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Regeneration and Optimisation
of Cultural heritage
in creative and Knowledge cities

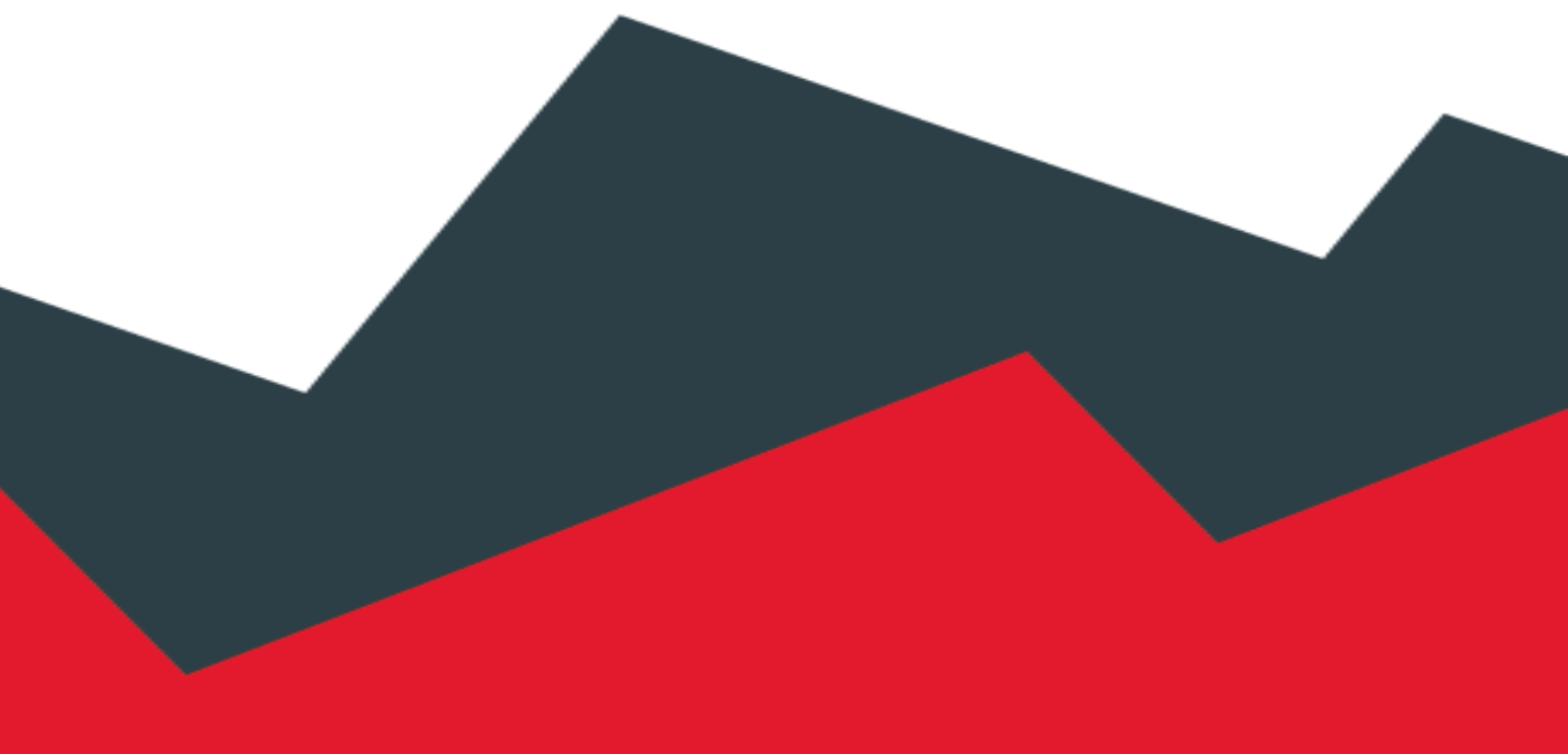
Linking Cultural Heritage to Smart Specialisation Strategies

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Executive summary

Over the past years, the European Union has made a remarkable effort to spread the idea of cultural heritage valorisation and the need for a cross-cutting approach to embrace its multi-faceted nature and potential impact. It has led to increasingly address cultural heritage as a driver for growth, even a “strategic resource for a sustainable Europe” (European Commission, 2014, 2019b; Council of the European Union, 2018).

Indeed, heritage is reasonably well placed at the culture policy, urban policies and even social innovation practices. But, when it comes to the innovation policy, there is still wide room for improvement, despite a number of last efforts (European Commission, 2019b). In fact, many practitioners, from heritage managers to innovation policymakers, are not fully aware of the number of heritage-applied new technologies and innovative solutions which are called to have an impact on the heritage management field, both in the short and medium term. For instance, the city of Eindhoven could enlighten on this transforming power of technological innovation over the heritage field, where a number of tech enablers – e.g. crowd monitoring, environmental assessment sensors, AR/VR applications - have contributed somehow to the adaptive reuse of the former Philips factory campus Strijp-S as a smart and sustainable neighbourhood.

Today, place-based mainstream innovation policies in the EU are by large the so-called Research and Innovation Strategies for Smart Specialisation (RIS3 or S3 in acronym), which are promoted as an ex-ante conditionality for member states and/or their regions to get access to the European Structural and Investment Funds via Operational Programmes. Those strategies should therefore be seen as a fast track to connect heritage to innovation policies more massively, as well as an excellent way to expand funding opportunities.

Nonetheless, only a few of the RIS3s underway have expressly considered cultural heritage in a way or another – in this respect, the Italian regions of Lazio and Emilia Romagna worth a mention. Others regions prioritize tourism or culture-related domains, but mostly with an imprecise content, where the contribution of heritage to an innovation-led growth is not properly examined. Certainly, digitisation represents a main avenue in this regard, but it is so overarching that ultimately is not instrumental enough to best place heritage within the S3 frameworks, or catch proper attention of innovation policymakers on the innovative potential linked to modern heritage management.

Instead, a type of purpose-oriented approach to heritage-applied innovations and technologies could work better to that aim - Heritage Digital Storage & Preservation, Heritage Experience, Smart Heritage, Heritage Care, Heritage Resilience and Lighting and visual experiences. These

main innovation trajectories could be addressed as dashboards to organize “entrepreneurial discovery” dynamics, with the aim to pave innovation-led pathways for cultural heritage. Needless to say, these categories could perfectly work as pipelines for research, investment attraction & funding and start-up development.

In this attempt, the empowerment of cities as S3 key actors would be rather helpful, since local governments are playing a primary role as heritage managers and promoters of heritage-led urban regeneration projects. However, it is a fact that, roughly speaking, smart specialisation still means little for many city officers. Hence, both challenges will mutually reinforce: filling the “city gap” with regard to smart specialisation and connecting properly cultural heritage to S3.

Scope

This report provides a pathway to those interested in connecting the cultural heritage field with the smart specialisation strategies, in particular: i) RIS3/S3 regional leading authorities wanting to focus on cultural heritage at different levels and dimensions; ii) heritage managers wanting to frame cultural heritage within the innovation policy, notably the strategies for smart specialisation; iii) city officers wanting to unlock the potential of heritage as a driver for innovation-led local development.

It is the final output of the ROCK project task named “Linking Cultural Heritage-led Urban Regeneration to Smart Specialization Strategies”. Main goal of this task was to give a transnational response to the need for better connecting heritage-applied technologies and innovative activities to the existing smart specialisation strategies. Such linkage has not been properly scrutinized so far.

The rationale and ambition behind ROCK have certainly created an excellent framework to initiate a reflection on this theme, which ultimately has to do with best placing cultural heritage within the innovation policy. The Emilia-Romagna experience has been rather valuable, as well as the set of technology-driven solutions that have been tested in the ROCK partner cities. As part of this task, the workshop “Smart Specialisation and the Heritage City” was organized at the European Week of Regions and Cities - Brussels 7-10 October 2019 - with the aim to confront the first insights gathered at the inception report (ROCK deliverable D6.2). Furthermore, ROCK’s urban focus has been a precious opportunity to raise awareness of the need for empowering cities as S3 actors.

The ROCK project has been focused on historic districts as testbeds to demonstrate the full potential of cultural heritage as a driver for regeneration, sustainable development and economic growth. Based on a role model/replicator approach, ROCK’s final goal has been refining a European pattern on heritage-led urban development and regeneration.

1. A bridge connecting two banks

1.1. Smart specialisation. What's in it for cities?



In a nutshell, smart specialisation can be introduced as a collaborative process aimed at agreeing where a region is or can be excellent in terms of science, technology and economic performance. That consensus among key stakeholders involved in innovation-led growth should lead to a greater alignment of policies and a more distinctive competitive positioning of that region within the global economy.

The concept emerges from the expert group “Knowledge for Growth” created by the European Commission in 2008, which was headed by Professor Dominique Foray. It quickly inspired and gave shape to a new generation of Regional Innovation Strategies beginning of the EU Programming Period 2014-2020, which were called Research and Innovation Strategies for Smart Specialisation (RIS3).¹ Furthermore, for the first time, the European Commission established that every EU Member State and region should have their RIS3 in place as an ex-ante conditionality to get access to the European Structural and Investment Funds via Operational Programmes. Consequently, smart specialisation becomes mainstream in a very short period of time.

As it was delivered by the European Commission, the RIS3 method was shaped as a 6 step process - analysis, co-production model, vision, priority setting, policy mix alignment and subsequent action plan, and monitoring – along with an ad-hoc governing framework - steering group or management team, knowledge leadership group or mirror group, and a number of thematic working groups, usually cluster-based or technology-based (Foray et al, 2012). To spread the method, the European Commission established in 2011 the Smart Specialisation Platform (S3 Platform) at the Joint Research Centre-Seville. This Centre provides methodological support, peer-review workshops, online library and promotes

¹ Nota Bene: In this report, both acronyms RIS3 and S3 are interchangeable. At the beginning of the EU Programming Period 2014-2020, the concept of smart specialisation gave birth to the method called Research and Innovation Strategies for Smart Specialisation (RIS3). At this time, facing the new Cohesion Policy cycle 2021-2027, the use of RIS3 is getting less use in favour of S3 or just “smart specialisation strategies”. The latter refers to the same subject as RIS3 - research and innovation strategies – but now the implicit aim is to cover a broader policy-mix with regard to innovation-led economic development. For instance, at the time of its launch in 2015, the Emilia Romagna region used RIS3. Four years later, S3 is the most commonly used acronym for the same strategy.

discussion around the smart specialisation concept, involving the academia, practitioners and experts.



Certainly, the idea of smart specialisation is not entirely new. However, compared to former generations of Regional Innovation Strategies in the EU, what is now stressed is the value of prioritizing (making smart choices), as a result from a multi-stakeholder, challenge-based and permanent process which is called “entrepreneurial discovery” in the S3 jargon. A prioritisation which nevertheless is just a start, a kind of backbone towards a “specialized diversification”, in the sense of a well-structured complete picture of the regional economy. In this perspective, promoting and working over cross-sector innovations becomes central. And that is mainly why smart specialisation is indeed a sophisticated strategy.

Hence, reducing smart specialisation to a matter of prioritization is rather simplistic. The real meaning and scope of the concept is at the crossroads of the following key values:

- **Choice.** Priority setting should not be only based on the industrial/productive background but also on the potential to up-scale new emerging activities and turn both global and local challenges into opportunities for innovation and business growth. Such an exercise of choice should lead to fine-tune the horizontal mix of policies and initiatives on economic development accordingly (Foray et al, 2009).
- **Relatedness.** As said before, the priority setting (productive and technological domains, fields of knowledge...) is not an end itself but the basis for a kind of structured diversification. The purpose is to fully activate the potential of a number of core competences, knowledge fields and sectoral specialisations, expanding them to other value chains and sectors (Boschma, 2017). Therefore, promoting related variety is a primary goal within a S3 framework, which can be seen as a roadmap for cross-innovation.
- **Co-production.** It’s about mobilizing stakeholders from the triple or quadruple helix to jointly explore and prioritize opportunities for innovation-led growth in a dynamic way. This is called Entrepreneurial Discovery Process (EDP) in the S3 jargon. In this context, entrepreneurial means out-of-the-box thinking, aimed at maximizing the own innovation potential by responding to specific market needs and/or global and local challenges – e.g. ageing population, climate change... cultural heritage valorisation. To promote relevant insights and get an impact, the EDP must be carefully facilitated and politically supported and legitimized.



Setting aside for a while the RIS3 method – and the need for cities to be duly entrusted as RIS3 key developers within their national/regional contexts - the very concept of smart specialisation,

as described above, is powerful as an overarching approach to re-invigorate the local economic agenda and make it more cohesive, innovation-oriented and transformative.

We mean an agenda aimed at breaking path dependencies and governance silos as well as exploring more systematically new growth potentials in order to accelerate the transition to real knowledge-based and sustainable urban economies. Nonetheless, both challenges could ideally be addressed as sides of the same coin, namely: cities themselves making the most of the smart specialisation concept to upgrade the local economic agenda; while being consciously appointed by due regional/national authorities as RIS3 key actors or developers - at least those cities owning a significant background promoting innovation-led growth (Figure 2).

