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An Empirical Analysis of Driving Factors and Policy Enablers of Heritage Adaptive Reuse within the Circular Economy Framework

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Abstract: The adaptive reuse of cultural heritage has been recognized as a driver of the circular economy. It stimulates economic growth, boosts its inherent values, and reduces material usage and energy consumption. It can be regarded unviable due to financial constraints, limitations in regulatory frameworks and lack of engagement in decision-making. To tackle these challenges, this study aims to examine the drivers and related policy instruments that support adaptive reuse practices, and to analyze the usefulness and feasibility of a set of multi-level policy enablers at varying local contexts. In this context, we first conducted a semi-systematic review of academic and gray literature and identified 19 driving factors and associated policy documents. These instruments were concentrated on administrative, regulatory and financial tools. This analysis led to the identification of policy enablers that can be adopted at three levels: European, national and local. An online survey was then conducted to investigate how a variety of local stakeholders in the selected case cities and region evaluate the adaptability of these enablers in their individual cases. The findings show that all the assessed enablers are deemed useful and feasible to a certain extent with higher score of usefulness, confirming the adaptability of these instruments into the circular economy framework. These evidence-based results can inform future policies at multiple-levels that will accelerate and scale up circular actions through heritage adaptive reuse.

Keywords: adaptive reuse; cultural heritage; circular economy; drivers; policy enablers; policy analysis



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1. Introduction

Cultural heritage plays an essential role as an economic and cultural asset for cities. Creating unique cultural identities and focal attraction points in cities, heritage can draw inward investments and boosts economic growth. In addition, the reuse of abandoned and underused cultural heritage buildings and sites is a practical substitute to demolition, bypassing the wasteful processes of demolition and new construction, prolonging the cultural heritage lifespan [1]. Regarding the principles of circular economy, adaptive reuse is also recognized as a driver towards circularity in the construction sector as it stimulates the reduction of raw material use, energy consumption, waste and environmental costs, and it also curbs carbon emissions [2,3]. Adaptive reuse of cultural heritage thus enhances urban liveability, contributes to environmental sustainability and the achievement of circular economy goals.

Adaptive reuse of existing building stocks, rather than demolition and new constructions, has become an increasing trend within the built environment in the past two decades [4–9]. Previously, reuse was considered within the scope of function and material/structural change of derelict buildings, associated with the terms of building rehabilitation and renovation [10]. With a growing interest towards instrumentalization of heritage with its inherent cultural and economic values, adaptive reuse has now been better acknowledged and employed as an environmentally sustainable and financially feasible

mean of regeneration and heritage conservation [11]. This rising trend has also influenced the policy making at multiple levels. Adaptive reuse has been increasingly incorporated into the existing and newly developed policy frameworks within culture, heritage, building and renovation, and urban development policy fields.

According to the International Council on Monuments and Sites (ICOMOS) Burra Charter, the goal of adaptive reuse of historic buildings is to sustain the value of a building to a place or community while ensuring its future usefulness [12]. The Leeuwarden Declaration calls for a smart and quality-based heritage transformation process [13]. This can be ensured with flexible regulatory frameworks, participatory and inclusive governance structures, innovation, quality-based procurement and sustainable financial and business models for effective adaptive reuse practices in the long run [13]. Building renovation is designated as one of the policy forerunners of the European Green Deal to increase energy efficiency of buildings and to reduce carbon emissions [14]. Adaptive reuse thus plays a significant role here in the transition towards circular economy as it relies upon a regenerative and reusable resource.

Yet, the adoption of the circular economy framework into the building, renovation and reuse sector is still quite new [15–17]. Lack of collaboration and awareness among relevant stakeholders, such as administrators, property owners, users and developers, and limited use of knowledge, planning, administrative and financial instruments that facilitate the development and adaptation of such circularity initiatives in the built environment are some of the known challenges in this context [18]. Adaptive reuse can still be regarded as an unviable option due to financial constraints, limitations in regulatory frameworks and lack of stakeholder engagement in governance structures [19]. Kapsalis et al. (2019) also highlight some social and administrative barriers, such as “sustainable provision and modeling schemes”, “socio-cultural appreciation and payment schemes”, and “regulatory and maintenance schemes” that challenge the integration of the circular economy framework with ecosystem services [20]. The decisions regarding the planning, design, and implementation stages of the reuse practices and relevant policies thus entail a complex set of considerations and triggers to be addressed at multiple levels of decision making.

