all profile roles, given the increasing evolution and impact of digital technologies in society? Is it possible to identify emergent profiles taking shape? What digital competences are needed or expected?

Mu.SA, Museum Sector Alliance (2016-2019), a project funded by the Erasmus Plus Programme (Sector Skills Alliance) was founded to address these and other related questions. By supporting ongoing professional development in Greece, Italy and Portugal, the Mu.SA project addresses a need to increase the digital competences of the museum workforce, understood as a key factor in successfully negotiating the digital transformation of museums.7

This article describes the Mu.SA project's rationale, objectives and research methods, and examines key findings from the first phase of the research in the Portuguese case study. Four job profiles that emerged from the project's overall findings are also briefly presented.

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Mu.SA RESEARCH GOAL
to update previous
eCult Skills findings

3 focus groups

81 experts involved

Mapping Museum professionals' needs in EL, IT, PT

Mapping Museum training provisions in EL, IT, PT

130 training programmes analysed

265 responses to the survey

Digital and transferable skills and competences needs in the museum sector in Greece, Italy and Portugal

NEW EMERGING JOB PROFILES

Fig. 3. Mu.SA research framework and key performance indicators. © Mu.SA project

What is Mu.SA?

The design of the Mu.SA project takes into consideration the findings of a previous European two-year project (2013-2015), eCultSkills (eSkills for Future Cultural Jobs) which identified five emergent role profiles in the culture sector that involve digital skills.8 By looking specifically at the needs of the museum sector, Mu.SA aims to identify specific role profiles, including their digital and transferable competences (hard skills and soft skills) to create training programmes that foster the continuous development of digital competences among museum professionals.9

The project consortium consists of 12 partners from Greece, Italy and Portugal, as well as a European network based in Belgium, representing a variety of different organisations operating in the culture, education and museum sector.10

The project comprises two phases. The first of these, now completed, consisted of mapping the skillset needed by museum professionals during the process of digital transformation, and identifying emerging job profiles. Data were drawn from three case studies: Greece, Italy and Portugal (Fig.3). Empirical research was conducted similarly in the three countries from December 2016 to March 2017, which combined several qualitative research methods: a series of in-depth semi-structured interviews (78 in total), three focus groups, an online survey and desk-based research (Silvaggi 2017, p.18).11

The second phase of the project aims to create two e-learning programmes: a MOOC (Massive Open Online Course), followed by a specialisation course, both shaped by the project's earlier research findings. The MOOC, which lasts eight weeks, introduces essential digital competences for museum professionals with the aim of stimulating broader comprehension, familiarity and digital confidence in all job profiles. The MOOC model allows for unlimited numbers of learners in different geographic situations, since it is web based, and it is also freely accessible. MOOCs have seen significant expansion since 2012, with applications and results in the museum field, and elsewhere (Mazzola 2015; Parry et al. 2016).

For learners who complete the MOOC, a specialisation course is projected (approximately six months) through a Moodle platform. Here, participation in the course follows an application and a selection process. This second stage of training is modular and addresses specific job role profiles and competences identified in the project's earlier phase. It includes learning modules and activities online, but also face-to-face and workplace learning in Greece, Italy and Portugal.

The primary results of the Mu.SA project (reports, articles, presentations, training programmes) are disseminated through the official website and social media.12

Public events are organised in the three participant countries around the project, involving external specialists in the discussions. Three major conferences have addressed the following themes: *Digital Challenges for Museum Experts* (Athens, 25 November 2016), *Re-designing Museums. Digital Skills for Change and Innovation* (Rome, 13 July 2017) and *+Digital Future: Competences for the Cultural Sector* (Porto, 18 April 2018).

Research methods

As a partner in the Mu.SA project consortium, ICOM Portugal participated in the empirical study of the project's first phase, focusing on the Portuguese museum sector. The main objectives were to understand how museums are embracing the challenges of digital technologies, to map professionals' needs in terms of digital competences, and to identify emerging job profiles.

Firstly, a literature review of the Portuguese museum sector was conducted, gathering evidence on national museum policy, museum development (needs and gaps), museum workforce and training, including reports and academic studies focussed on the application of technologies within the sector.

Secondly, primary research was carried out by applying qualitative research methods to grasp how the development of digital technologies is affecting museums, taking into consideration the perceptions and interpretations of this community of professionals itself. In total, 12 in-depth interviews (in person) were conducted during this phase. Each one addressed a number of open-ended questions:

– How is the museum sector reacting to the digital shift?
– Are there gaps in digital competences among museum professionals?
– Which aspects of museum work are most affected by the digital shift?
– What would help museum professionals better face the challenges involved in trying to embrace the digital shift?
– Which digital and transferable competences need to be developed?
– In what areas of activity should museums invest to improve a digital strategy?