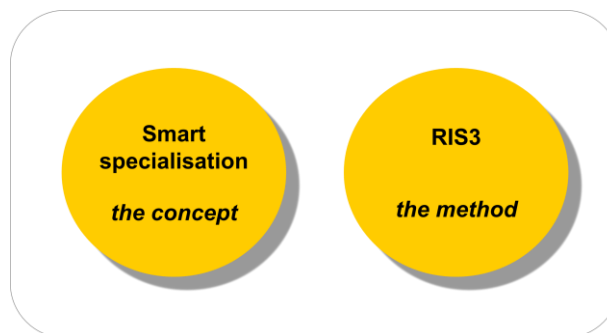


Figure 1. Smart specialisation: the concept and the RIS3 method

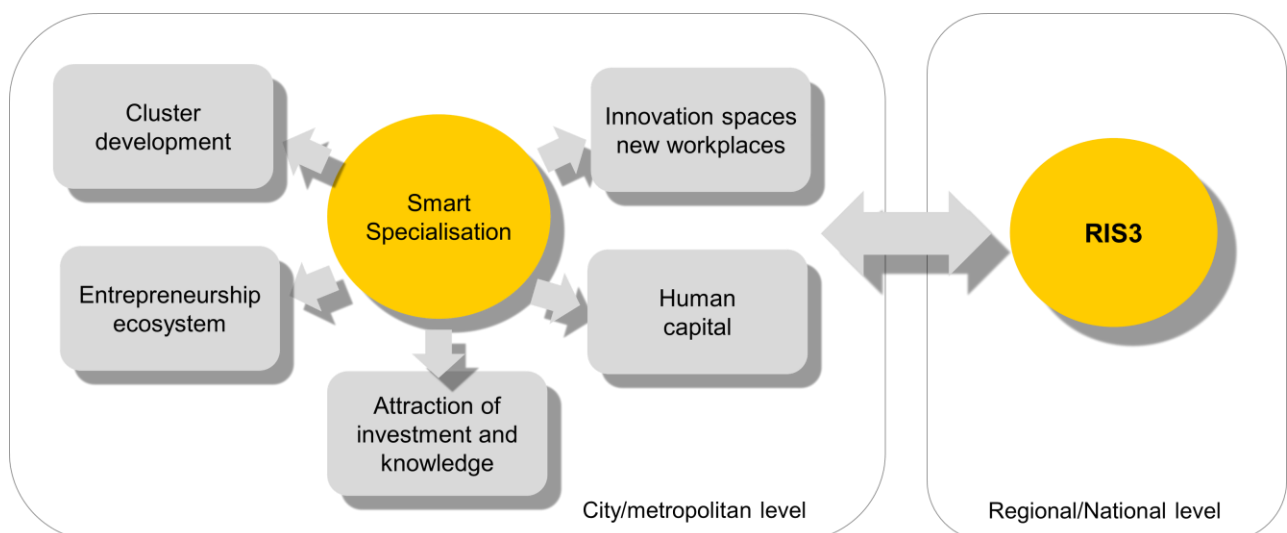


Figure 2. Smart specialisation as a driver to re-invigorate a give greater direction to the local economic agenda (Rivas, 2018)

1.2. Heritage valorisation and heritage-led urban regeneration



This report intends to build up a bridge between smart specialisation and cultural heritage. As a starting point, it is good to be aware of some significant changes that have affected the heritage management field. One is about a **change of purpose**, since the idea of heritage valorisation (and adaptive reuse to contemporary issues, when appropriate) matters now as much as preservation. So, the best preservation policy is now that of trying to reconnect heritage to the contemporary city, in terms of use and function. Heritage is a history of transitions, and it should be properly managed as such (Rivas, 2020).

Such a **transitional or dynamic approach** understands heritage as living memory, and therefore valuable to build the future. In other words, heritage is not only a stock of the past. In this perspective, the historic artefact should not be merely preserved, but its function should be re-thought into the present time, beyond its representational and iconic value. ROCK project strapline, ***Cultural Heritage Leading Urban Futures***, captures this transitional approach perfectly.

The above assumption leads to accept the multi-faceted nature of cultural heritage valorisation, since the latter is indeed at the crossroads of several fields – e.g. culture, tourism, economy, urban planning, society and wellbeing. **Innovation and technology** have certainly much to contribute as well. Indeed, today heritage is reasonably well placed at the culture policy, urban policies and even social innovation practices. However, the link between cultural heritage and innovation policies is still weak. And at this point, just recalling that place-based mainstream innovation policies in the EU are mostly the smart specialisation strategies.



In addition to this, there has been a **change of scale** with regard to cultural heritage, which has even underlined the need for an integrated approach in modern heritage management. Now the subject is not only the historic building and the monumental artefact, but also the urban (and rural) cultural landscapes (Rivas, 2020). This became doctrine in 2011 with the adoption of the UNESCO Recommendation on the Historic Urban Landscape (HUL).

Consequently, this has paved the way to heritage as a driver for urban development and regeneration – the ROCK circle model is a good example of it (Boeri et al, 2019). That is, when timely, the urbanisation and re-urbanisation processes can be fertile ground to roll out such transitional and integrated approaches of cultural heritage. **Heritage-led urban development and regeneration** must be seen as a propitious context to best connect heritage-applied innovations to smart specialisation strategies.

Moreover, this is endorsed by the now mainstream sustainable urban development models, since the “New Urban Agenda” and its related Sustainable Development Goals expressly

acknowledge the contribution of culture and cultural heritage to sustainability.² In this respect, the European Green Deal,³ which has been presented in December 2019 as the new growth strategy for the EU, is called to work as a new filter to assess the relevance of the S3 running over the 2021-2027 Multiannual Financial Framework. This condition of **cultural heritage as a sustainable development enabler** is therefore another powerful reason to build up a bridge between heritage and the smart specialisation strategies.



All the above has contributed to shape a **new paradigm** in cultural heritage characterized by a broader conceptual scope and a reinforced integrated approach, which has been called the “third regime” in cultural heritage (Sunkoly and Vahtikari, 2018), following the former ones more focused on restoration and preservation. The first based on the protection initiatives from the nation state, and a second regime distinguished by the internationalisation of the conservation pattern, with UNESCO as a primary actor.

In the same vein, Christer Gustafsson translated Pier Luigi Sacco’s concept of Culture 3.0 into the more specific field of cultural heritage to speak about Conservation 1.0 (with the spotlight on protection), Conservation 2.0 (focused on conservation and restoration) and Conservation 3.0 “with focus on adaptive re-use and spill-over effects in connection with” urban sustainable development and growth (Gustafsson, 2019).



The European Union has made a major effort in giving shape and spreading this forward looking approach of cultural heritage. In this sense, it is remarkable the launch of the so-called Joint Programming Initiative on Cultural Heritage (JPI-CH) in 2010, and the report of the Horizon 2020 Expert Group on Cultural Heritage stressing that heritage does not entail, as is often claimed, solely costs, nor it is only limited to aspects related to culture and identity, but it has multiple positive effects over the economic, social and environmental fields (European Commission, 2015). It gave rationale to a number of H2020 call for projects aimed at examining the multi-dimensional impact of heritage in the context of urban (and rural) development and urban regeneration⁴. Then, Council of the EU and European Parliament’s decision designating 2018 as the European Year of Cultural Heritage put a big spotlight on heritage as a multi-purpose “strategic resource for a sustainable Europe” (European Commission, 2014).

² The New Urban Agenda was adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, on October 2016. It was endorsed by the United Nations General Assembly the same year.

³ European Commission (2019) The European Green Deal. COM(2019) 640 final. Brussels, 11.12.2019.

⁴ Next Framework Programme Horizon Europe 2021-2027 is considering “Culture, Creativity and Inclusive Society” (including Cultural Heritage) as one out of the 6 clusters organizing the pillar “Global Challenges and EU Industrial Competitiveness”.

Following the European Year of Cultural Heritage, the Union declared its determination to “bring cultural heritage to the fore across policies in the EU” (Council of the European Union, 2018), which was translated into the transitional European Framework for Action on Cultural Heritage. One out of the 5 pillars of action identified in this Framework is “Cultural heritage for an innovative Europe: mobilising knowledge and research” (European Commission, 2019b).

However, putting into practice this new integrated approach is not easy. A main outcome of the policy review “Innovation in Cultural Heritage Research”, commissioned by European Commission’s DG for Research and Innovation in 2018, was to verify that “the potential of current cultural heritage research could not be fully exploited - therefore, cultural heritage needs to be adequately placed in the post 2020 European research agenda with a clear focus and a scale which can bring about change” (Sonkoly and Vahtikari, 2018).

In this respect, what could work as a **real turning point** to realise the full innovation potential of cultural heritage is a better placement of heritage within the second generation of S3s – those to be developed over the 2021-2027 period. We have two reasons to think this way: i) because a modern understanding of cultural heritage as a driver for sustainable growth is transformative itself,⁵ and therefore suits well to the right envisioning of S3 as a transformation agenda; ii) because of the massive mobilisation of resources at regional/national level put behind most smart specialisation strategies across the EU.⁶

⁵ “Powerful catalyst for the future of Europe”, this was the headline regarding cultural heritage for a manifesto launched on May 2020 by the European Heritage Alliance, an informal platform bringing together 50 European and international networks active in the heritage field.

⁶ Just to give an idea, Emilia Romagna’s smart specialisation strategy provided coverage to more than 8,500 projects during the first 4 years after its approval in 2015. Those projects mobilized an investment of 3 billion Euros and benefited from almost 1.5 billion Euros in public financial support (ART-ER, 2019b).

2. The (imprecise) placement of cultural heritage in current smart specialisation strategies

2.1. A look at RIS3s hosting ROCK cities



Eye@RIS3 is a database available online, which is managed by the S3 Platform at EU's Joint Research Centre. It was created to collect information from all RIS3s in Europe in a standardized form, in particular on 3 types of priorities:⁷

- Economic domains, based on Eurostat's NACE2 sectoral codes and OECD categories.
- Scientific domains, based on NABS.⁸
- EU policy objectives, mostly related to Horizon 2020's "societal grand challenges".

It was soon discovered that it is not possible to enquire about "cultural heritage", because this field is not encoded as such or in a similar way in the long list of possible domains, sub-domains and policy objectives. The closest codes to the heritage field in the database are the following:

Economic domain

R - Arts, entertainment and recreation

R.90 - Creative, arts and entertainment activities

R.91 - Libraries, archives, museums and other cultural activities

Scientific domain

10 - Culture, recreation, religion and mass media

10.85 - Cultural services

10.86 - Racial, cultural and social integration, sociology of science, religion, art, sport and leisure; media, language, libraries, archives and cultural policy

Policy objectives

C - Cultural & creative industries

C.16 - Development of regional cultural & creative industries

⁷ <http://s3platform.jrc.ec.europa.eu/eye-ris3>

⁸ Nomenclature for the Analysis and Comparison of Scientific Programmes and Budget.

As a result, in the few regions with a remarkable placement of cultural heritage at their priority settings, such a good positioning is not visible once translated to Eye@RIS3. For instance, “Cultural Heritage and Technologies for Culture” is one out of the seven big priorities at RIS3-Lazio, in Italy. But it is encoded as “ICT and new technologies for tourism, cultural and creative industries”, which is not the same indeed. The heritage field has been much blurred. The same applies to S3-Emilia Romagna, where cultural heritage is clearly recognizable at two priority domains, cultural and creative industries and building & construction. However, this latter connection remains invisible at Eye@RIS3, since the encoded domain “sustainable construction” does not include any topic related to heritage.

This is an evidence of the gap between (the promising and growing) cultural heritage field and the innovation policy represented by RIS3/S3, despite the continuous statements over the past years on the role of cultural heritage as a “strategic resource for a sustainable Europe”.⁹

So, Eye@RIS3 was used just as kind of preliminary check, before going through the original RIS3 documents of Emilia-Romagna (IT), Lisbon city-region (PT), Auvergne-Rhône-Alpes (FR), South Netherlands (NL), North-West Development Region (RO), Attica (EL), Piedmont (IT) and Lithuania. That is, those regions or member states hosting a ROCK partner city and with a smart specialisation strategy in place.¹⁰

The Eye@RIS3 check aimed to pick out those RIS3s fulfilling with at least one of the following criteria:

- “Arts, entertainment and recreation” as one of the prioritized economic domains.
- “Culture, recreation, religion and mass media” as one of the prioritized scientific domains.
- “Cultural & creative industries” within the policy objectives.
- The words “Heritage” or “Culture” at the description of any of the main priorities. This was indeed the most reliable sign of somewhat meaningful presence of cultural heritage at the priority setting, as that description is free-writing, not subject to any coding.

⁹ Council conclusions of 21 May 2014 on cultural heritage as a strategic resource for a sustainable Europe, 2014/C 183/08. See also European Commission, 2014.

¹⁰ ROCK brought together a unique 32-member consortium, including 10 cities: 7 acting as “role models” (Lyon, Eindhoven, Liverpool, Cluj-Napoca, Athens, Torino and Vilnius) and 3 “replicators” (Bologna as ROCK project leader, Lisbon and Skopje). As belonging to a non-member country, Liverpool’s research & innovation priorities are encoded at Eye@RIS3 but not coming from a S3 framework properly and referred to all England. And no information yet on North Macedonia, which is currently running a RIS3 planning process at Country level, with the support of the European Commission-S3 Platform. RIS3-North Macedonia is expected to be completed in 2021.



South Netherlands and **Piedmont** do not pass the Eye@RIS3 filter. Moreover, neither the Research and Innovation Strategy for Smart Specialisation for Zuid-Nederland (2014) nor the *Strategia per la Specializzazione Intelligente del Piemonte* (2016) include any reference to the cultural heritage field. Does it mean that those regions are not promoting or investing in cultural heritage-applied innovation projects? Not necessarily of course, but this field is not explicitly settled at their innovation policies. It is like the heritage field remains hidden at the innovation policy eyes.