Each geographic setting is unique with its existing legislative, governance and financial structures, socio-economic formation, limitations, barriers and drivers that influence the decisions made regarding the built environment. The international and cross-regional policy documents set standards and provide toolkits for actions to accelerate and facilitate the transition to circular economy, but their adaptation to diverse local contexts is yet challenging. It is thus important to understand and assess how useful and easily adaptable each policy-related strategy and tool are at individual local contexts. Certain enablers that support the development of effective policies can then be defined, which will contribute to the scaling up of actions that promote adaptive reuse within a circular economy framework cross-borders and regions.

In the realm of built environment practice, the factors influencing the decision making, design and implementation phases of adaptive reuse practices, *named the driving factors or drivers* in this study, and the related policy instruments that support these processes towards circularity are not fully grasped and addressed. The normative academic literature has recently expanded its scope to a certain extent to include regulatory, economic and environmental factors to be addressed at wider urban, regional and national scales, but their approach is still sporadic and fragmented. The policy-related scholarly discussions and evaluations mainly have limited scope, scale and geographical distribution that are specific to policy field, country or typology. For instance, there are a number of scholarly contributions that look individually into environmental factors and indicators [1], financial mechanisms [21] or legislative frameworks [8]. Additionally, several scholars examine only the nation-wide regulatory and legislative structures concerned with adaptive reuse practices, such as in Australia [7,22], United Kingdom [5], and Canada [23,24]. In sum, there is lack of an integrated vision that investigates the factors, enablers and associated

policy-related instruments that support and accelerate adaptive reuse practices holistically at wider scale, and this gap is filled in this research.

1.1. Scope and Aim of This Study

Given the limited scale, scope and geographical representation of the scholarly contributions on policy analysis related the field of adaptive reuse in the transition towards circular economy, there is a clear gap in literature that provides a holistic overview and analysis of different policy contexts, administrative and financial mechanisms addressing and supporting adaptive reuse of heritage. This study thus embraces a policy-related focus and responds to the following two questions: What are the driving factors that promote adaptive reuse within the circular economy framework and what sources of policy-related instruments facilitate the process? How can these drivers and policy instruments can be better adapted to varying local contexts and what kind of policy enablers can support the transition to circular economy through adaptive reuse? In this study, drivers (or driving factors) are defined as factors that stimulate adaptive reuse practices for policy and decision makers. Policy enablers stand for policy-related strategies and tools to be adopted at European, national or local administrative levels, which facilitate and accelerate the implementation of adaptive reuse within the scope of circular economy.

In this context, this study aims to identify and examine the drivers and related policy instruments that facilitate adaptive reuse practices, and to further analyze the usefulness and feasibility of a set of multi-level policy enablers to be implemented and adapted at varying local contexts to facilitate and scale up adaptive reuse towards circularity. The term usefulness associates with the functionality and practicality of the policy enablers and instruments, and their quality of being useful at local scale. Feasibility then stands for the degree of being conveniently and effectively implemented. For this purpose, firstly, a semi-systematic review of academic and policy-related literature was conducted to provide an overview and better understanding of driving factors and related legislative and regulatory frameworks, governmental policies, funding and other financial mechanisms. This analysis then allowed us to identify relevant policy interventions and their enablers, which have been evaluated from multiple stakeholders' perspectives through a multi-dimensional and multi-scalar assessment. The evidence-based outcomes of this research support the better understanding of how various EU, national and local programmes, policies and funding structures can support adaptive reuse practices, and their better adaptation in individual context with proven enablers. The findings of this research are also highly valuable for real-life policy practice, as the policy effectiveness is dependent upon local and national settings, as well as sector-specific factors where varying political, economic and administrative structures usually require differentiated implementation schemes. These policy enablers can also contribute to the formulation of a set of policy-related guidelines at European, national and local policy scales.

This study was conducted within the EU funded Horizon2020 CLIC (Circular models leveraging investments in cultural heritage adaptive reuse) project. In the CLIC project, 3 pilot cities and one region were selected to adopt, test and validate a human-centred circular city approach in different spatial localization. Cities of Amsterdam (Netherlands), Salerno (Italy) and Rijeka (Croatia) represent localizations in urban areas of diverse scale, socio-economic conditions, governance structures and geographical distribution, whereas the region of Västra Götaland (Sweden) represents localization in rural areas of demographic decrease with low potential of regeneration. For this study, in addition to the semi-systematic review, the CLIC project cases were used for the conduct of an online survey due to existing contacts, communication and collaboration with the local, regional and national stakeholders there. These case areas are also well distributed across Europe with varying regulatory frameworks and governance schemes, which enhances the balanced representation and diversity across Europe for this study.