Interviews focused also on a set of open-ended and closed questions concerning the five eCult skills profiles framework (provided in advance), in order to understand its relevance in the Portuguese museum sector. Our aim in constituting the interview target group was to reach museum staff (full-time or freelance) from different levels of expertise (management, curatorial, education, communication and marketing, accessibility, technician, conservation).

Another point was to obtain a diversified sample of museums, in terms of management (national and local museums, public and private) and in terms of museum types. As regards size, the majority of museums covered were small/medium organisations with 21-50 staff members.13 Additional interviews were conducted with two experts in technology from external companies to provide an external perspective and two academic researchers with expertise in the field.

A focus group was also carried out on 22 July, 2017, in collaboration with Mapa das Ideias, another Portuguese partner within the Mu.SA project consortium.14 The main objective of the focus group was to explore and consolidate some of the ideas from the individual interviews, regarding the digital shift and the competences needed to address it in the museum field. Focus group participants were invited to consider three main topics: museums and digital challenges, new emerging digital job profiles, and museum training needs (from formal to non-formal). The same criteria adopted for the interviews were applied in choosing the 12 participants for the focus group.

The Portuguese museum context

According to the most recent data published (collected in 2010), there are approximately 1,223 museums in Portugal (counting all self-designated museums), which corresponds to a 68 per cent growth as compared to the year 2000 (Neves, Santos and Lima 2013, p.32), testimony that the Portuguese museum boom, which began in the 1980s, continued unabated in the first decade of 2000. Nonetheless, a more detailed analysis of the parameters highlights a more restricted universe of 683 museums15, of which only 149 museums are accredited,16 according to the Portuguese Network of Museums (RPM) standards, an organisation created in 2000, which is presently under the General-Directorate for Cultural Heritage (DGPC).17

Regarding governance, a significant number of museums are run by local authorities (48,6 per cent), while museums in the private sector constitute 35 per cent of the total. The central government (e.g. Ministry of Culture, Ministry of Defence, public universities, and other organisations) run 13.1 per cent of museums, including the national museums (Neves, Santos and Lima 2013, pp.46 and 52). There are currently 15 national museums run and funded by the DGPC (under the Ministry of Culture). Furthermore, a small percentage (3.4 per cent) of museums are managed by the regional governments of Azores and Madeira (Neves, Santos and Lima 2013, p.46).

Traditionally, museums in Portugal have been heavily dependent on public funding. Although a small portion of funding for special projects may be secured through fundraising, this path has been explored in an unstructured and punctual way, and no reliable data analysis is available.

The current national policy for museums contains no guidelines that specifically address digital challenges in museums. However, a report resulting from an internal qualitative analysis of the DGPC, including the 15 national museums, contains some key points that can help us to comprehend existing challenges (Camacho 2015).

The report found insufficient communication (internal and external) to be one of the difficulties needing to be addressed. Additionally, the lack of IT hardware was also identified as a limitation (Camacho 2015, p.16). Following this internal assessment, communication (e.g. implementation of communications plans at national museums, addressing digital as an asset, etc.) was presented as one of the strategic goals in a reviewed vision of the whole organisation for 2015-2019. However, this plan was never implemented, due to changes to the DGPC board and a new political cycle in government.

The museum workforce

Regarding the museum workforce, data collected in 2009 identified 6,284 people working in museums (comprising every job level, full-time, part-time, internships). In spite of overall growth of 39 per cent in relation to 2000, the average number of people working per museum within the period 2000-2009 has fluctuated between nine and 11 (Neves, Santos and Lima 2013, p.59).

If, however, we consider only the group of people working in the job category of 'curator/professional with academic degree' (*conservador/técnico superior*), this number is considerably reduced to three individuals per museum, showing no change between 2000 and 2009 (Neves, Santos and Lima 2013, p.59). This means that Portuguese museums have, in general, small teams, in which professionals may cumulate a range of functions and roles, a point also raised in the interviews carried out under the Mu.SA framework. On the other hand, the quantitative data was gathered in 2009, meaning that it may no longer be representative of the complexity exhibited by today's reality, notably because it may not take into account the post-2008 international financial crisis (intensified after 2011 with the sovereign debt crisis) and its impact on museums, with possible effects also on the loss of qualified human resources.18

Another trend found at the level of national museums is the aging museum workforce. A study conducted on the DGPC (comprising the 15 national museums) has demonstrated the generalised aging of teams: 58 per cent of employees are over 50 years old and only 4 per cent fall in the age range of 25-34 years. Furthermore, it is expected that 120 people (out of 800) will retire by 2020, considering the current mandatory retirement age of 66 (Camacho 2015, p.16).