Auvergne-Rhône-Alpes should be included in this group too. The French region passes the Eye@RIS3 filter because of “arts, entertainment and recreation” and “cultural & creative industries” are ticked as prioritized economic domain and policy objective respectively. However, at the Regional Strategy for Economic Development, Innovation and Internationalisation (SRDEII),¹¹ this only relates to their priority area named “Sports, Tourism and Mountain Activities”, whose purpose is to develop a “mountain sector”.

In our view, such inexistent placement of cultural heritage at S3-Rhône-Alpes is revealing what we herein are calling the “city gap” (see sub-chapter 5.1), consisting on the weak involvement of the local authorities in S3. So, despite Lyon’s agenda stands out on heritage-led urban development for years,¹² this unique positioning has no effect at the regional innovation policy.



Cluj-Napoca has been finalist in the European Capital of Innovation 2020 contest, as an endorsement of the great job the city doing in addressing innovation as a truly cross-cutting driver for the local agenda, also covering culture and cultural heritage. However, both fields have been left out of the smart specialisation strategy of the **North-West Development Region** (RIS3-NV), organized from the NW Regional Development Agency as RIS3 coordinating authority.

Even so, what it comes to ICT as one of the six RIS3-NV major priorities, “arts, entertainment and recreation” has been ticked as a related domain at Eye@RIS3. This may leave a door open to bridge with cultural heritage, through a number of technologies like IoT, artificial intelligence and gamification. Transilvania IT cluster - likely the most robust IT cluster in Eastern Europe - would be willing to impulse this working line through a dedicated agenda.

In a way, the picture in **Lithuania** is similar. RIS3 in the Baltic republic is set at national scale, where “Inclusive and Creative Society” is one the 6 broad priority fields. It focuses on education

¹¹ SRDEII is the acronym for the Schéma Régional de Développement Économique, d’Innovation et d’Internationalisation 2017-2021, adopted by Auvergne Rhône-Alpes in December 2016. It assumes the Stratégie Régionale d’Innovation - Spécialisation Intelligente for Rhône-Alpes (SRI-SI), at least in terms of priority areas, which dates back in 2013, before the merge between Auvergne and Rhône-Alpes.

¹² The city is even a global reference in the lighting industry, which is increasingly connected to modern heritage management.

and to some extent on social innovation issues, with no explicit reference to culture or cultural heritage. However, at the Eye@RIS3 database, the domain encoded as “arts, entertainment and recreation” has been ticked in relation to this priority, thus leaving a way open to bridge with the cultural heritage field.



A Regional Innovation Strategy for Smart Specialisation - *Estratégia de Inovação Regional para a Especialização Inteligente* - was specifically set up in 2015 for **Lisbon city-region**, also referred as to Lisboa-Vale do Tejo, as part of a meaningful national RIS3 framework, which is coordinated by the National Innovation Agency (ANI).

RIS3-Lisbon highlights 6 domains of specialisation, namely: Tourism and hospitality, Mobility and Transport, Culture and creative industries, Health, Marine resources and Advanced services to companies. In this setting, cultural heritage is expressly addressed as an asset within the tourism and hospitality domain, yet it might also be recognized as part of the cultural and creative cluster. It is also worth noting RIS3-Lisbon’s interest to make a bridge between tourism and the cultural and creative industries, as well as to deepen into the digital transformation of both. Looking at the future, such a cross-innovation vector might expand the role of heritage at the innovation policy in Portugal (that is, beyond culture and tourism policies), as well as to make heritage work for the vibrant creative-digital and start-up ecosystem of Lisbon, through a variety of forms and usages.

Similarly to Lisbon, heritage can also be found somehow at the promising “Culture-Tourism-ICT interaction” domain, which is one out of the six big priority areas at **RIS3-Attica**. However, heritage is not as explicitly visible as one could expect from one of the heritage regions par excellence in the world. To our view, this first S3 roadmap has been a missed opportunity to link the heritage field (which is undoubtedly distinctive in Athens/Attica) to the innovation policy.



At this point, it is possible to wrap-up **some insights**:

- Trying to work with secondary sources to assess the role of cultural heritage at S3 is a difficult matter. Heritage is usually out of the key words, knowledge fields and even main policy objectives most commonly associated to S3. In this regard, another revealing fact is the almost inexistent literature on the relationship between heritage and smart specialisation - none out of the more than two hundred documents available at the S3-Platform’s knowledge repository (checked on February 2019), including both technical reports and policy brief series, directly address cultural heritage as a topic. It is just an evidence of the urgency to build up a bridge between the heritage field and the smart specialisation strategies at the new cycle 2021-2027 of the Cohesion Policy.

- Only in three out of the eight S3 examined - Emilia Romagna, Attica and Lisbon – the cultural heritage field is visible enough. We could assert that Attica and Lisbon follow a conventional path, yet valuable. While Emilia Romagna stands out in many aspects and can offer a benchmark to other regions wanting to best position cultural heritage at forthcoming S3 developments - we will enter the Emilia Romagna experience in more detail along this report.
- When it comes to Lisbon and Attica, the innovation potential of heritage is framed within tourism development and/or the cultural and creative industries. Digitisation as cross-cutting challenge is widely considered as well. They are broad and relevant domains to experiment and growth, but maybe are not enabling a more precise drawing of the innovation potential linked to modern heritage management. Moreover, they do not encompass the whole spectrum of innovative and tech-driven developments linked to the heritage field.
- In the other regions, cultural heritage, and even culture, can hardly be recognized at the description of both the content and relatedness of the S3 priority domains. In some cases any explicit mention to cultural heritage simply does not exist - South Netherlands, Piedmont and Auvergne-Rhône-Alpes. In other cases, when reading between lines, the silhouette of heritage can barely be guessed, and mostly connected to the digital transformation challenge, like in the North-West Development Region (RO) and Lithuania. But, it might be enough to start a conversation to better involve the heritage valorisation field at the S3 roadmaps.
- In this context, empowering cities as S3 actors matters. The “city gap” may explain the total absence of culture and cultural heritage at the current RIS3 designs in regions like Auvergne-Rhône-Alpes, Piemonte or Transilvania (NW Development Region), which clashed with the prominent role those fields are playing in the agendas of Lyon, Torino and Cluj-Napoca respectively.

2.2. Remarkable experiences: Emilia-Romagna, Liverpool, Lazio



S3-Emilia Romagna: smart cultural heritage.

First delivered in 2015, Emilia Romagna’s smart specialisation strategy highlights five vertical priority domains. Three defined as region’s core business (Agri-Food, Mechatronics and the Automotive industry and Building & Construction) and two envisaged as developing domains with a great potential for growth (Cultural & Creative Industries and Health & Wellness).

Within this setting, cultural heritage was expressly considered as one out of the three “thematic orientations” of the cultural & creative industries domain, called Smart Cultural Heritage at that time. The monitoring report dated on November 2019 disclosed that Smart Cultural Heritage accounted 21% of the total investment mobilized within the cultural & creative industries, and 33% of the public grants applied to this priority domain, with Horizon 2020 as main funding source, followed by ERDF and ESF (ART-ER, 2019b).

In addition to this, built heritage was also well represented and developed, in an explicit way, at the building & construction priority. In particular, through the strand on “restoration, recovery and regeneration”. It covered new materials able to auto-diagnose and interplay with monitoring systems, less invasive techniques for diagnosis (e.g. IoT-based solutions) and BIM (Building Information Modelling).

Later at the implementation phase, Emilia Romagna’s cluster map was re-drawn according to S3’s five vertical priorities, and the new cluster platforms (clust-ERs) were duly commissioned to perform the entrepreneurial discovery by specific ambits for discussion and collaboration, now called “value chains” instead of thematic orientations.¹³ Built heritage was then expressly included at the clust-ER Build (building & construction), through the value chain **Innova-CHM – Innovation in Construction and Cultural Heritage Management**.

Likewise, cultural heritage is a significant component of the clust-ER Create, covering the cultural and creative industries priority. Three out of the five value chains organizing the work of the clust-ER Create involve cultural heritage explicitly.¹⁴ One of them fully dedicated to the heritage field: the so-called **CultTech – Technologies for Tangible and Intangible Cultural Heritage**.

CultTech is promoting an agenda with three focal points: i) Artificial Intelligence as new driver, replacing the role of digitisation of the past years; ii) stressing the value of interoperability in heritage digitisation; iii) promoting cross-overs in the field of restoration and conservation, involving IT, mechanics, chemistry, physics and engineering in order to upgrade the methods of diagnosis and self-guarding.¹⁵

¹³ This changing path in the way of organizing the priority setting along the implementation stage is a positive sign of the impact and usefulness of S3 as a policy framework in Emilia Romagna.

¹⁴ The activity of the clust-ER Create is currently organized into five value chains: ADDICT (advanced design & digital craft technologies), CultTech (technologies for tangible and intangible cultural heritage), Fashion, MultiModel (multimedia and new business model) and Tourism and Urban Reactivation. Besides CultTech, MultiModel and Tourism & Urban Reactivation involve the heritage field as well.

¹⁵ More on the Emilia Romagna experience in sub-chapter 4.2.



Liverpool's heritage-led urban regeneration as fertile ground to realise the full innovation potential of cultural heritage.

The UK will no longer share any planning framework and related funding source with the EU. Nonetheless, as a ROCK partner city, we have brought Liverpool into this section because of its (even visionary) understanding of the many possibilities that are related to cultural heritage as a driver for urban growth, in particular for **place-making** and boosting innovation. Saying place-making first is to emphasize Liverpool's vision to put heritage somehow at the heart of the urban regeneration project, as fertile ground to gardening the multi-faceted nature of heritage valorisation, including innovation and tech-driven developments.

This approach was gone further to the initial momentum of the nomination of the city as European Capital of Culture in 2008 and the focus on the historic docklands' re-development, and was then applied, inter alia, to nearby Baltic Triangle district. An area where the massive re-using of the industrial heritage buildings and historic warehouses has quickly turned it into home to Liverpool's creative-digital cluster. To harness the potential of this cluster, a number of major programmes and initiatives are being deployed – e.g. LCR Activate, The Sensor City, Centre for Architecture and the Visual Arts (CAVA), Immersive Liverpool... where quite a few pilots and projects applied to heritage valorisation are developing.

In fact, such a place-making approach is formally envisioned as a cross-cutting driver at Liverpool City Region Growth Strategy (2016), where "Place" is one of the three pillars, along with Productivity and People. The pillar Place aims "to improve our transport, energy and digital infrastructures, and protect and enhance our cultural and environmental assets".

Furthermore, the creative-digital is one the seven "growth sectors" identified at that growth strategy. A priority set which also included advanced manufacturing, financial and professional services, health and life sciences, low carbon energy, maritime and logistics and the visitor economy. Later in 2018, at the Liverpool City Region Strategic Investment Fund Strategy,¹⁶ the visitor economy was renamed as "visitor economy, culture and heritage". In 2020, priorities were reformulated again, this time as a short range of "transformational opportunities" at the so-called Local Industrial Strategy. One of them "Global Cultural Capital – *a place where culture creates prosperity for all*".

¹⁶ The Strategic Investment Fund Strategy was set up to manage the public funding following Liverpool's devolution agreement of 2015.



S3-Lazio: cultural heritage and technologies for culture as a priority domain.

Rome has not joined the ROCK project, but it's worth highlighting in this report the Lazio region, whose RIS3 (2016) is one of the few considering cultural heritage, as such, within the short range of big priority domains.¹⁷ That is, not necessarily because of its contribution to the visitor economy or the creative economy sectors, as a primary reason. Furthermore, the priority has been labelled "Cultural Heritage and Technologies for Culture", making it clear the aim to consolidate a technological pathway for the heritage field.

In this sense, the purpose is twofold. On the one hand, promoting substantial technological innovation to strengthen the local innovation ecosystem as a world-class leader in cultural heritage, notably in technologies related to "analysis, conservation, and restoration". On the other hand, put the spotlight on technologies serving heritage valorisation, usage (new ways of experiencing heritage) and management. Regarding both lines of work, the regional innovation agency Lazio Innova – also the coordinating entity for S3-Lazio – is mobilizing the following policy instruments and resources:

- A specific innovation ecosystem is underway on this priority domain through the country-wide figure of "Distretto Tecnologico" (DT). So, the *Distretto Tecnologico per i Beni e le Attività Culturali* (DTC) is already working in Lazio, now with the mission to organize the entrepreneurial discovery as well.
- The DTC has been notably reinforced with a **Competence Centre on Cultural Heritage Technologies**, officially launched in October 2018. On one side, the centre strives to build a repository of the technological know-how in the areas of restoration and conservation. On the other side, it seeks to involve the higher education entities on this knowledge field by implementing new University Degrees. This is meant to create a new array of professionals and practitioners keen to manage technologies in the domain of heritage.
- A set of financial incentives targeting different stakeholders and purposes: i) multi-action programme to push forward technological co-operation and synergies among companies, professionals and research bodies; ii) investments in research centres and Universities; iii) start-up development; iv) museums and other cultural institutions wanting to introduce digital-based solutions and new immersive experiences.¹⁸

¹⁷ RIS3-Lazio' seven specialisation areas are: aerospace, life sciences, cultural heritage and technologies for culture, creative-digital industries, agrifood, green economy and security.