1.2. PESTEL-CA Framework

To assess these driving factors and policy enablers holistically, an integrated assessment framework that encompasses all the relevant policy fields is essential. The sustainability domain concentrates on the four pillars for the evaluation of sustainability indicators, namely environmental, economic, social and cultural, but this core framework is limited to address separately the regulatory, governance-related and physical factors mentioned in the literature. The evaluation tools for cultural heritage regeneration and adaptive reuse, also for industrial organizations holistically, have developed substantially in recent years, introducing a multi-dimensional, multi-parametric and multi-actor perspective to the analysis [2,25–27]. Fusco Girard (2019) further emphasizes the integration of complex values derived from natural ecosystems and cultural assets into a human-centred circular economy approach [11].

Building upon this approach, we elaborated an assessment framework conveyed in this study for the designation and categorisation of driving factors and relevant policy instruments supporting adaptive reuse. The PESTEL-CA (political–economic–social–technical–environmental–legislative–cultural–administrative) framework is drawn from the PESTEL classification initially used in the business management field [28,29]. The PESTEL categorisation scheme is used for the analysis of political, economic, social, technological, environmental and legal factors in strategic management [30]. The newly elaborated framework, entitled PESTEL-CA framework, expands PESTEL by also considering the cultural and administrative factors that affect policies and practices. It thus brings a more expanded holistic approach to identify and evaluate the key driving factors and policy fields leveraging adaptive reuse of cultural heritage.

Table 1 introduces and defines the eight dimensions used in this framework, along with keywords and sources for the definitions:

Table 1. Definition and explanation of political–economic–social–technical–environmental–legislative–cultural–administrative (PESTEL-CA) framework.

Factor/Category	Keywords	Scope	Key References
Political	Government, authority, policy, democracy, transparency	It is concerned with governments, governmental policies and regulations that institutions have to comply with. It includes political policy and stability as well as national trade, fiscal and taxation policies.	[30,31]
Economic	Investment, funding, grants, loans, financial incentives, partnerships, economic activities	It is based upon the theoretical framework of urban and ecological economics. It involves the following themes: market forces, land use, urban transportation, public funding policies, housing, local government expenditures and taxes	[9,32]
Social	social equity, social inclusion, social cohesion, wellbeing, quality of life	It stands for the combination of social principles for basic societal needs, i.e., housing and health, equality and social justice with concepts associated with wellbeing, such as a sense of place, happiness and quality of life	[33–36]
Technical/technological	Sustainable buildings, building components and materials, design, techniques/methods, technology, innovation, tools, accessibility	It focuses on physical characteristics and technological aspects related to the built environment. It integrates both building and urban related factors, and encompasses a wide range of disciplines from design and engineering.	[1,37]

Table 1. Cont.

Factor/Category	Keywords	Scope	Key References
Environmental	Environment, climate change, natural hazards, energy efficiency, eco-friendly, green areas	Concerned with protecting the natural environment (particular ecosystems in and around properties), environmental factors involve gradual changes due to geological, climatic or other environmental factors, threats and protection from natural hazards, pollution, efficiency and improvement of natural resources, environmentally friendly interventions, etc.	[38]
Legal/legislative/regulatory	Legislation, legal acts, regulations, buildings codes, health and safety	It involves all legal-related topics and issues. Factors include zoning, land regulations, heritage legislation, building codes, local policies and strategies, health and safety regulations	[30]
Cultural	Cultural heritage, cultural values, intrinsic values, significance, sense of belonging, attractiveness	Set of cultural, spiritual, material, intellectual and emotional features of society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs	[39]
Administrative	Administration, governance, stakeholder engagement, citizen participation, collaboration	It is concerned with holding the balance between economic and social goals and between individual and communal goals. The aim is to align as nearly as possible the interests of individuals, of cultural heritage, and of society. governance and regulation of cultural expressions and cultural orientation systems	[40]

Adapted by Authors from the given sources.