This evidence is particularly relevant regarding the present critical state of the museum sector, where hiring has been frozen since the application of government restrictions in the last years, making the entry into the sector difficult or impossible, since the majority of Portuguese museums are dependent on government funding (either central or local). This may impose limitations on the possibilities for optimising the composition and renewal of the museum workforce through recruitment to address digital challenges.

As concerns the museum workforce profile, a recent survey based on a sample of 710 Portuguese museums finds that professionals with a university degree background in museology represent 32 per cent of this group, while a plurality holds a specialised degree in 'other areas' (39 per cent). It is also worth mentioning that professionals with a background in 'information and communication technology' are among the least represented (2.7 per cent) of professionals working in museums (Santos, Serôdio and Ferreira 2017, p.35).

Formal training in museum studies is available through university degrees (postgraduate, Master's, Ph.D.). Looking at 2016-2017, there were seven active Master's programmes in museum studies. Despite restructuring leading to top-down administrative approaches in Portuguese universities as a result of the financial crisis, this number remains quite significant in comparison with other countries (Vaquinhas 2013).19 However, core disciplines prevail, such as museum theory, history of museums and museology, management, collections (inventory, preventive conservation, management), heritage laws, museum architecture, programming, and to some extent communications and interpretation/education.

Of the seven active Master's degrees mentioned, two programmes include specific units dedicated to technology applied to museums. These are the University of Porto (the programme was created in 1994) and the University Lusófona of Humanities and Technologies.20 The latter addresses augmented reality since 2013. Nevertheless, in general, there is little evidence of a systematic approach to digital competences in these programmes, where technology may make a punctual and fragmented appearance according to the themes covered. This impression was further reinforced by informal conversations with professors and directors from these programmes, despite an awareness of the topic and acknowledgement of its relevance. The challenge remains to achieve balanced programmes that can provide a broad base of knowledge about the museum context but also an essential set of skills for working in museums.

Non-formal training for museum professionals is also available. The RPM annual training programme (running from 2001 to 2010 and from 2014 to present) is one short courses programme that promotes continuing professional development in the sector under the auspices of the central government, through the DGPC. Traditional competences in areas of work associated with the care and management of collections predominate, and address, to some extent, communications and accessibility issues, among others. Globally, however, the analysis of publicly available information indicates a limited focus on digital competences and technology, insofar as it is explored in an unstructured way–something that was also acknowledged in the interviews conducted as part of the Mu.SA project.

While not exhaustive, the key points mentioned above contribute to an overview of museums and their professional staff, therefore helping to frame the main findings of the project's primary research (interviews and focus group).

The digital shift: awareness and expectations

Interviews from the first phase revealed that Portuguese museum professionals are generally aware of the importance of embedding technologies (digital or not) in museums, and of a need for museums to be more engaged and proactive. Several arguments for this were advanced:

– Changes due to technological development are an inevitable by-product of a mainstream tendency in contemporary society, with significant impacts for museums and museum professionals.
– Technology can help achieve a museum's mission in a more integrated way and with more effective results.
– Digital tools can contribute to the dissemination of knowledge, increasing the potential reach of a museum's collections.
– Technology can improve and enrich the visitor experience, and simulate curiosity.
– Technology makes it possible to reach new audiences, especially the youngest audiences who already expect mediation through new technologies.
– Digital technologies can involve audiences beyond the information already available and displayed, for instance in labels and museum texts or other traditional formats; multi-layered information facilitated by technology may provide other forms for interpretation.
– Technology broadens the range of new content possibilities (e.g. free of charge and downloaded from visitor devices) and allows for new means and conditions of access to information (ex. audio-guides, sign language for the visitor's mobile phone; guides with audio descriptions, etc.).

Despite a broad consensus as to the benefits of forthcoming applications of technology in museums in several areas, interviewees also showed an awareness of the complexity involved. Furthermore, interviewees identified primary reservations or limitations to be considered when dealing with technology, namely a risk of misunderstanding the possibilities involved, and their inadequate use, but also a risk of not engaging at all.