¹⁸ The AR/VR experience designed for the *Ara Pacis* in Rome is a good sample of these supported initiatives <https://youtu.be/EtkCd7Wxh5>

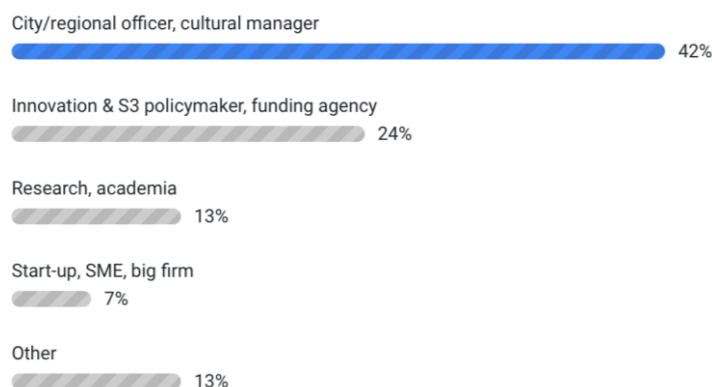
2.3. Main hindrances



The organisation of the workshop “Smart Specialisation and the Heritage City”, at the 2019 European week of Cities and Regions, gave us the opportunity to gather information from a diverse group on a number of issues regarding this report’s theme. This group mostly included public officers working on cultural heritage, economic development and innovation at both regional and local level, along with representatives from business, research and the academia.

First, participants were asked about their degree of knowledge on the smart specialisation strategies. The answers show a **communication gap** with regard to RIS3/S3. Despite being a mandatory planning exercise at the Programming Period 2014-2020, 43% of the participants recognized having no knowledge or quite superficial knowledge about the smart specialisation approach and the RIS3 running at their regions (figure 3). Interestingly, such a poor knowledge goes beyond practitioners working at the local level, and even includes other parties more closely involved in innovation practices.

Identify yourself. Which category fits you better?



Are you familiar with smart specialisation strategies?

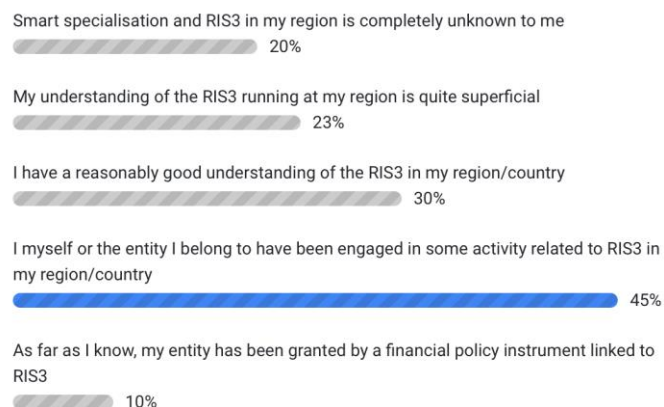


Figure 3: Onsite poll at the workshop Smart Specialisation and the Heritage City, European Week of Regions and Cities, Brussels, October 2019. 45 voters, question on the right allowed multiple answers.



Enquired about the main hindrances for heritage-applied research and technologies to expand and be duly considered at the innovation policies, participants underlined two barriers (figure 4). First, **governance silos** preventing an integrated approach to cultural heritage. Being aware of the cross-cutting nature of modern heritage management, not to mention that of heritage-led

urban development and regeneration, is like a pre-condition to start working to a better placement of cultural heritage at the smart specialisation strategies. Pooling resources among different city units and orchestrating cross-sectoral policies around heritage can certainly be challenging for policy officers.

What in your view are the main barriers to a more rapid expansion of heritage-applied research and technologies?



Figure 4: Onsite poll at the workshop Smart Specialisation and the Heritage City, European Week of Regions and Cities, Brussels, October 2019. 40 voters, question allowed multiple answers.

Second main barrier is the **low awareness of technology trends** applying to cultural heritage by heritage managers. To face this obstacle, one of the recommendations taken from the entrepreneurial discovery type of discussion organized about the heritage field in the context of S3-Emilia Romagna was promoting research projects bringing together cutting-edge technologies and humanistic disciplines (Clust-ER Create, 2019). In this regard, the very idea of heritage valorisation is not widely assumed yet, and it represents the third major obstacle.



More specifically, another hindrance relates to the way heritage digitisation is being addressed and developed, where an individualistic approach can limit the impact of the digitalisation project. In this field, cooperation and pooling resources is key: i) to raise adequate funding for the high-cost digitisation techniques and systems; ii) to enable the interoperability of the e-solutions adopted; iii) and to tackle jointly training needs for heritage managers and officers on digital skills and solutions. In this sense, Antonella Fresa (2014) has reported the continuous investment in in-house systems, which is contributing to lack of interoperability and fragmentation of resources into “**digital silos**”.

3. Categorizing innovation trajectories regarding cultural heritage

3.1. Re-framing heritage into smart specialisation strategies



A more in-depth analysis would be needed on how cultural heritage is represented at the strategies for smart specialisation. Nonetheless, the considerations gathered at the previous chapter reveal that, yet valuable, none of the three most widely assumed **mediators** between the heritage field and S3 – tourism, cultural and creative industries and digitisation - can embrace, for different reasons, the multi-faceted nature of cultural heritage valorisation, and therefore its innovation potential.



The **tourism-driven approach** of heritage at current S3s is working largely because of the correlation between quantity and quality of the heritage assets and the size of the visitor economy. It is the case of RIS3-Attica, for instance. That is indeed a strong reason to promote quite a few heritage-applied technologies serving the tourism sector (and the culture-related event industry). But other tech and innovative developments linked to heritage valorisation likewise, can remain hidden or underestimated.



Silvia Cerisola (2019) has recently demonstrated through an econometric model that beyond tourism, **creativity** — possibly expressed according to different patterns— works as a mediator to unleash the positive impact of cultural heritage on local economic development. This is a major contribution because, to a large extent, even the abundant literature on the creative economy tends to see cultural heritage (and the cultural agenda) as part of the amenities – the urban scenario – useful to attract the creative class towards the “creative city” (Backman and Nilsson, 2016).

There is therefore a first need for re-framing heritage within the creative economy. The challenge would be “how to get cultural heritage into a broader conversation with the creative industries” (Vahtikari, 2018). This gap may explain the so vague content referred to heritage once it is mentioned as part of the cultural and creative industries as priority domain. In other words, only a small number of S3s are focusing on heritage (within the broader domain of cultural and creative industries) in a way that it can be really instrumental in order to clarify and

prioritize more precisely a number of innovation strands concerning heritage – just like S3-Emilia Romagna does.

Anyhow, it is a fact that many S3s are prioritizing activities and innovation strands within the cultural and creative economy, and this should be highly appreciated in order to counterbalance certain prevalence of a tourism-driven approach to cultural heritage.



Sustainable construction, and innovative developments along the real estate value chain,¹⁹ can certainly meet some of the challenges posed from heritage preservation, valorisation and adaptive reuse. Not to mention that “renovation and maintenance represents more than a quarter of the value of Europe’s construction industry”, as the Horizon 2020 Expert Group on Cultural Heritage echoed (European Commission, 2015). For instance, in this regard the so-called “Halland model” has been widely acknowledged as an impactful place-based approach on built heritage valorisation, also working as a booster for the local building and construction sector, in terms of investment mobilisation, job creation, and new skills and tech solutions (Gustafsson, 2009). It takes the name from the Swedish city of Halland (300,000 Inhabitants), which promoted an ambitious, *Keynesian* plan on heritage conservation and valorisation as a driver to face the economic decline the city underwent during the 1990’s. From this perspective, sustainable construction should be called to a bigger role as a connector between heritage and S3.



Somehow connected to sustainable building and construction, **heritage-led urban development and regeneration** is getting a growing interest as field of work and experimentation (Rivas, 2020), as commented before in sub-chapter 1.2. This means there is wide room for a number of innovative developments concerning modern urban management to involve the heritage field, from promoting circularity²⁰ to smart city megaprojects. This is worth noting, in order to find out and size the potential of cultural heritage at the smart specialisation strategies. Indeed, this is why Liverpool has been highlighted in this report. Liverpool’s well-known background on heritage-driven urban regeneration is what has led cultural heritage to a meaningful placement at the innovation policy and other major policies in the city region.

¹⁹ In this regard, Historic Coventry Trust (UK) brings a good example. It is a charity founded in 2015 with a current portfolio of 20 historic properties to be revitalized and reused for different purposes, from workplaces and hospitality to residential and civic uses. In doing so, the charity creatively operates along the real estate value chain, including fundraising, property acquisition, restoration, re-functionalisation and sustainable cost/revenue modelling.

²⁰ See CLIC - Circular models Leveraging Investments in Cultural heritage adaptive reuse, a H2020 trans-disciplinary research project <https://www.clicproject.eu>



The above considerations can be helpful in order to re-think cultural heritage as a driver for growth, and by extension to re-contextualize heritage at the smart specialisation strategies. In this regard the S3-Emilia Romagna experience is valuable, because of its vision and ability to place cultural heritage into a variety of innovation frameworks – cultural and creative industries, building & construction, tourism and urban regeneration.

3.2. Digitisation as main avenue connecting heritage to S3



In this context **digitisation is everywhere**. It powerfully draws the spotlight on the debate about cultural heritage and innovation²¹. Indeed, at the EU level, besides the Digital Agenda for Europe, cultural heritage digitisation has been specifically encouraged and strongly supported by the European Commission. More specifically through the Recommendation on the digitisation and online accessibility of cultural material and digital preservation (2011/711/EU) and the subsequent consolidated reports monitoring the efforts and achievements of the member states in this respect (e.g. European Commission, 2018).

This particular interest gave birth to Europeana²² - the attempt of the EU to develop its own digital cultural heritage platform– and in 2017 to a new Expert Group on “Digital Cultural Heritage and Europeana”. Later in 2019, the member states re-confirmed their commitment with Commission’s Recommendation (2011/711/EU) signing a “declaration of cooperation on advancing digitisation of cultural heritage”. It is based on three lines of work:

- A pan-European initiative for 3D digitisation of heritage artefacts, monuments and sites.
- Re-use of digitised cultural resources to foster citizen engagement, innovative use and spill-overs in other sectors.
- Enhancing cross-sector and cross-border cooperation and capacity building in the sector of digitised cultural heritage.

Even the digital agenda toolbox provided by the S3 Platform at the Joint Research Centre (Kleibrink and Sörvik, 2014) posed a 5-step process for the digitisation of cultural heritage within

²¹ See the report of the Conference Innovation & Cultural Heritage, March 2018, Royal Museum of Arts and History, Brussels, which was organized by the European Commission as a state of play meeting (Vahtikari, 2018).

²² <https://pro.europeana.eu>

a S3 context: analysis,²³ stakeholder involvement, priority setting, policy mix alignment, and monitoring and evaluation.



Digitisation can be seen as a main avenue connecting heritage to the innovation policy. It is ubiquitous, as it serves to a wide variety of purposes, ranging from preservation (through dematerialisation) and monitoring to accessibility and new forms to experience and engage with heritage. Moreover, the crisis triggered by the coronavirus pandemic has painfully revealed that digitisation is a key factor of resilience, and consequently it is accelerating society's digital transformation.

Nonetheless, digitisation is so overarching that should better work as a **fundamental enabler** - in the same vein as the KETs²⁴ - rather than a driver (in the sense of structuring principle) to promote ad-hoc better placements of cultural heritage at S3 frameworks (Kleibrink and Sörvik, 2014). In other words, digitisation by itself is not much helpful to highlight the most promising fields that are mediating the real and potential impact of heritage over an innovation-led growth.

For instance, speaking about cultural heritage digitisation is not enough to appreciate the impact of 3D modelling or Augmented Reality solutions on heritage preservation and valorisation (Ioannides et al, 2017)²⁵. Instead, a type of **purpose-oriented breakdown** of cultural heritage valorisation could be much more instrumental in order to best placing heritage at S3. It would be like painting the lane tracks inside the main avenue. And that is what we are going to try out at the next sub-chapter.

²³ For instance, the first step into the analysis would entail a choice on what heritage assets to digitise and under which protocols, cost estimation and preliminary fundraising activity, awareness of the necessary skills, expertise and technological resources and which of them are available in the region.

²⁴ The Key Enabling Technologies (KETs) have been defined as those technologies that are crucial for the competitiveness and renewal of European manufacturing, namely: micro/nano-electronics, photonics, nanotechnology, biotechnology, advanced materials and advanced manufacturing systems. KETs play an important role in RIS3/S3 strategies as crosscutting connectors, due to their potential to boost innovation and growth in a broad range of productive activities.

²⁵ In any case, Heritage 4.0 would be more suitable to refer to this changing path (Bolognesi and Santagati, 2019), since every industry and working field is impacted by the digital transformation somehow.

3.3. Purpose-oriented main innovation trajectories. A proposal



If we assume that, on the one hand, neither tourism/cultural entertainment nor the cultural and creative industries are the absolute mediators between heritage and economic development. And on the other hand, that digitisation, as main technological avenue involving heritage, is too broad to improve the current placement of cultural heritage within S3 policy frameworks. Then, we should prospect other ways that could better pipe the connection between heritage and the smart specialisation strategies.