2. Materials and Methods

A mixed research methodology of qualitative and quantitative techniques is employed for data collection and analysis within this study, as shown in Figure 1. To identify the driving factors and related policy instruments for heritage adaptive reuse, we conducted a semi-systematic review of academic and gray literature and analyzed the qualitative data through thematic analysis. The results led to the identification of policy enablers at European, national and local levels. Then, to analyze how the usefulness and feasibility of these policy enablers are perceived and evaluated at different local contexts, an online survey was conducted among local stakeholders of four European pilot cities. This two-stepped methodology is further explained in the following sub-sections:

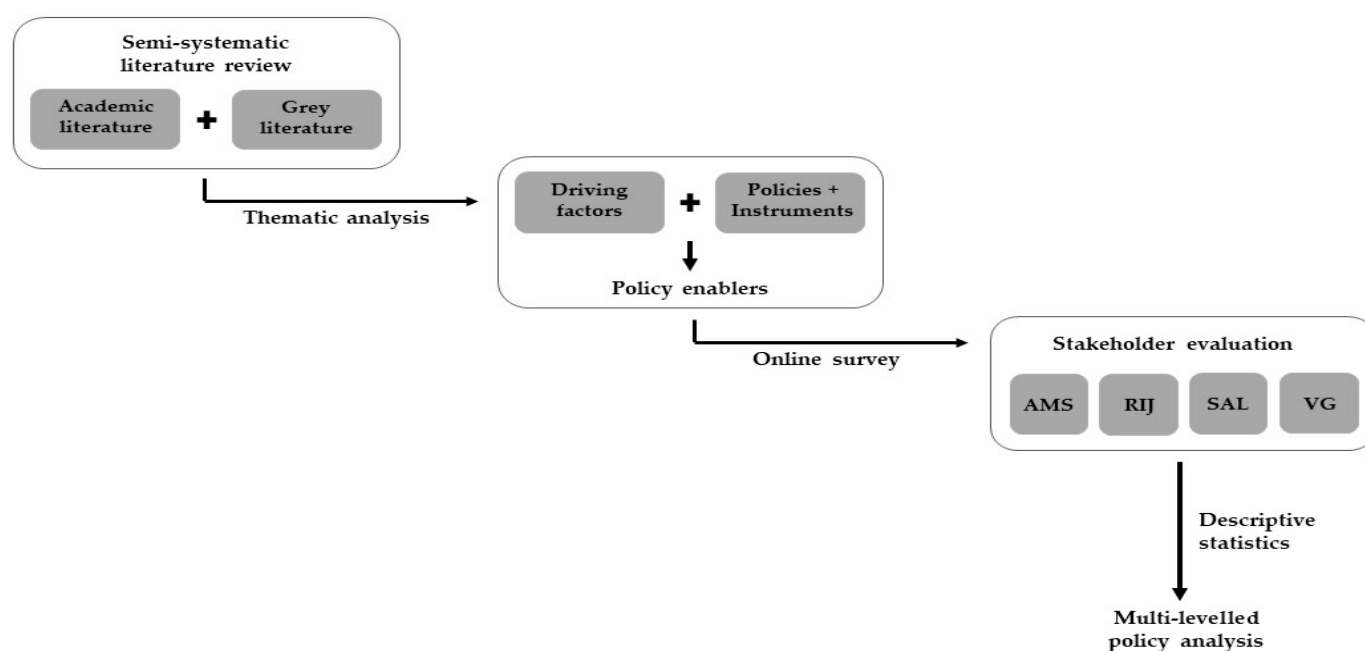


Figure 1. Summary of methodology.

2.1. Semi-Systematic Literature Review and Thematic Analysis

This review employs a dual approach, drawing on both a corpus of academic literature and “gray literature”, including policy documents, regulations and reports adopted by multiple levels of policy-makers. We deduced data from these two different sets of secondary sources in order to minimise biases and make the identification process more balanced and robust [41].

For the academic corpus, a semi-systematic literature review is used to identify drivers and policy fields relevant to adaptive reuse, as this type of review is commonly used to detect, analyze and report on prevalent themes or topics within a specific research discipline [42]. This type of review also fits to the qualitative thematic analysis that follows, rather than the statistical meta-analysis technique mainly utilized in systematic reviews [43]. We started the academic literature review process with a search procedure conducted in November 2019 and updated in December 2020 within two major academic databases: Scopus and Web of Science. The search strings used in the search within Scopus and Web of Science portals concentrated on the keywords of adaptive reuse, policies and drivers, where synonyms and different combinations are taken into account to widen the scope of the initial search.

First, we conducted literature search on the Scopus portal by using the following keywords in varying combinations: “Adaptive reuse” OR Reuse OR Regeneration OR Adapt* AND polic*, “Adaptive reuse” OR Reuse OR Regeneration OR Adapt* AND Driv* OR Factor OR Enabl*. The first search string group resulted in 89 publications, and the second search group included 29, 63 and 34 publications respectively. Then, we eliminated the duplications and resulted in 112 papers in total. The same keywords and combinations were also used in the Web of Science portal and after the removal of the duplications, we collected a total of 124 publications. The ten most-relevant and recent (published in last 5 years) abstracts are then selected for backward snowballing procedure in order to finalize the complete list of included publications [44]. As part of the paper reduction process, publications that do not address drivers, enablers and/or indicators for adaptive reuse in their titles and/or abstract are excluded from the review, along with papers that are not relevant to the built environment. Followed by checking for the availability of full papers, we ended up with a total number of 69 publications to be included in the semi-systematic literature review.