The following arguments were brought forward:

– Not embracing the digital shift and ignoring the opportunities associated with technology could cause museums to become out of date and, at some point, irrelevant.
– The need to overcome a lack of knowledge about the potential offered by technological applications in several areas and be aware of current tendencies, highlighting the limitations of not having sufficient guidelines to plan properly.
– A recognition of the scarcity of evaluations or studies assessing the impact of technology already implemented in Portuguese museums.
– Digital tools or technological solutions should not be an end in themselves, but understood as a means, with a clear objective behind each solution. Concerns were raised about applications driven by fashionable marketing solutions that do not add intrinsic or relevant value and become mere decorative accessories.
– The need for solutions that go beyond amusement, meaning the need to have a critical and informed use of (limited) resources to create products/solutions that are useful and relevant, not just for visitors to play or have fun.
– The risk of using technology excessively, meaning without critical judgment, resulting in information overload.
– Evidence of technological illiteracy among certain audiences, and the consequent risk of their exclusion caused by the intensive use of technological (digital or not digital) tools.
– The risk of designing gadgets/devices that are assumed to be intuitive and user-friendly in their conceptualisation phase, but are not always tested with real audiences to include their needs and foresee necessary adjustments.
– The more evolved a museum is in terms of incorporating technological equipment and solutions (e.g. in exhibitions), the more complex its maintenance; cognizance of the risks of not planning for maintenance requirements in the long term (e.g., choosing to outsource maintenance contracts or having in-house staff) and replacement of devices (e.g. updating obsolete hardware).
– Acknowledgement that technologies can also weigh on museum professionals, especially when their use defies their goal to simplify, save time and help professionals to be more productive in their daily routines as regards internal bureaucratic workflow systems.

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A complex landscape

Interviewees recognised that, in general, museums try to address the challenge of adopting technology, but in an unstructured and fragmented way. 'Complex', and 'disruptive' are among the adjectives used by certain interviewees to describe the current situation. While aware of changes, museum professionals argue that, in most cases, conditions and means preclude the introduction of technology in a professional and systematic way.

Interviewees were also asked to reflect on which areas of museum work are experiencing the greatest impact due to use of technology. In general, it was recognised that all areas are being affected transversally, while noting that the level of impact depends on each museum in terms of vision and available resources (human, financial, technical infrastructure, etc.). Nevertheless, three main areas were repeatedly mentioned: collections management, communications (internal and external) and exhibitions.

In a prospective analysis to identify key areas for investment in a digital strategy, interviewees were given a set of seven examples (while not exhaustive) to comment on (up-skilling in the use of social media; digitisation of the collection; managing archives and collections; website updating; digital exhibitions; app development; online shop management; others). While opinions on this topic varied among interviewees, they noted in general that all the areas identified may need to be developed, but that an overall strategy is needed that fits each of the museum's specificities (mission, vision and resources), to permit adequate focus on each area in turn. Again, taking into consideration the current crisis many museums in Portugal face, it was acknowledged that implementing a digital strategy remains to some extent unpredictable because it is conditional on the availability of resources.

However, the digitisation of collections and their management (archives and collections) were designated as the main areas in need of development. In general, interviewees pointed to their importance as a starting point for creating new and relevant content to be subsequently explored by other museum departments (e.g. communication, exhibition, education, etc.). Despite progress in this field, it remains an under-developed area that requires significant investment, whether in terms of human resources allocated or adequate technical infrastructure.

Difficult access to digital

Some interviewees identified the lack of proper equipment as an impediment to fulfilling quality requirements in terms of digitisation. The centralisation (and bureaucratisation) of services at central government departments, in the case of national museums, was also mentioned as a limitation. Concerning collections digitisation, a recent analysis based on a survey of 710 Portuguese museums, finds that in 2015, most museums (53.2 per cent) (of 222 answers) were undertaking the task as a (partial) working process, but only 15 per cent had all collections digitised, while a quarter of museums had yet to initiate the process (Santos, Serôdio and Ferreira 2017, p.52).

Concerning the updating of websites, interviewees highlighted its importance, but some pointed out the lack of autonomy to directly manage information, especially in museums run by local authorities (48.6 per cent of Portuguese museums), which in many cases exercise strict control or do not allow their museums to maintain independent websites. This situation not only presents limitations in terms of content visibility and updating, but is also seen as preventing the creation of a digital strategy.

In the study cited above, Santos, Serôdio and Ferreira (2017) point out that 77 per cent of museums have a website, of which 41 per cent do not have an autonomous website, but rather specific information about the museum embedded within the local authority website upon which they depend, and merely 35.6 per cent of museums have independent websites. Furthermore, 23 per cent of museums still do not have a website, a common feature, especially among museums run by local authorities (Santos, Serôdio and Ferreira 2017, p.44).

Regarding the type of data presented on these websites, it is noteworthy that among the contents provided, museum information (99 per cent), practical visitor information (e.g. opening hours, access, admission fees, and services available) (88 per cent) and newsletters (29.4 per cent) predominate. Particularly relevant is the fact that only 22 per cent of these museum websites have digital collections available, and just 22 per cent disseminate content related to scientific knowledge produced about the museum or its collections (Santos, Serôdio and Ferreira 2017, p.45).