At this point, it is important to stress that such connection does not necessarily have to be addressed in terms of “big priorities”. That is, we cannot naively pretend to see cultural heritage often within the short range of S3 main priorities at the regional level.²⁶ Not every region has the same association with heritage as Lazio. But the challenge of the heritage valorisation could provide precise content to some of those main priority domains, if appropriate (Emilia-Romagna style, we might say). This claim can also be presented as getting a broader and more explicit participation of cultural heritage at some of the many cross-innovation vectors that are called to draw up the related variety (diversification) of a regional economy. Important to recall: the value of smart specialisation as a policy concept lies not only with making smart choices (prioritizing), but also on making smart connections (relatedness) and organizing a real co-production model (entrepreneurial discovery).



To try “another way”, it would be helpful to start from a kind of **research & technology driven categorisation of the heritage field**, with an eye on the idea of valorisation. In this sense, a reference might be the strategic research agenda agreed at the Joint Programming Initiative on Cultural Heritage.²⁷ It was organized into four key areas (JPI Cultural Heritage Coordination Unit, 2014), namely:

- Developing a reflective society – identity and perception, values and ethics concerning heritage management.

²⁶ In the context of ROCK, such misunderstanding hindered our aim to open up a discussion with some RIS3 leading authorities, in order to examine in more detail the real or potential role of cultural heritage in their S3 roadmaps. For them, if cultural heritage was not at the “front row” of their main vertical priorities, then there was nothing or little to talk about. For instance, that was the case with North West Regional Development Agency (Romania) with regard to RIS3-NV.

²⁷ Joint Programming Initiative (JPI) is a concept that was introduced by the European Commission to implement the European Research Area. The JPI on Cultural Heritage was launched in 2010 with the mission to promote a common strategic research agenda between the member states.

- Connecting people with heritage – all related to accessibility and sustainable management of heritage.
- Creating knowledge – information and monitoring techniques around cultural heritage.
- Safeguarding our cultural heritage resource – conservation and risk management.

It is indeed an innovative and challenge-based prioritisation, which would fit the spirit of smart specialisation, since the **challenge-based approach** is closely associated to the RIS3 method. It is valuable no doubt. However, this proposal seems to be biased to government and the academia. We would miss an approach closer to the market, where the perspective of firms and start-ups could be better recognized. In fact, firms were not considered a category for the Delphi consultation delivered as part of the foresight study leading to the JPI-CH strategic research agenda.



The following purpose-oriented innovation trajectories could work within a S3 framework better. They are closer to a real market segmentation, and not so dependent on the usual mediators between heritage and economic development. They come from inside out – i.e. from the very heritage field to then relate to other sectors, as appropriate.²⁸

Working within a S3 framework means that these categories could be addressed as **dashboards to organize entrepreneurial discovery dynamics**, with the aim to pave innovation-led pathways for the heritage field. Furthermore, it would help to make out meaningful cross-innovation vectors that relate heritage to other activities and industries. Needless to say these main innovation trajectories can perfectly work as **pipelines for investment projects**.

- **Heritage digital storage & preservation.** It has drawn the main focus over the past years, aimed at safeguarding and wide spreading cultural heritage through digitisation. Artificial Intelligence (AI) is called to play a bigger role in order to scale-up the heritage digitisation efforts. Some flagship massive projects like Europeana and Time Machine Europe deserve a special mention.
- **Heritage experience.** Enhancing the heritage-based experience serving different purposes - e.g. culture, tourism, entertainment, education... not mutually exclusive - and reaching out new audiences, through a range of immersive technologies.

²⁸ Certainly, broadening the number of those mediators will amplify the linking opportunities of heritage to S3 – e.g. from just tourism or/and the cultural/creative cluster to also sustainable construction, real estate value chain, urban regeneration, wellbeing. The type of proposal “from inside out” herein considered just aims to create new paths when framing the heritage field into the smart specialisation strategies.

- **Smart heritage.** It covers the number of emerging technologies and solutions supporting data-driven management of heritage sites and historic districts, ranging from Internet of Things (IoT) to crowd analytics.
- **Heritage care.** It gathers adapted techniques and tools from a wide range of knowledge fields supporting advanced restoration and preservation. It would also include the range of solutions for circular heritage management and the idea of *Green Heritage*.
- **Heritage resilience.** Heritage risk assessment, prevention and monitoring, ranging from natural to man-made hazards.
- **Lighting and visual experiences.**²⁹ Innovative lighting is proving to be a very efficient tool to give new life to historic buildings, sites and districts, as well as to increase people's engagement. This innovation trajectory, which is certainly more specific than the aforementioned ones, would also embrace new types of visual and curatorial experiences, many of them using heritage as the perfect scenario.

Table 1. Main purpose-oriented innovation trajectories regarding heritage

Main innovation trajectories	Purpose	Sample of technologies
Heritage digital storage & preservation	Digital dematerialisation of heritage and interoperability between cultural heritage organisations	Tech related to archive digitalisation and classification [compression issues, minimizing damages/defects/ink-bleed, content-based retrieval, automated or semi-automated transcription/processing/classification, style identification] 3D modelling Digital museification Artificial Intelligence (AI) – e.g. machine learning
Heritage experience	New ways of experiencing cultural heritage and targeting new audiences	Immersive technologies – e.g. Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR) Gamification Digital interactive solutions AR-based app development
Smart heritage	Data-driven heritage management	Data mining Internet of Things (IoT) Embedded systems. Wireless sensor networks

²⁹ A main outcome of ROCK has been to stress the great innovation potential of lighting for heritage valorisation and heritage-led urban regeneration. Nonetheless, we are aware of considering lighting and visual experiences as a main category within this set might be arguable for some. That's why the cursive letter.

		Building automation systems (BAS) QR codes, Near Field Communication (NFC) Crowd analytics Motion/body tracking, gesture recognition Location intelligence applied to heritage management Indoor geo-localisation
Heritage care	Advanced and sustainable restoration and conservation	Non-invasive techniques for diagnosis [fluorescence with X-rays infrared reflectography, remote sensing...] Dispersion models for pollutants, models for polluting sediments 3D scanning tools BIM (Building information modelling) Engineering of materials Monitoring solutions for indoor microclimate Solutions for circular heritage management
Heritage resilience	Heritage risk assessment, prevention and monitoring	Earthquake resilience Reduction of vulnerability to climate change Modelling and prediction of decay Fire safety Security technologies & systems in museums, archives and historic buildings and sites
<i>Lighting and visual experiences</i>	Making the nocturnal historic landscape	Building lighting and urban lighting Video mapping and other outstanding visual experiences



We assume this setting may be neither perfect nor comprehensive, but it could facilitate for S3 key practitioners to get clearer awareness of the innovation potential linked to modern heritage management.

Thus, there can be significant overlapping between some of these trajectories. Lighting projects might have been placed within heritage care, but they are increasingly going far beyond. They also deal with the embellishment of the monumental artefact, opening new ways of enjoining and experiencing heritage and historic urban landscapes. The border between heritage care and embellishment is so fuzzy anyway. In turn, innovative lighting is at the crossroads of art, design and technology.

Moreover, some of the key technologies supporting these innovation trajectories are indeed quite overarching and cross-cutting, and can be approached as General Purpose Technologies, like the Internet of Things or Artificial Intelligence. So, the latter “refers to the capability of the

computing systems to gather and analyse information and make decisions about that information to solve problems”.³⁰ It therefore matters to go beyond and get aware of the most common types of AI with an application to heritage management and valorisation – e.g. machine learning, computer vision, natural language processing and understanding.

Actually, heritage digitisation is entering a new phase where AI will play a bigger role, with the aim to facilitate interactions between different (and already digitized) heritage artefacts, as well as to expand the way we experience heritage and learn from it. In a way, our consultation at the workshop on “Smart Specialisation and the Heritage City” (Brussels, October 2019) endorsed this idea that digitisation is already well assumed as ground floor for heritage valorisation (we mean the European context), and **new priorities** are climbing up the innovation agenda. Participants were asked to prioritize among a number of innovation trends regarding the heritage field, and digitisation is no longer at the top, compared to others like data-driven heritage management or the immersive technologies (figure 5).

Prioritize these innovation strands according to your local context

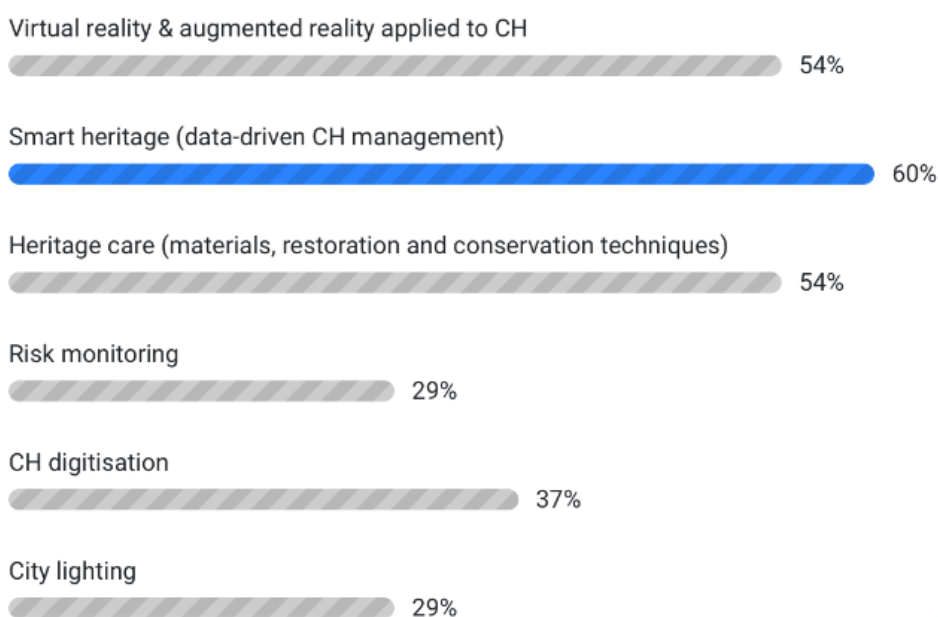


Figure 5: Onsite poll at the workshop Smart Specialisation and the Heritage City, European Week of Regions and Cities, Brussels, October 2019, 38 voters, question allowed multiple answers.

³⁰ Taken from NESTA AI glossary.

The liquid museum: enhancing heritage accessibility and enjoyment

The National Archaeological Museum of Cagliari has undergone a significant renovation process which has turned it into a “liquid museum” (Marras, Messina, Mureddu and Romoli, 2016). This concept has intended to overcome the “fixed” conception of museum, seeking to create a more dynamic, “civic and social space”. The *Museo Liquido* project included the removal of architectural barriers, the installation of sensorial pathways and a big step ahead on 3D modelling and digital museification. The new sensors let visitors physically touch original or 3D representations with a higher engagement experience - in this regard specific training was delivered in collaboration with the FabLab of Sardinia Research.

Website, blog and social media are playing now a central role at the liquid approach, since the museum is not only interested in targeting visitors but active online users as well. In April 2020, Politecnico di Milano’s Osservatorio Innovazione Digitale nei Beni e Attività Culturali reported the National Archaeological Museum of Cagliari as the most active Italian museum in Twitter, ahead of Archaeological Museum of Venice and Galleria degli Uffizi, ranked at second and third position respectively.

Digitisation has certainly been at the heart of this revamping process, but is not enough to embrace the ambition and the number of innovations put behind the “liquid museum” idea. Perhaps, it would be more informative to refer to a mix of tech-driven solutions serving three main purposes: digital storage & preservation, new ways of experiencing cultural heritage and targeting new audiences, and data-driven heritage management.



Table 2. ROCK tech solutions

Main innovation trajectories	ROCK tech solutions
Heritage experience	<p>Augmented Reality app development, by Virtualware. In the context of ROCK, Spain-based company Virtualware was working with local authorities in Liverpool and Bologna to develop a single digital content management system with the aim to serve AR-based app development concerning a number of cultural heritage hotspots, in particular St. Georges Hall (Liverpool) and Teatro Municipale (Bologna).</p> <p>WunderBO videogame, by Malazeta. WunderBO is a game available as an app in which players are called to collect artefacts from the Civic Medieval Museum and the Museum of Palazzo Poggi in Bologna to build their own <i>Wunderkammer</i>. Players are engaged through AR devices to scan the QR code of the artefacts to complete the game, which can be shared through social networks. This project won the public contest “Playable Bologna - Bologna si mette in gioco”, calling for applicants to develop a videogame aimed at showcasing the city heritage. It was funded by IncredibOL! (see sub-chapter 5.2) and ROCK.</p> <p>Video neuroanalytics, by VGTU. In the frame of ROCK, a team from Vilnius Gediminas Technical University was testing a tool to register people’s facial expressions and translate this data into emotional categories. Human body motion and gesture recognition can be helpful to measure the behavioural effect (degree of wellbeing) of cultural heritage.</p>
Smart heritage	<p>LBASense – large crowd monitoring, by DFRC. LBASense is a technology delivered by DFRC. It consists on a network of mobile-phone detection sensors deployed in a monitored area, in order to monitor the number of people in the area, duration of their stay, country of origin and mobility patterns, while strictly preserving data anonymous. In the context of ROCK, the Municipality of Torino installed the LBASense system in a number of museums and art galleries, as well as in temporary events such as the International Book Fair and the Week of Contemporary Art.</p> <p>People flow analytics, by TU/e. Eindhoven University of Technology (TU/e) has developed a GPS-based trace annotator that allows to monitor people’s behaviour at specific sites and events (most visited spots, duration of the visit, modes of mobility – walking, biking...) in order to feedback further planning and decision making. At some point of the analytics, people’s opinions are gathered as well. The tool was first tested at the Dutch Design Week in 2017.</p> <p>Outdoor multi-parameter tool, by Acciona. It is a modular platform for monitoring a set of environmental parameters related to wellbeing (e.g. air quality, noise levels) in a particular area. It can be a cost-effective solution to measure the impact of heritage-led urban regeneration processes. The platform consists of 3 differentiated layers: monitoring layer (sensor network to measure</p>