For the selected publications, we then conducted reflexive thematic analysis through a semantic approach where coding and theme development are drawn on the explicit content of the papers [45]. We used coding and generated themes defining the driving factors for adaptive reuse. The themes were created from common factors, causes and qualities that were repeatedly indicated in the literature as a supporting element for adaptive reuse. We then categorized these themes by thematic focus and the PESTEL-CA framework, and then associated these factors with the relevant policies mentioned in the papers (see Table 2). This thematic categorization of drivers and relevant policies supported the identification of policy enablers examined in the second part of the study.

The second review we conducted concentrated on “gray literature”, which included policy documents and reports adopted by governmental bodies, local administrations, relevant inter-governmental and non-governmental organizations, think tank institutions and knowledge-based private companies [46]. The reason for including gray literature review in this study is to identify and examine cross-regional and cross-sector (policy domain) policy interventions addressing adaptive reuse of cultural heritage at local, national and European contexts. This complementary gray literature review extended the scope of the study, and contributed to the identification of the multi-levelled policy enablers to be assessed.

For the selection of the gray literature sources and publications, initially the policy documents, recommendations and reports mentioned in the academic literature were identified. Then, thorough a forward and backward snowballing procedure, other policy-oriented reports, regulations and publications were added to the review [44]. Furthermore, the Europe-wide policy overview on adaptive reuse of cultural heritage delivered by OpenHeritage EU H2020 project provided a basis for cross-border comparative analysis of national policies [47]. In total, 12 European, 5 national and 10 local policy documents and reports were included in the review. Through a thematic analysis again, the common policies, strategies and instruments that are adopted at different governmental levels (local, national and European) were identified as policy enablers through a synthesis with the results of the academic literature review.

2.2. Survey on Policy Enablers and Statistical Analysis

In the second phase of data collection, we conducted an online survey on policy enablers with local stakeholders within the selected European pilot cities and region. The survey aimed to investigate the relative importance of certain strategies, tools and policies in relation to adaptive reuse of built heritage practices at different contexts. We examined how stakeholders assess the usefulness and feasibility of a set of policy-related enablers at local, national and European levels to support the driving factors identified.

We employed purposive sampling to recruit the stakeholders involved in the survey [48]. Within the EU funded Horizon2020 CLIC project framing this study, we selected the participants from the three pilot cities and one region examined in the project [49]. For the survey, a list of 49 different stakeholder groups were identified in total from the 4 cases in consultation with the local or regional administrators. We sought stakeholders representing governmental agencies, administrators, experts, small or medium-sized enterprises and NGOs at local, regional or national level that are directly or indirectly involved in adaptive reuse practices. The online survey was initially provided to the relevant local and/or regional administrators who circulated it among the selected stakeholders. The respondents were only asked to indicate the city and the administrative level that they participated and were not questioned about the stakeholder group that they represented for the sake of anonymity. We gathered responses from diverse stakeholder groups representing various levels of governance in all the 4 cases (Figure 2). The survey was available for completion between November 2019 and March 2020 and resulted in 23 fully completed responses.

Table 2. Assessment of driving factors for adaptive reuse.

PESTEL-CA	Driving Factor	Context	Key References	Relevant Policy/Instrument
Political	Public administrative support	Existing governance structure; the role, duties and budget of public administration at different governance levels	[50]	Public procurement
	Tourism	Increase in tourism flows, positive economic impact and local growth	[51–54]	Tourism development plan
Economic	Real-estate market	Changes in highest and best land use	[23,52,54]	Market-based incentives, public subsidies
	Financial aid	Subsidies/grants, equity investment, fiscal relief and/or loans	[55–57]	Public funding, subsidies, financial incentives
	Public financial return	Returns on public investments	[53,58]	EU directives
	Increasing construction costs	Setback for demolition and new construction	[59]	
	Affordable housing	Access to affordable housing after the reuse and regeneration implementation	[60,61]	European Social Fund, European Regional Development Fund; national subsidies
Social	Social cohesion	Sense of community and belonging, collaboration, citizen engagement	[52,62]	Citizen engagement tools
	Well-being and quality of life	Public and urban health	[62–64]	Community improvement plan
Technical/technological	Physical characteristics of buildings	Adaptability to a new function, flexibility for conversion, physical durability	[55,61,65–67]	Land use plan, building regulations
	Sustainability and circularity goals		[18,62,67–69]	
Environmental	Green and recreational spaces	Localization and number of green areas, public spaces, public parks, and recreational services	[50,62]	Land use plan, environmental impact assessment
	Environment and natural capital	Protection of natural resources, creating and revitalization of green areas	[52]	Environmental impact assessment
	Reducing use of resources		[55,70]	Public procurement
	Less energy consumption and material waste		[55,68,71]	Building regulations and codes, waste management policies
Legal/regulatory	Accessibility	Connection to public spaces, transportation nodes and hubs	[65]	Smart mobility plans and incentives
Cultural	Creative industries	Revitalization and creating spaces for creative and vibrant industries; creative, cultural and innovative activities	[52,53,60]	National grants and subsidies, cultural-focused land use
	Cultural heritage value of property	Heritage significance and inherent values of heritage properties and landscapes	[52,53,72–74]	