On social media use

Moreover, a qualitative assessment of the way Portuguese museums disseminate information via the Web concludes that communication is largely designed according to a unidirectional, hierarchical and top-down approach (Macedo 2014, p.71). Interviewees also mention the possibility of increasing museum engagement with social media and the need for up-skilling, but underlined, in particular, problems similar to those affecting websites, particularly existing restrictions on independently run accounts for museums at the level of local authorities.

Globally, Facebook is the preferred social media among Portuguese museums (97 per cent), according to a sample of 143 answers from museums, while other platforms represent a significantly low percentage: YouTube 23.1 per cent; Twitter 14.7 per cent; blogs 12.6 per cent; and Instagram 9.8 per cent (Santos, Serôdio and Ferreira 2017, p.46). Museum professionals choose Facebook as a primary preference tool for their museums due to the range of features it presents (free, easy, fast) and the fact that many people use Facebook, guaranteeing advantages in terms of broad dissemination, sharing and interaction (Macedo 2014, p.72).

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App development was considered an added value for museums, but opinions varied among interviewees as to the relative merits of in-house design solutions or contracting external solutions in cooperation with specialised companies. Research demonstrates that Portuguese museums are not fully exploiting app development possibilities, considering the low 7.5 per cent of museums (from 109 answers) that were using apps in 2014 (Macedo 2014, p.48).

Online shop management was also mentioned in the interviews, but some interviewees highlighted the fact that many museums still strive to have on-site museum shops with available and adequate merchandising products, therefore limiting the possibilities for extending that service online. One study concluded that online services to sell merchandising products have very low representation (Macedo 2014, p.50).

The creation of digital (or virtual) exhibitions, according to interviewees, is seen as a difficult subject, partially due to its dependence on website management. Generally, it remains an underdeveloped feature in most Portuguese museums, despite a number of experiences. As a matter of fact, a study conducted in 2014 identified 22 museums (among 109 answers) that had online exhibitions based on existing onsite exhibitions, but only six museums had virtual exhibitions specifically designed for the Web (Macedo 2014, p.46).

Up-skilling digital competences

Most interviewees and participants in the focus group spoke of the need to develop the digital competences of the Portuguese museum workforce. To some extent, a subset of museum professionals has been up-skilling their digital competences through non-formal and *ad hoc* learning, each according to their individual interests and needs. There is, however, an absence of in-house planned training in such areas, including from official training programmes available for museums professionals (e.g. RPM programme).

It was seen as helpful for museum professionals at all levels to possess basic familiarity with digital competences to provide a common language and understanding among professionals. Also noted was the need to overcome communication barriers, not only between older generations of museum professionals and the younger cohort that may be more digitally literate, but also to facilitate exchanges with in-house IT professionals or external service providers.

One interviewee pointed out that few museums have staff with a communications background, a profile crucial to develop and implement an overall strategy across media, including the digital sphere. Likewise, interviewees also pointed to the lack of a museum communications plan as an overall limitation. This is a telling indication as to the limited degree of digital maturity achieved by most Portuguese museums, given that digital initiatives are also shaped by strategic communication plans. To some extent, this is intertwined with the way the organisational structure within museums have accommodated communication demands and responsibilities (including digital initiatives). As several interviewees observed, museums generally have small teams in which professionals cumulate a range of functions and roles (including communication), and where structured departments for communications, marketing or audience development do not exist.

The importance of leadership is another point raised by both interviewees and the focus group. Leadership (at several levels, from public authorities management to museum directors) was identified as a critical factor in the strength or weakness of a museum strategy, and consequently the communication plan (including digital initiatives). The consensus held, i.e. that the digital transformation of museums requires that leaders become more familiar and involved. Leaders who understand the importance of digital, it was suggested, are better able to identify their organisation's needs (including staff training), and nurture strategic outcomes.

Overall, a changing attitude towards digital transformation of museums and a willingness to take risks were recognised as significant soft skills needed in leadership. Communication and teamwork were considered the relevant soft skills to be fostered transversally among the museum workforce.

Reflecting on training needs, most interviewees identified gaps in the currently available offerings in formal or non-formal learning. Lifelong learning was generally seen as the mechanism best adapted to keep pace with the rate at which digital technologies themselves are changing. Some interviewees argued for customised training that would take into account specific staff needs and raised the possibility of learning from peers by sharing working methods and practices.

Mu.SA and emerging role profiles

One of the aims of the first phase was to map specific role profiles, adopting a framework drawn from the results of a previous European project, eCultSkills (*eSkills for Future Cultural Jobs*), which identified five emergent role profiles involving digital competences across the cultural sector more generally.21 This framework was analysed via interviews and focus groups in Greece, Italy and Portugal to examine its relevance for the museum context. Four emerging job profiles were identified as suitable for guiding professional development and museum workforce up-skilling (Fig. 4).