	<p>the set of parameters), data transmission/storage layer (local communications infrastructure and cloud server) and data visualization/analysis layer (web interface). These solutions can be then integrated at comprehensive data-driven dashboards, like the ROCK interoperable platform.</p> <p>ROCK interoperable platform, by Corvallis. Kind of data-driven balance scorecard or dashboard, with a view on benchmarking, serving the integrated management of heritage-led urban regeneration projects and heritage-led urban development models. According to the ROCK experience, this pursuit is proving to be quite challenging, and requires strong institutional backing to make this smart city solution work.</p>
Heritage care	<p>Indoor microclimate monitoring, by UNIBO. In order to control the micro-climate within heritage buildings, ROCK has sponsored the advanced monitoring of the University Library of Bologna. The focus on measuring temperature, humidity, illuminance and CO₂ values are of great help for rooms storing books and manuscripts.</p> <p>Creative Green Tools, by Julie's Bicycle. London based charity Julie's Bicycle has delivered a suite of free carbon calculators specifically developed for the cultural and heritage sectors. The aim is to understand the environmental impacts of cultural buildings, heritage sites, cultural events, covering energy, waste, water, travel and transportation and materials. Environmental impacts are visualized in a variety of carbon footprint graphs, allowing users to compare their environmental performance.</p>
Lighting and visual experiences	<p>The culture of light, by Viabizzuno. ROCK partner Viabizzuno is a unique company in the lighting industry bringing together art, design and technology. Bologna-based and with offices in many countries, they are often hired to contribute to heritage valorisation projects through innovative and place-sensitive lighting solutions and installations. For instance, the restoration of Piazza del Francia in Bologna. In this case, the light project pursued to evoke the presence of Aposa, the old bologna stream that until the end of the nineteenth century still flowed open-pit.</p> <p>Lyon and the making of the nocturnal landscape. Lighting has played an outstanding role at the knowledge transfer organized by the ROCK project, with Lyon as "role model". The city has pioneered in rising awareness of how the making of nocturnal landscapes can make an impact on the heritage city, and on the local innovation ecosystem too. The city is home to the <i>Cluster Lumière</i>, which brings together more than 170 companies and research bodies in the light industry. LUCI, the international network of cities on urban lightning (over 70 cities and 40 associated members) is also headquartered in Lyon. LUCI is doing a great job in promoting a culture of urban lighting.</p>

See ROCK project factsheet 3 - Technological Solutions for Heritage-led Urban Regeneration.



As already mentioned, **relatedness**, along with co-production, is a key value as much important as prioritisation within a S3 framework. It can be understood as a kind of **conscious geometry of connections** between different industries, value-chains and knowledge fields with the aim to source new innovations and growth opportunities.

So, taking the above 6 innovation-driven cultural heritage developments as starting point, we have sketched the related variety around them. In two directions. On the one hand, a set of related industries and knowledge fields deserving a special link, in terms of cross innovations through collaboration or B2B exchanges.

On the other hand, we have highlighted a number of narratives converging to local economic development which are mainstream (or at least on the way for being so) and therefore shaping dedicated strategies and policies. This second type of link matters, to the extent that they can amplify the policy contexts where cultural heritage is considered somehow, and thus expand the exploitation landscape of the heritage-applied technologies and innovative solutions. Put another way, the more heritage innovation trajectories can be framed within growing narratives and policy fields others than the more obvious ones (e.g. the culture policy), the more market opportunities to them.

Related sectors

- IT industry
- Creative digital sector
- Visual and digital arts
- Architecture and interior design
- Sustainable construction
- Real estate, including the hospitality sector
- Materials engineering
- Event & cultural entertainment industry
- Education/edutainment
- Wellbeing cluster
- Earth sciences
- Light industry

Big narratives (leading to major strategies and policies)

- Digital agendas
- Cultural heritage accessibility - in turn related to social innovation
- Experience economy – also as a driver to revamp the cultural destination
- Smart city projects
- Resilience – a driver on top again in the era of pandemics
- Sustainable urban development
- Discourses on the creative economy and the creative city

Table 3 shows 28 meaningful innovation-driven linkages between cultural heritage and other activity fields, where **architecture/interior design** and the **IT industry** stand out. Such a prevalence of architecture was endorsed by the participants at the workshop “Smart Specialisation and the Heritage City”, who also underlined the visual and digital arts as activity fields to which strengthen a link with (see figure 6).

Table 3. Relatedness around cultural heritage

Main innovation trajectories	Related sectors												Related big narratives/policies						
	IT industry	Creative digital sector	Visual and digital arts	Architecture and interior design	Sustainable construction	Real estate	Materials engineering	Event & entertainment industry	Education/edutainment	Wellbeing cluster	Earth sciences	Light industry	Digital agendas	Cultural heritage accessibility	Experience economy	Smart city projects	Resilience	Sustainable urban development	Creative economy / creative city
Heritage digital storage & preservation																			
Heritage experience																			
Smart Heritage																			
Heritage care																			
Heritage resilience																			
Lighting and visual experiences																			



 Degree of meaningful of the link

Table 3 also represents meaningful links (those coloured) with already consolidated, emerging or re-emerging policy concepts and narratives which are crystallizing into major place-based strategies in the EU. In this respect, **sustainable development** and **resilience** worth a special mention. We mean addressing cultural heritage as an enabler of sustainable development. It matters, since the upcoming round of S3s – those that will run over the Programming Period 2021-2027- would have to be duly framed within the so-called European Green Deal, which has been put forward as the EU's new growth strategy (Gianelle et al 2020).

As for resilience, the coronavirus pandemic has put it back as a policy concept to the top of the agenda. EU leaders' agreement of July 2020 to propose 750 billion Euros of grants and loans under a new facility called Next Generation EU, to support recovery and resilience plans all over Europe has no precedent. And governments will have to take a special care to align their S3s to those recovery and resilience plans as much as possible. In this framework, innovation perspectives on cultural heritage should have an explicit role to play.

Main cross-innovation vectors involving cultural heritage: What bridges to other sectors should be particularly promoted?

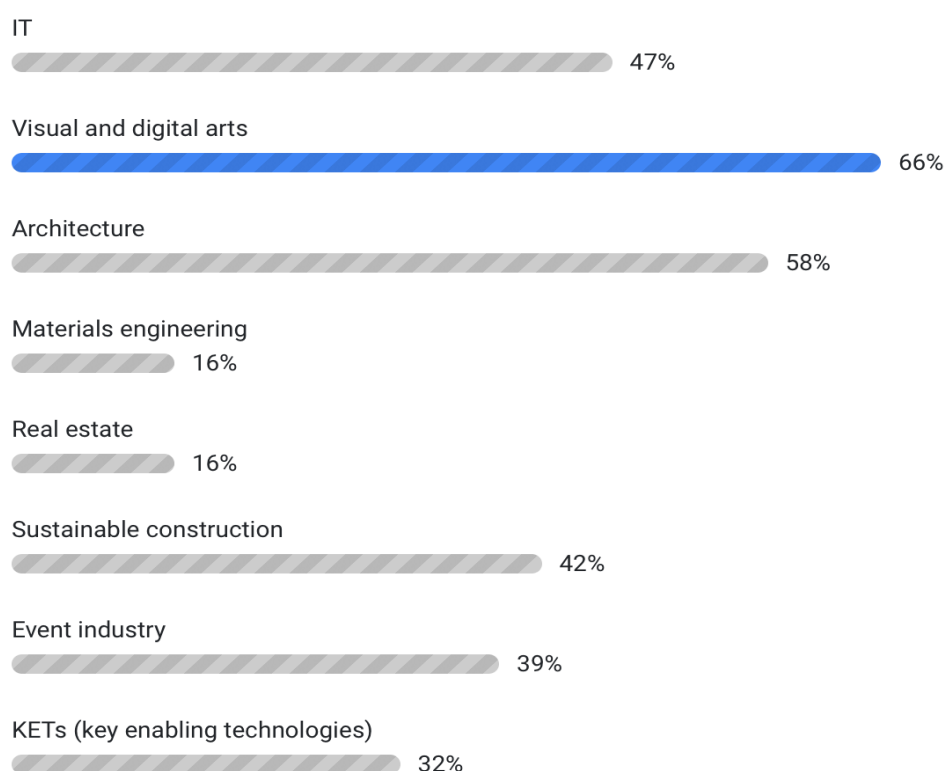


Figure 6: Onsite poll at the workshop Smart Specialisation and the Heritage City, European Week of Regions and Cities, Brussels, October 2019. 38 voters, question allowed multiple answers.

4. Entrepreneurial discovery involving cultural heritage

4.1. Why EDP matters



As said in chapter 1, along with prioritisation and relatedness, **co-production** is one of the key values which is inherent to smart specialisation. If well-done, what gives soundness to S3 is getting a robust co-production model behind. We mean a challenge-based, somehow market-oriented collaborative pattern, involving key actors from the triple or quadruple helix as appropriate - researchers, firms and entrepreneurs, relevant policy makers, end users.

This is what is called Entrepreneurial Discovery Process (EDP) in the S3 jargon, and it should be run as a **continuous process** as much as possible (Marinelli and Perianez-Forte, 2017). The EDP is closely linked to the innovativeness of the institutional setting under which S3 is being promoted – or at least its willingness to get “out of the box” with regard to policymaking.



There are a number of **reasons** why this EDP-type of mechanism for collaboration, co-production and learning can be useful for the cultural heritage field, within a S3 framework:

- To scan regional strengths concerning cultural heritage, in terms of research capacities, firm performance and governance.
- To get a dynamic selection of technological and innovation trajectories to best respond to the specific, place-based challenges regarding heritage preservation, valorisation and reuse, as well as heritage-based urban regeneration. Those trajectories could work as pipelines for research initiatives, strategic investments, start-up development and collaborative projects. They could even shape S3-funded calls and other ad-hoc funding sources.
- To raise project-based opportunities for public-private partnerships, in order to make feasible many heritage valorisation projects. In this sense, Justrell and Fresa (2014) recalled that cultural heritage digitisation is complex and expensive, and it is something that “cannot be pursued alone”.

- To advise policy makers on how to fine-tune horizontal policies and instruments - culture policy, entrepreneurship, research, urban planning, internationalisation – in order to unlock the untapped potential of the selected innovation trajectories.



The **involvement of firms** is certainly key, when exploring innovation trajectories and turning the achievement of societal challenges (like cultural heritage valorisation) into a driver for growth, as well as to embed the new innovative solutions into the market. That is why those EDP practices too biased by overacting government and public bodies are not fully satisfactory. This bias is justly what has happened in many RIS3 process across Europe (Aranguren et al, 2016).

Indeed, the analysis carried out by the S3 Platform on the state of RIS3 implementation, based on a questionnaire to national and regional RIS3 leading authorities, revealed difficulties in getting some stakeholder groups involved, in particular start-ups and civil society (Guzzo et al, 2018). Such a lack of **civil society** involvement was already pointed out at the European Parliament's report on Cohesion Policy and RIS3 (European Parliament, 2016).

In this regard, due to the proximity factor, **local authorities** and their relevant subsidiaries could be helpful to overcome these gaps, if duly entrusted as RIS3 primary actors. This would mean organizing and facilitating entrepreneurial discovery type of dynamics. It is worth noting that concerning cultural heritage the city is widely acknowledged for being at "the forefront of culture-led development and creativity", according to the Cultural and Creative Cities Monitor promoted by the European Commission (Montalto et al, 2019). Moreover, EDP type of processes are not entirely new to many local authorities, many of them with a longstanding background on stakeholder involvement and community-led local development.

4.2. The case of Emilia-Romagna



At this point, it is good to know how the entrepreneurial discovery has been put in practice at the Emilia-Romagna Strategy for Smart Specialisation, and the outcomes for the cultural heritage field. S3-Emilia Romagna is coordinated from the *Servizio Politiche di Sviluppo Economico, Ricerca Industriale e Innovazione Tecnologica*. This Unit took the lead for the initial priority setting in the region, which was sourced by relevant analysis. Five vertical domains were prioritized. Three defined as region's core business (Agri-Food, Mechatronics & the Automotive industry and Building & Construction) and two as developing sectors (Cultural & Creative Industries and Health & Wellness).