Table 2. Cont.

PESTEL-CA	Driving Factor	Context	Key References	Relevant Policy/Instrument
Administrative	Collaboration between multiple actors	Participatory governance, collaboration and consensus among multiple stakeholders and decision makers	[55]	Participatory governance models and tools
	Participation and citizen engagement	Participatory decision-making, citizen deliberation and engagement	[75]	Citizen engagement tools

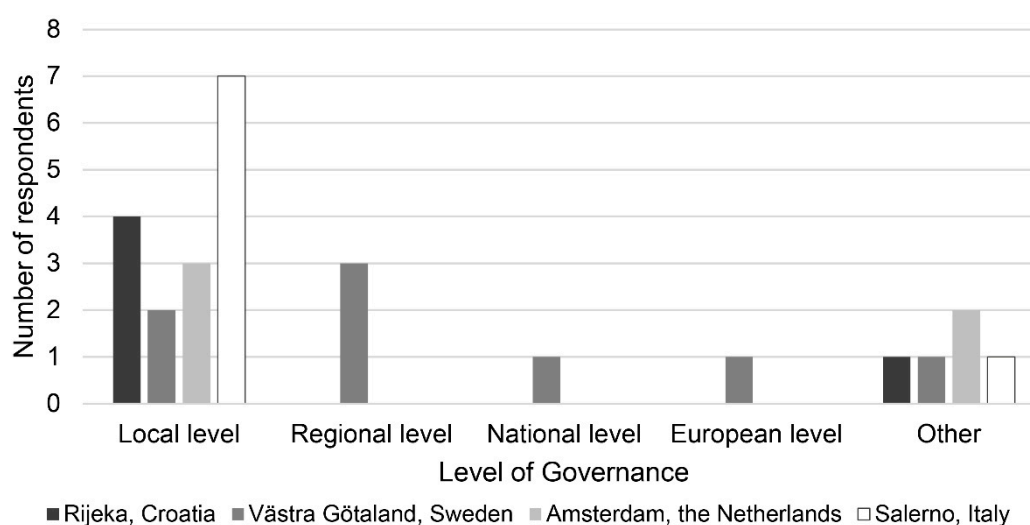


Figure 2. Distribution of the survey participants per level of governance and case study.

In the survey, each set of policy enablers was presented to respondents based on the level of governance it relates to, namely European, national, and local. The respondents were provided a short description of each policy enabler and were asked to rank the enabler usefulness and feasibility considering their local context. For this ranking, a 5-point Likert scale was adopted ranging from 1 to 5, where 1 represented “least” or “strongly disagree” and 5 “most” or “strongly agree”. We analyzed the survey results using descriptive statistics.

3. Results

For the analysis of the dataset, we initially identified and analyzed the driving factors for adaptive reuse, along with relevant policies and instruments that were deduced from the existing academic and gray literature. This assessment resulted in a list of multi-level policy enablers that were later evaluated from the perspective of stakeholders.

3.1. Driving Factors and Policy-Related Instruments for Adaptive Reuse

Following the thematic analysis of the semi-systematic review, 19 main drivers were determined. They were further classified according to the PESTEL-CA categorisation, which are well distributed among all the categories. Table 2 provides an overview of each driving factor with their thematic description, key references and relevant policy instruments addressed in the given literature.