Each job profile was described in terms of scope of mission, tasks and responsibilities, and requirements (academic qualifications, knowledge, digital and transferable competences and role in relation to the organisation's structure, among others). They are listed below, by order of priority.22

The Digital Strategy Manager supports a museum's technological and digital innovation, guided by a museum's overall strategic plan by assuming responsibility for the digital strategy. They provide regularly updated information about digital products and play a mediating role between museum departments and external stakeholders, including external service providers (Silvaggi 2017, pp.81-85).
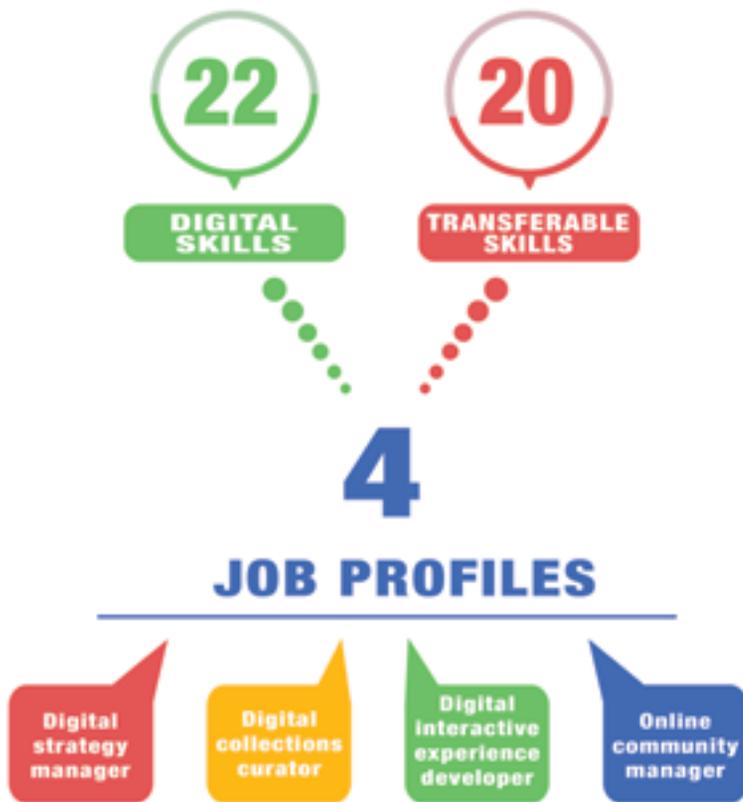
Fig. 4. The four Mu.SA job role profiles. © Mu.SA project

The Digital Collections Curator is specialised in preserving and managing digital collections (either natively digital or digitised) and develops online and offline exhibitions, as well as content for other departments. While in larger museums, this could become a role profile in its own right, in smaller museums a more traditional curator could be up-skilled in this area (Silvaggi 2017, pp.90-93).

The Digital Interactive Experience Developer designs and develops interactive and innovative experiences/solutions based on audience needs, providing meaningful experiences for diverse audiences; this person carries out audience research and observation analysis, develops tools that increase accessibility, and facilitates communication flow between museum teams (and departments) and external service providers (Silvaggi 2017, pp.86-89).

The Online Community Manager belongs to the communication, marketing or audience development team or department. They design and implement an online audience development plan, such as social media, interactive platforms, etc. that fits in the museum's communication plan. They are responsible for building a sense of community between the museum and its online stakeholders/communities in addition to liaising with other departments to produce content and meaningful online experiences. They also engage with, monitor and manage online audiences, and assess the effectiveness of online activities (Silvaggi 2017, pp.94-98).

Additionally, the four profiles described share and require in-depth knowledge of how a museum works, and should be embedded in the museum's teamwork to be successful, despite the specificities of each profile role and its competences (Silvaggi 2017, p.33).

This framework is offered as a guide or set of recommendations with a forward-looking attitude to professional development and up-skilling of the museum workforce in the area of digital technologies. At the same time, it also acknowledges the challenges the framework presents if strictly interpreted, given that application is directly intertwined with other factors, such as museums' capacity to recruit or up-skill their staff for the four job profiles that were identified.

This was one of the limitations identified in the interviews and focus group carried out in Portugal. While they recognised the suitability of the profiles, interviewees highlighted its limited feasibility considering the Portuguese museum landscape: short budgets, small and multitasking teams, low digital (and communications) maturity at the structural level, all of which to some extent thwart extensive application of the Mu.SA job profiles described above.