Afterwards, the Regional Development Agency ART-ER³¹ was appointed to organize the **entrepreneurial discovery** in each of the five priority domains. It was first done throughout focus groups involving relevant stakeholders from the regional innovation ecosystem. The exercise led to a more detailed prioritisation, and set the criteria for a first round of S3-funded calls in Emilia Romagna. Meanwhile, a web-based tool was launched aimed at monitoring the resources mobilized through this regional innovation strategy, delivering a six-monthly synthetic report. It has given transparency and concrete data to feedback further decision making.³²

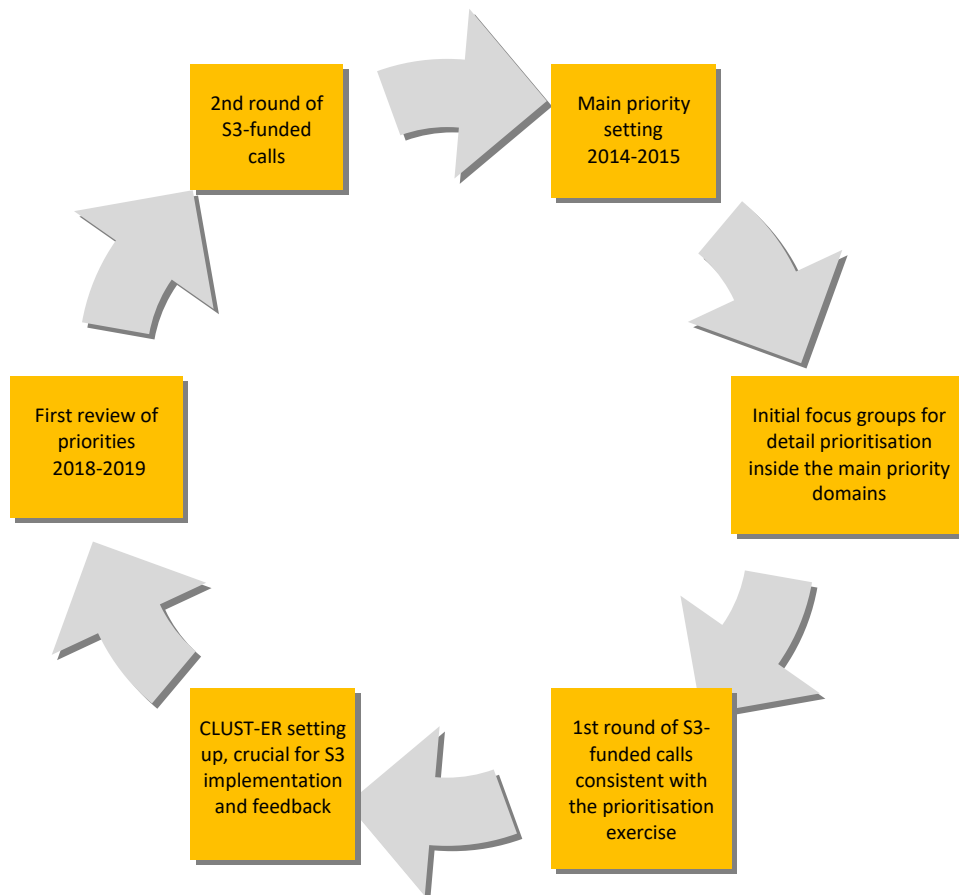


Figure 7. S3-Emilia Romagna design and development

³¹ ART-ER (Attractiveness Research Territory Emilia-Romagna) is the new body resulting from the merge between the innovation consortium ASTER and the regional development agency ERVET.

³² <https://www.regione.emilia-romagna.it/s3-monitoraggio/>

The **co-production model** was then refined and institutionalized through the so-called Clust-ER figure. It is a cluster type of platform largely conveyed by the business system (mostly small firms in the case of the cultural & creative industries), research labs and innovation centres, and Universities and higher education institutions. Main purpose was to keep the detailed innovation and technological priorities updated through a number of specific working groups inside every Clust-ER. That is, performing the entrepreneurial discovery on a permanent basis, besides pooling research infrastructures and resources, tackling high-level technical training, and promoting collaborative projects of high impact.

There are currently 7 Clust-ER platforms at work. One for each of the five S3 vertical priority domains, plus two dedicated to Service Innovation and Energy & Sustainable Development. A last association on Big Data has been established in 2018 (ART-ER, 2019a). S3-Emilia Romagna's mid-term review, which began in 2018 and led to a second round of funding calls, strongly relied on the work done by the Clust-ERs. Hence, the co-production model behind Emilia Romagna's strategy for smart specialisation is now well established. The business view is at the heart, along with that of other actors from the regional innovation ecosystem, by means of the **Clust-ER platforms**. And it gives continuous feedback in order to keep the priority mapping current.



In this setting, cultural heritage is well represented inside the **Clust-ER Create** (the collaborative and co-production platform dedicated to the cultural & creative industries priority domain) and **Clust-ER Build** (building & construction). It can be said that such a renovated cluster policy within the new S3 framework has resulted in a good placement of cultural heritage at the Emilia Romagna innovation policy.

As an example, the entrepreneurial and multi-stakeholder discovery exercise carried out by the clust-ER Create over 2018 included the following ambits for discussion and insights (Cluster-ER Create, 2019):

- **Value chain CultTech - technologies for tangible and intangible cultural heritage**
 - Strategic objective 1 "Access to heritage and historic archives through new technological models, in particular Artificial Intelligence". Next challenge to meet is about massive and interconnected cultural heritage digitisation in a multimedia, multimodal and cross-media environment, by taking full advantage of **AI systems**, in particular **machine learning**, as a general purpose technology in future's cultural heritage management. This will expand opportunities for companies, teams and professionals operating in the digital humanities and the cultural and creative industries.
 - Strategic objective 2 "New models and platforms for the management of museums, archives and tangible and intangible heritage". This working line should refine the heritage digitisation process, stressing the **interoperability** between archives, museums and heritage sites. This would include tools to track users' behaviours at

exhibition venues, communication-oriented platforms suitable to interoperate with existing platforms in compliance with open protocols, and platforms suited to content co-creation and new curatorial practices.

- Strategic objective 3 “Technologies and tools for the diagnosis, conservation and preservation of tangible heritage, including cinematography and audio-visual”. It is about promoting **crossovers** in the field of restoration and preservation, involving IT, mechanics, chemistry, physics and engineering. To some extent, new tools and methods linked to diagnosis and preservation should facilitate the digitisation process as well.

■ Value chain MultiModel - multimedia and new business models

- Strategic objective 1 “Immersive technologies and new platforms for the (cultural) entertainment sector”. **Augmented Reality, gamification** and social networks can be considered the basis of a modern evolutionary approach for the enjoyment and sharing of the theatrical experience and live shows of any kind. When involving cultural heritage, those new tools can expand audiences dramatically. They are boosters for the creative digital field, where built heritage is called to play a bigger role.

■ Value chain Tourism and urban re-activation

- Strategic objective 1 “Urban reactivation through events and digital and co-produced initiatives”. This ambit of reflection and innovation is rather interesting, because it assumes that culture and cultural heritage should be seen as a major force not only for tourism but urban development and regeneration too.³³ Thus, from now on, a wide number of city initiatives, ranging from digitisation of the tourism value-chain and destination management to circular economy and smart city projects, should involve the heritage management field in a way or another.

4.3. New collaborations to organize the entrepreneurial discovery over the heritage field at city level



A first lesson from S3-Emilia Romagna is that having cultural heritage at the first row of the big priority domains is not absolutely necessary to keep it well represented at the whole picture of smart specialisation. Instead, it can be enough and relevant organizing entrepreneurial discovery

³³ In line with Liverpool’s place-making approach of heritage valorisation.

type of discussions and processes around the heritage field, which ultimately will feed that S3 whole picture.

Second key message is caring to engage the private sector extensively, notably firms and start-ups, to get consistent and workable pipelines of investment and innovation projects. This assumption was already claimed by the H2020 Expert Group on Cultural Heritage (European Commission, 2015).³⁴

Even more, many EU-wide funding schemes related to S3 have required a first mobilisation of firms and/or cluster organisations. For instance, the COSME³⁵ project “European strategic cluster partnerships for smart specialisation investments”, or the pilots launched under the “Vanguard Initiative New Growth through Smart Specialisation”.³⁶ Not to mention the possibility to think of a future “thematic smart specialisation platform” on Cultural Heritage, which would be consistent with the global leadership of Europe in the cultural heritage field.³⁷



At the city level, some collaborative platforms or communities of practice along the “circle” of heritage-led urban regeneration, could perfectly work to make the entrepreneurial discovery flourish in this field.³⁸ We mainly refer to the figure of **Urban Living Lab**, as an open innovation format with a significant track record in the urban environment. The urban lab has been well tested at the ROCK project. Just two examples:

- Bologna Urban Living Lab (U-Lab) was focused on the inner city located University district, around Via Zamboni - called for this purpose U-zone. **U-Lab** stood out for its experimental approach, in many aspects. For instance, new ways of living and

³⁴ In this regard, it deserves a special mention the initiative of Confindustria, the Confederation of the Italian industry, to create in 2011 the Italian Platform for Cultural Heritage Innovation and Enhancement iPoCH2, with a great involvement of the University as well. It was based on the model of the industry driven European technology multi-stakeholder platforms.

³⁵ COSME is the EU programme for the Competitiveness of Small and Medium-Sized Enterprises.

³⁶ The so-called *Vanguard Initiative* was launched early in 2013 by a number of regions as an initiative of inter-regional cooperation and alignment <https://www.s3vanguardinitiative.eu>

³⁷ Thematic Smart Specialisation Platforms are an initiative of the European Commission to bring together regional authorities interested in joining forces in the implementation of RIS3 in specific domains. Three Smart Specialisation Platforms have been set up so far in Energy, Industrial Modernisation and Agro-Food. Further information at Rakhmatullin et al, 2020. ILUCIDARE is a visionary H2020 project focusing on heritage-led innovation as a vehicle for Europe’s diplomacy.

³⁸ More information on the ROCK circle model and ROCK outstanding experiences with urban labs in Bologna, Lisbon and Skopje in Boeri et al (2019).

experiencing the historic neighborhood, new ways of city governance... and new crossovers like connecting heritage and culture to emerging technologies.

- **SkULL**, Skopje Urban Living Lab, was created to support the heritage-led regeneration in the Old Bazaar area. It convened a variety of stakeholders, including researchers, artists, business owners and citizens. One of the explicit purposes of this platform was promoting technology-driven activity models and new urban experiences aligned to the regeneration purpose.

Another enlightening experience comes from the successful industrial heritage-led regeneration of Eindhoven' Strijp-S district, which largely relies on a dedicated living lab for the area, with a great involvement of start-ups and local creatives and innovators. Consequently, **Strijp-S** stands out as a tech-driven, heritage-led urban regeneration experience, where a good number of innovative solutions have been tested and developed.³⁹



In short, duly adapted to bring together heritage managers, city planners and economic development officers, businesses, researchers and technologists, potential public and private funders and even heritage users,⁴⁰ the urban lab format would suit perfectly to make emerge innovative and tech-driven solutions in the field of heritage-led urban development and regeneration. Indeed, the entrepreneurial discovery method is quite similar to that of living labs. Additionally, the urban labs working at the ROCK framework organized events in the form of **pop-up tech showcases**, with the aim to bring heritage-applied emerging technologies closer to cultural heritage managers and city officers.

Anyhow, some **training and capacity building** would certainly be needed for those with a facilitator role at the urban lab. It would include concept and meaning of smart specialisation, main innovation trajectories involving heritage and facilitation techniques for the entrepreneurial discovery.

³⁹ See Elisei, P. Draghia, M. Dane, G. and Onesciuc, N. (2019). Cultural heritage adaptive reuse for sustainable development pathways in creative and knowledge cities. Proceedings of the International Conference on Changing Cities IV - Spatial, Design, Landscape & Socio-economic Dimensions. Chania, Greece, June 24-29.

⁴⁰ The H2020 projects OpenHeritage and REACH have spotlighted on the involvement of citizens as heritage users in heritage-led urban regeneration.

5. Empowering cities as S3 actors

5.1. Filling the city gap



Empowering cities as S3 key actors, in particular major cities, matters to boost a better placement of cultural heritage at the existing and forthcoming S3 frameworks. Increasingly, local governments are playing an important role in the heritage field, in terms of policymaking and management, regulation and procurement capacity. Not to mention that a good number of cities all over Europe are doing an outstanding job promoting and facilitating local innovation ecosystems.

However and roughly speaking, the role of cities (we mean local governments) as policy actors has been missing in the **narrative on smart specialisation** so far. This role has been usually limited to that of an (obvious) scenario or, at its best, testbed for new S3-sourced insights (Gianelle et al, 2016).

Such a **weak linkage** between the city and S3 comes from the time of RIS3 elaboration for the EU Programming Period 2014-2020, when the involvement of local authorities (and their relevant subsidiaries working on economic development, if the case) was mostly trivial, much closer to a conventional consultation logic rather than real co-production. Afterwards, there has been an effort by the European Commission to encourage multi-level governance in relation to RIS3, but the focus has been largely on inter-regional coordination,⁴¹ much more than exploring City-to-Region articulation at the sub-regional level (Rivas, 2018).

As a result, smart specialisation still means little for many cities, who see it as a matter belonging to the upper levels of member states and the regions. So, despite presented as a place-based innovation policy, even as a brand new overarching approach for territorial development, roughly speaking most RIS3 regional authorities have showed little interest in empowering local governments – not even major cities - as RIS3 actors so far. And this is certainly constraining the role of cities as key agents for change⁴².

⁴¹ Notably Country-Region articulation, as well as transnational Region-Region cooperation and learning.

⁴² Such a still underestimated role of cities in innovation-led economic development even comes from the theoretical and academic field as well. On a recent paper, Michel Storper and Allen Scott have already stressed the error of underestimating the “forces of agglomeration and nodality in urban-economic

■ In reaction to this, the “city gap” issue regarding smart specialisation mainstream practices was raised for the first time by the URBACT Network InFocus-Smart Specialisation at City level, led by the city of Bilbao. The action research carried out by the Infocus partner cities posed a **twofold goal**: re-invigorating the local economic agenda by means of smart specialisation as an overarching concept, while building a bridge with the RIS3 strategies at regional level. Both goals mutually reinforce (figure 8).