The only political driver of heritage adaptive reuse defined is the public administrative support where local authorities collaborate and play a mediator and facilitator role in the

reuse process [50]. Collaboration also comes forth as an administrative driver, covering communication, coordination and consensus among multiple actors and decision makers, including engaged citizens and community groups [75]. Economic drivers include both factors that boost local economic growth and attract investments, such as tourism and rising real-estate market, as well as direct financial benefits in terms of financial aid, funds and public financial returns [52,55,57]. Increasing construction and material costs is also defined as an economic constraint stipulating reuse choice over reconstruction [4,59]. While the real estate market is introduced as an investment attracting factor, access to affordable housing is also recognized as a crucial social driver promoting social cohesion [60]. The Covid-19 pandemic has also accelerated transitions in the real estate market, calling for actions and strategies that take into account public and urban health considerations [64]. In addition, sense of belonging in community, wellbeing and quality of life are also listed as social driving factors [52,62]. Complementary to the sense of community, the cultural and heritage values inherent in the reused properties and landscapes also promote adaptive reuse over demolition and reconstruction [53,72].

Narrowing down to the building scale, the physical characteristics of existing building stocks and their flexibility and adaptability to new functions come forth as a technical/technological driver [65,66]. Reduction in the use of resources, material and building costs, energy consumption and material waste also complement these physical factors from an environmental and circularity perspective [55,70,72]. The localization of the regenerated building and area in terms of their proximity to natural environments, green areas and public spaces, as well as to main transportation nodes, is also acknowledged to stimulate reuse processes [50,61,64]. Aiming for a more sustainable building/urban area that is energy efficient is also recognized as an environmental driver. Yet, the instruments that facilitate identification and achievement of sustainability and circularity goals have not been fully covered in the scholarly contributions.

The policy instruments stimulating these wide range of driving factors that they are associated with, are concentrated on common economic, regulatory and administrative policy-related tools to be adopted at multiple levels. For instance, national governmental support in terms of public administration, financial support and legislation has been emphasized in a number of scholarly publications. Allegro and Lupu (2019) indicate that the public administrations carry a dual role for cultural heritage: heritage conservation and valorisation of public good [21]. The public authorities thus act as a catalyst to foster adaptive reuse practices for the cultural shared value in a hybrid approach integrating social and economic optimums [21]. Governments can provide direct financial support through subsidies/grants, equity investment, fiscal relief and/or loans. They can also implement projects through public–private partnerships, which align with public and private interests. Deployment of regulatory tools that support innovative procurement methods can also facilitate the involvement of small or medium-size enterprises or third sector in these partnerships [76]. Abastante et. al. (2020) explain that the relationship with local authorities may vary from cooperative to hostile, and emphasize that collaborative stakeholder engagement tools that promote mutual support and cooperation can facilitate the adaptive reuse process [50].

At local administrative level, land use is recognized as a key policy instrument. Land use regulations meet demands from housing, transportation, energy, tourism and economic development sectors, and thus have direct influence on housing and energy decisions, culture and tourism management, as well as transportation and mobility planning. This is why a number of scholars have mentioned land use plans as the right policy instrument to promote legislative, environmental and cultural drivers: Vecchio and Arku (2020), for instance, indicate that former industrial lands can be re-deployed to address urban development targets in acknowledgement of industrial decline and economic transition [60]. Numerous scholars highlight that urban-focused land use policies and culture-led regeneration strategies can play a significant role in this transition [61,76]. In culture-led regeneration projects, for example, creative and vibrant industries can play a vital role in co-creation

and co-design processes, as well organization of creative, cultural, and innovative activities in these spaces [77–79].

Looking into the gray literature, it is observed that both kinds of literature complement each other. Extraction of themes and policy-related priorities from multiple types of sources that are shaped by different agendas and approaches contribute to a more up-to-date and robust listing of policy enablers. The academic literature is still new to the integration of adaptive reuse of cultural heritage into the wider urban development and circular economy frameworks [9]. Going beyond the limited scope of culture and heritage-related policy fields, the gray literature also embraces a wider context that brings together culture, energy, well-being, sustainable environment and urban-related focus. The recent policy documents and reports also take into account spill-over effects from the outset, which generates more effective outcomes for circular economy with long-term benefits [80].

Particularly in EU programmes, policies and funding mechanisms, the focus on adaptive reuse extends beyond the culture and heritage sectors, and we see a more holistic approach towards integration within the energy and circular economy frameworks. The EU has been one of the most active players in the transition towards zero carbon emissions by 2050, and in mainstreaming of the circular economy into the European policy agendas. The 2015 EU Circular Economy Action Plan stresses the EU's commitment [81]. In a recent European policy recommendation adopted by the Architects' Council of Europe, adaptive reuse is acknowledged as a value-oriented approach based on maintenance and reuse of existing resources that contributes both to the protection of built heritage and energy efficiency in support of circularity [13]. The European Framework for Action on Cultural Heritage derived from the European Year of Cultural Heritage 2018 further defines five main pillars and clusters of actions, in which adaptive reuse is highlighted under the cluster for sustainable Europe [82].