Going forward: outrunning challenges

Museums do not exist in a vacuum isolated from the digital age, but they are embracing change at different levels and at varying rates. Looking into the future, the museum 'will be more emotional; people will be able to connect with it in different ways, and the physical and digital dimensions will be more and more interconnected, being two sides of the same coin, both for the visitors and the staff' (Sturabotti and Surace 2017, p.8). The question that remains is how digital transformation can best be operated in museums and to what extent in each case (Fig. 5).

Up-skilling the digital confidence of museum professionals is one of the mechanisms used to conduct digital museum transformation. This is a solution advocated by the Mu.SA project, but it is also supported by other projects, such as *One by One: Building Digital Literacies* (2017-2020) in the UK. Within the Mu.SA framework, were identified four emerging job profiles from field research carried out in Greece, Italy and Portugal.

The findings will contribute to the design of two training programmes (a MOOC and a specialisation course)—currently in development and for which expected delivery has been set for 2018-2019. Their goal is to empower members of the museum workforce and, consequently, inspire museums to achieve digital transformation with greater efficacy and agility. Moreover, assessment of these training programmes may promote better understanding of their feasibility, prompt a review of current approaches, and guide future research development, including in countries that experience similar deficits in terms of digital proficiency among museum workers.

DIGITAL TRANSFORMATION DECALOGUE

1. Develop strong leadership to support a mental shift in rethinking existing processes in digital terms;

2. Build digital confidence for the whole staff of a museum;

3. Support continuing professional development regarding new technology;

4. Understand audiences' needs for implementing meaningful experiences;

5. Develop soft skills as well as specific digital skills;

6. Learn from your peers and from the audiences;

7. Support digitization of museum collections and archives;

8. Change towards open approaches;

9. Develop a safe space to experiment and fail through a trial and error process;

10. Improve internal and external collaborations;

Fig. 5. Digital transformation decalogue. © Mu.SA project

Looking more specifically at the Portuguese case study, research revealed a highly fragmented experience among museums as concerns the digital shift, a conclusion shared by overall findings in Greece and Italy (Silvaggi 2017).

This overview addresses a diversified set of interdependent challenges that Portuguese museums must overcome in order to be resilient and relevant organisations in the 21st century. One focus centres on enhancing the digital competences of the museum workforce through up-skilling, with formal training via flexible and updated training plans; however, it recognises that non-formal training through lifelong learning is also needed, considering the evolving nature of technology. Continuous investment in professional development is therefore needed. At the same time, the findings highlight the challenge of filling existing gaps within museum organisational structures to support digital maturity, given the limitations on replacing departing staff, to say nothing of creating positions according to customised museum needs. Furthermore, and beyond financial resources, the existing technical infrastructure was also described as lacking in most cases.

The development of national museum policy and strong leadership clearly remains crucial to establishing strategic guidelines and objectives, and to supporting the digital transformation of museums in an integrated and coherent manner. This not only involves establishing a new mind-set, but also assessing the effort and means required going forward. For the Portuguese case, this remains a critical challenge to overcome since, generally, strategic planning has been 'scarce, discontinuous and rarely the subject of evaluation' (Filipe and Camacho 2018, p.54). Although the Mu.SA project does not present a solution for all the current challenges, it does provide a closer examination of the situation, identifying existing needs and emerging trends. In so doing, it opens up new perspectives and avenues for investigating the digital shift of museums.

Notes

1 By 'new technology', we mean those technologies based on micro-electronics that are current in the information and communications sector, which are revolutionising the organisation of work.

2 A number of scholars in the museum and heritage field have observed these implications. See, for instance, Cameron and Kenderdine 2007; Parry 2007; Parry 2010; Drotner and Schrøder 2013; Drotner *et al.* 2018; among others.

3 By 'digital technologies', we mean the branch of scientific or engineering knowledge and activity that deals with the creation and practical use of digital or computerised devices, methods, systems, etc.

4 As argued by Price and Dafydd (2018), there are different definitions and perceptions of how to embed digital transformation in museums and how to measure its success (or lack thereof).

5 See Teather (2016) for a historical overview of the approach to professional development at ICOM and ICTOP.

6 The website can be accessed here: https://one-by-one.uk [Accessed 28 September 2018].

7 The choice of the term 'competences' is taken from Silvaggi's definition, as 'the ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development' (Silvaggi 2017, p.12).

8 The eCultSkills – *eSkills for Future Cultural Jobs* project (2013-2015), coordinated by the Hellenic Open University (Greece) and funded by the European Commission, analysed new and emerging jobs in the cultural sector in six European Union countries following the standards of European Qualifications Framework (EQF) and European e-Competence Framework (e-CF). See the online website, available at http://groupspaces.com/eCult/ [Accessed 25 January 2018].