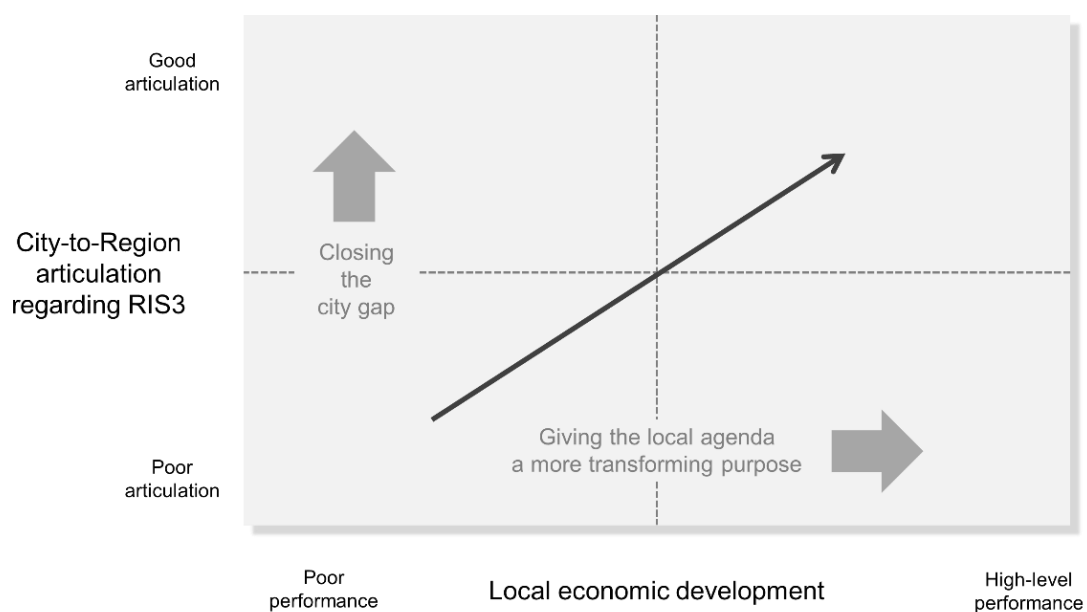


Figure 8. Smart specialisation at city level: a twofold challenge (Rivas, 2018)

■ Today, the need for more effective S3 implementation is fortunately leading to bring **vertical multi-level governance** on top of the discussion about how to improve S3 designs and developments for the new Programming Period 2021-2027 (Gianelle et al 2016, Larrea et al 2019). It paves the way to a real and explicit empowerment of city governments as S3 key actors.

geography” – “The ontologies of flatness favoured by post-structural theory are equally damaging to the vibrancy of urban studies especially in their denial of scalar dimensions to space in a manner that effectively dissolves the city away as a structured socio-geographic entity, and this encourages in turn a rampant eclecticism so that the city as such tends to shift persistently out of focus” (Storper and Scott, 2016).

For the simple reason that S3 needs to gain in **granularity** and be embedded into the territory as much as possible.

Moreover, at gathering ideas to shape the post-2020 innovation policy, the European Commission has made an explicit call to **empower the cities** as policy actors in this field – “cities should be included from the very start of the innovation process” (European Commission, 2019).

However, if no one knocks at city’s door, the cities themselves (notably major ones) should take a first step in asking the S3 regional leading teams for a clear and active role to them, as S3 primary actors. Nonetheless, to make this happens, those cities will probably have to fill some knowledge gap, since many practitioners involved in local economic development are not familiar with smart specialisation yet, or still find difficulties to fully understand the real meaning and scope of it as a policy concept (Rivas, 2918).

5.2. Learning from IncrediBOL!



There are still few cases in Europe of great alignment and coordination between regions and cities with regard to smart specialization strategies, and in particular with a focus on culture and cultural heritage. IncrediBOL! offers a remarkable experience.⁴³ It is an initiative of the Municipality of Bologna on entrepreneurship and innovation in the creative-digital sectors, where heritage issues and applications are playing a significant role. It is largely funded by the region through the S3-Emilia Romagna. And it is a good example on the “scouting” role of local authorities to outreach actors, in particular **start-ups**, at a more fine-grained territorial level, which is pivotal to embed the smart specialisation strategies properly over the ground. The initiative is shaped by the following elements:

- The programme lies with a number of **challenge-based contests**. Those challenges meet specific priorities and problems the city is addressing. It determines the scope of the contest, in terms of types of projects, organizations and individuals that may apply, etc. Since the start in 2010, the IncrediBOL! contests have named over one hundred winners.
- The award benefits range from grants to rent-free use of city-owned workspaces, as well as consulting and training services. In addition to supporting many small businesses and

⁴³ Indeed, Emilia-Romagna stands out for a special interest in exploring vertical multi-level governance in smart specialisation, with a focus on the cultural/creative field. The Region is involved in the Interreg project Creadis3-Smart Specialisation Creative Districts, and Città Metropolitana di Bologna is participating at Interreg RELOS3-From Regional to Local: Successful deployment of the Smart Specialization Strategies.

freelancers, IncrediBOL! has contributed to the **valorisation of the historic urban landscape** of Bologna since the program has resulted in the renovation of around 40 previously vacant spaces at little to no cost for the city. Thus, entrepreneurs have turned a degraded heritage space into a self-sustaining bike rental business and community centre; an abandoned market into a multi-purpose community centre and concert hall; unused greenhouses into a start-up incubator and co-working space, and more.

- Yet coordinated and managed by the Municipality and financed by the Region, IncrediBOL! is involving an extended network of more than 30 public and private partners, who contribute to the supporting scheme according to their own specialisations. It shows the power of an effective **multi-level and multi-stakeholder governance**.



At the workshop “Smart Specialisation and the Heritage City”, which was organized in the context of this report, the Head of the IncrediBOL! programme Giorgia Boldrini shared the following messages:⁴⁴

- **Share your plans** – meaning that keeping all actors well updated and involved was crucial for S3-Emilia Romagna to have an impact, in terms of scanning trends and challenges accurately, and then delivering tailor-made S3-funded calls. Opening a two-way dialogue with a number of principal local governments made regional S3 gain in fine granularity.
- **Monitoring is key** – Developing an online tool, accessible to everyone, to monitor the implementation of S3-Emilia Romagna, has been key not only to feedback the strategy, but to keep all actors and beneficiaries engaged as well.
- **Cities, open up your minds!** - Vertical multi-level governance should move from rhetoric to real practice. When it comes to S3, (major) cities should not wait for S3 regional leading authorities to knock at the door with an invite to team up. If the doorbell does not ring, cities should take a first step to be entrusted as S3 key developers.

⁴⁴ Workshop “Smart Specialisation and the Heritage City”, European Week of Regions and Cities, Brussels 7th-10th October 2019.

6. Bridging between heritage and smart specialisation: recapping in 10 messages

1. Notwithstanding the many calls, from the academia and the institutions (notably the European Union), for a more multi-dimensional approach of cultural heritage over the past years, the innovation potential of heritage still remains far from being duly realised (Sonkoly and Vahtikari, 2018). In this respect, a better placement of heritage at the second generation of smart specialisation strategies (S3s) – that of will be run from 2021 to 2027 - might work as a real turning point. There are two reasons to think this way: i) because this new ambition regarding cultural heritage is transformative in itself, and therefore suits well to the spirit of smart specialisation as a transformation agenda; ii) because of the massive mobilisation of resources at regional/country level put behind most S3s across the EU.
2. Despite S3 is becoming the mainstream innovation policy all over the EU, it is barely known to many officers. In particular, those working at the city level, who see smart specialisation as a matter belonging to the upper levels of member states and the regions. At this point, it is important to underline that the value of the smart specialisation concept lies not only with prioritisation, but also with promoting relations and connectedness from that priority setting, as well as organizing a real co-production model for governance (“entrepreneurial discovery” in S3 jargon). In this view, smart specialisation can be seen as a kind of conscious geometry of connections between different industries, value-chains and knowledge fields with the aim to source new innovations and growth opportunities. So, the challenge for the cultural heritage field would be to be positioned within this framework as best as possible.
3. Today, the positioning of cultural heritage in the current S3 policy frameworks is by large rather imprecise. Only in three out of the eight S3s examined in this report - Emilia Romagna, Attica and Lisbon – the heritage field is visible enough. Often, this absence of cultural heritage (and even culture) at those regional strategies for smart specialisation, clashes with the prominent role of heritage valorisation in some urban agendas, revealing the weak involvement of the local authorities (even from major cities) as S3 actors. For example, although Lyon’s agenda stands out on heritage-led urban development for years, this unique positioning has no echo at the regional innovation policy (the so-called SRDEII

Schéma Régional de Développement Économique, d'Innovation et d'Internationalisation 2017-2021 for Auvergne Rhône-Alpes).

It is a fact that a good number of cities are playing an important role in the heritage field, in terms of policymaking and management, regulation and procurement capacity. Hence, the more the cities are entrusted as S3 actors, the more heritage-applied technologies and innovative developments will be better placed at S3 frameworks.

4. Linking heritage to smart specialisation does not necessarily mean place it within the short range of big priority domains. What smart specialisation ultimately seeks is to embed innovation in a cross-cutting perspective, and in this view the aim would be just getting a more explicit (and as much broader as possible) consideration of cultural heritage at the S3 cross-innovation mapping.

In this sense, the Emilia Romagna experience deserves a special attention. Cultural heritage, as such, is not one of the five selected priority domains at S3-Emilia Romagna, but it is visible enough, in an explicit manner, at two of those priorities: Cultural and Creative Industries and Building & Construction. Meaning that two multi-stakeholder ambits for discussion and collaboration have been set up and devoted to the heritage field: Innova-CHM – Innovation in Construction and Cultural Heritage Management (as part of the building & construction priority) and CultTech – Technologies for Tangible and Intangible Cultural Heritage, within the cultural and creative industries priority domain.

5. At its best, heritage is framed in current S3s mostly from a tourism development and/or cultural and creative industries perspectives – e.g. Lisbon, Attica. Both are broad and relevant domains to make heritage valorisation growth, but maybe do not encompass the whole spectrum of innovative and tech-driven developments that are linked to heritage.

In this regard, digitisation is ubiquitous. It can be seen as a main avenue connecting heritage to the innovation policy. Nonetheless, digitisation is so overarching that it should better work as a fundamental enabler rather than a driver (in the sense of structuring principle) to promote better placements of cultural heritage at S3 frameworks. In other words, digitisation by itself is not yet much helpful to highlight the most promising fields that are mediating the real and potential impact of heritage over an innovation-led growth.

6. We are proposing a type of purpose-oriented breakdown of cultural heritage valorisation that could be more instrumental or helpful in order to better connect heritage to smart specialisation:
 - *Heritage digital storage & preservation* - digital dematerialisation of heritage and interoperability between cultural heritage organisations.
 - *Heritage experience* - new ways of experiencing and participating in cultural heritage, targeting new audiences.
 - *Smart heritage* - data-driven heritage management.

- *Heritage care* - advanced restoration and conservation, as well as sustainable heritage management.
- *Heritage resilience* - heritage risk assessment, prevention and monitoring.
- *Lighting and visual experiences* - making the nocturnal historic landscape.

These main innovation trajectories could work as dashboards to organize entrepreneurial discovery dynamics, with the aim to pipeline technology-intensive investment towards heritage valorisation projects, and provide direction to research, innovation, entrepreneurship and collaborative projects.

7. Heritage-led urban development and regeneration must be seen as a propitious context to realise the multi-faceted nature and full innovation potential of heritage valorisation, and therefore to facilitate a better placement of heritage at the smart specialisation strategies. Such a place-making approach to heritage valorisation is mainstream and distinctive in Liverpool, and has led cultural heritage to a meaningful placement, as a “growth sector”, at the city-region’s major strategies on economic development.
8. Empowering cities as S3 actors will engine a better positioning of heritage at the innovation policy. This would mean for local authorities (or their corresponding subsidiaries) to take a stake in organizing and facilitating entrepreneurial discovery type of dynamics, by bringing together heritage managers and city planners, businesses, researchers and technologists, potential public and private funders and even heritage users. Duly fine-tuned, the figure of Urban Living Lab, which has been well tested as an open innovation format in heritage-led urban regeneration, could work well for this purpose no doubt.

Not to mention that a number of major cities (those with a track record in promoting local entrepreneurial and innovation ecosystems) are better equipped to ensure a more “fine-grain granularity” of S3, being closer to innovators and entrepreneurs. Bologna’s initiative Incredibo! is proof of that.

9. A number of obstacles are hindering the making of this bridge between the heritage field and the smart specialisation strategies. The low awareness of technology trends applying to cultural heritage by heritage managers is a main one. It should be also worth noting that the very idea of heritage valorisation is not widely assumed yet. On the other hand, many practitioners involved in innovation policies, including S3, have scarce information on the innovation potential associated with heritage valorisation and heritage-led urban development and regeneration.

To overcome this, both groups should enter what Christer Gustafsson has called the “trading zone” – a transdisciplinary working field, with “an intermediate language”, which allows to communicate and create new cooperation between heritage managers, city planners and economic development officers, businesses and technologists (Gustafsson, 2019).

10. This is the right time to promote a better placement of cultural heritage at the smart specialisation strategies. Member states and their regions have been encouraged to update or re-formulate their S3 visions and roadmaps for the new EU Programming Period 2021-2027. Furthermore, the need for more effective implementation is bringing vertical multi-level governance on top of the discussion about how to improve the smart specialisation strategies in the near future. Therefore, it is also the right time to empower cities as S3 key actors.

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