9 Based on the definition provided by the Online Cambridge Dictionary, we employ the term 'transferable skills' to mean competences that are transversal to several professions (jobs or careers). Transferable skills include soft skills and hard skills. Soft skills are related to interpersonal capabilities. For instance, leadership can be considered a soft skill, as can communication and creative thinking, among others. Hard skills are defined more technically. For example, proficiency with MS Office Suite applications, or the ability to manage time using Outlook could be understood as hard skills.

10 Partners involved: Hellenic Open University (coordinator), Greece; Melting Pro Learning, Italy; ICOM Portugal; Link Campus University, Italy; National Organisation for the Certification of Qualifications and Vocational Guidance (EOPPEP), Greece; Symbola – Foundation for Italian Qualities, Italy; University of Porto, Portugal; Institute of Vocational Training (AKMI), Greece; Istituto per I Beni Artistici Culturali e Naturali della Regione Emilia Romagna, Italy; ICOM Greece; Culture Action Europe, Belgium; Mapa das Ideias, Portugal. See: http://www.project-musa.eu [Accessed 25 May 2018].

11 Additionally, 12 professionals from recognised museums in the European context were interviewed, resulting in the publication *Museum of the Future: Insights and Reflections from 10 International Museums* (Sturabotti and Surace 2017). The participating museums are as follows: Hermitage (Russia); Kiasma Museum of Contemporary Art (Finland); MAAT – Museum of Art, Architecture and Technology (Portugal); MUSE – Museo delle Scienze di Trento (Italy); Musée du Louvre (France); National Museum of Wales (Wales); Museo Nacional del Prado (Spain); Polin – Museum of the History of Polish Jews (Poland); Rijksmuseum (Holland); and the Victoria and Albert Museum (England).

12 See the official Mu.SA website at: http://www.project-musa.eu) and social media page: https://www.facebook.com/MuseumSectorAlliance [Accessed 16 November 2018].

13 We structured museum size parameters to take into account the number of staff as follows: micro (under 10); small (11-20); small/medium (21-50); and large (more than 50).

14 Mapa das Ideias is a Portuguese company (founded 1999) that serves museums, audiences and communities. One of its core actions is the development of museum educational services and the design of educational kits, as well as providing training courses for museum professionals (e.g. http://museummediators.eu). Within the Mu.SA framework, Mapa das Ideias was one of the partners involved in the project's first phase of identifying emerging roles among museum professionals and mapping the needs in Portugal. See http://www.mapadasideias.pt

15 These parameters concern the definition of what qualifies as a museum. In this case, the criteria adopted were: 'any organisation that is self-designated as museum, functioning on a permanent or seasonal basis with, at least, an exhibition room or an exhibition space, and having at least one staff member' (Neves, Santos and Lima 2013, p.32). For an overview of the methodological challenges of setting up statistical information concerning the Portuguese museum landscape in the past years, see Santos and Neves (2017).

16 See the list of accredited museums: http://www.patrimoniocultural.gov.pt/pt/museus-e-monumentos/rede-portuguesa/ [Accessed 2 June 2018].

17 DGPC is the Portuguese government body for museums and heritage within the Ministry of Culture, which is mainly responsible for developing national museum public policy.

18 Portugal was among the European Union member states most affected by the international financial crisis of 2008 (Garcia *et al.* 2016, p.12). Furthermore, a more global analysis of the cultural landscape in Portugal reveals two important cycles in the last decades. The first is related to the period from the 1990s to 2008, revealing a trend of overall growth of investment in culture (including museums) by the state and local governments. The second cycle is linked to the effects of the international financial crisis of 2008, but also to the subsequent sovereign debt crisis of 2011. Both circumstances contributed to an inversion of the first cycle, with tightening budgets, disinvestment and overall containment and discontinuity, in addition to reinforcement of (existing) asymmetries (Garcia et al. 2016, p.12).

19 For the academic year 2010-2011, there were 12 Master's programmes offered at Portuguese universities (Vaquinhas 2013).

20 It should be pointed out that the unit dedicated to technology at the University of Porto has been restructured since 1994 in terms of its designation, its scope and its contents. From 2009 onwards, the unit has been known as 'Information technologies and communication in museums' (*Tecnologias da Informação e Comunicação em Museus).*

21 Cultural ICT Consultant; Digital Cultural Asset Manager; Interactive Cultural Experience Developer; Cultural ICT Guide; and Online Cultural Community Manager. See: http://groupspaces.com/eCult/pages/project-results [Accessed 25 January 2018].

22 A more detailed description of the four profiles, including corresponding digital and transferable competences, is presented by Silvaggi (2017, pp.81-98).

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