In the wider cross-regional context, the Urban Agenda for the EU Pact of Amsterdam has also incorporated adaptive reuse into its key focus areas in order to support heritage-focused urban development since 2019 [83]. In terms of financial instruments, the EU Cohesion Policy has been developed to tackle regional inequalities through a number of funding mechanisms. Among them, the European Regional Development Fund particularly focuses on "preserving and protecting the environment and promoting resource efficiency", which encourages and accommodated adaptive reuse projects [84]. Although these regional development investments provide more direct funding to adaptive reuse practices, their communication, dissemination and exploitation at local contexts across Europe is still limited [47].

As the gray literature review shows, national policies, programmes and action plans play a significant role in the administration and application of such frameworks and tools at country level. The EU functions as a standard-setting umbrella organization for the coordination and support towards decisions regarding culture and heritage without direct authority on legislative and administrative frameworks. The national policies and strategies on adaptive reuse thus complement and implement priorities set at cross-national levels. Their implementation and adaptation to diverse local contexts is further supported and administered through local policies and regulatory tools.

3.2. Identification of Multi-Level Policy Enablers

Based upon the synthesis of academic and gray literature, we developed an overview of policy enablers that accelerate and facilitate adaptive reuse practices in the transition toward circular economy. Adopting again a multi-level approach for the formulation of these enablers, namely European, national and local, they are concentrated on four main categories of policy fields: regulatory, economic and administrative, as well as social. These key enablers aim to contribute to the expansion of adaptive reuse implementation and replication of effective instruments to promote wider and systemic changes toward circular economy.

The identified European, national and local policy enablers are listed and defined with content description and key references in Table 3:

Table 3. Multi-level policy enablers and their descriptions.

Scale	Policy Enabler	Description	Key References
European			
	EU Funding and Grants	The EU provides funding to support research and innovation on heritage-related projects through programmes such as Horizon2020 and Horizon Europe. the European Regional Development Fund, European Structural and Investment Funds and the Cohesion Fund also provide support in the transition towards circular economy, and to promote economic and social cohesion across Europe.	[84]
	EU Directives	Regulatory measures that support the Circular Economy agenda and the European Framework for Action on Cultural Heritage also act as facilitators for relevant actions to be adopted at local contexts.	[81,82]
	Support coming from Development Banks	As another European financial resource, European Investment Bank and the European Bank for Reconstruction and Development may also provide financial support.	[21]
	EU Action Plan for the Circular Economy	Adopted in 2015, this Action Plan aims to transform the economy of the EU and its Member States in favour of the circular economy.	[81]
	Pact of Amsterdam	In this EU Urban Agenda revised 2019, the role of social dimension and employment benefits of the adaptive reuse of cultural heritage are indicated.	[83]
	Historic Urban Landscape approach	Adopted by UNESCO in 2011, the HUL Recommendation provides an interdisciplinary and continually evolving toolkit to support conservation through transformation approach	[85]
National			
	Bottom-up approach to policy development	In order to enhance greater citizen engagement in policy making and implementation, bottom-up approaches that engage local communities and social groups horizontally in the decision-making process is supported.	[55,75]
	National subsidies and market-based incentives	Public financial mechanisms and supplementary tools, such as subsidies, tax relief and other market-based incentives, leverage investments in adaptive reuse.	[53–57]
	National public funding and special budget	Public funding provided through grants, special budgetary allocations and loans also provide financial support.	[21,58]
	Policies in favour of key national clusters	To foster cooperation and innovation between public and private bodies, agglomeration of certain economic entities can be promoted to support collaboration for effective adaptive reuse practices.	[50,78]
	Governmental circular economy and heritage priorities for smart specialization	Lack of partnerships and prioritisation of circular economy and heritage-related strategies were addressed as challenges by local stakeholders. National smart specialization strategies aiming to support sustainability and circularity goals through adaptive reuse can be adopted through public–private and –people partnerships	[9,52,80]
Local			
	Awareness raising campaign and education tools	Awareness raising campaigns focusing on action-based initiatives, coupled with educational tools are essential to raise awareness among different stakeholder groups on the impact of adaptive reuse in the transition to circularity.	[62,63]

Table 3. Cont.

Scale	Policy Enabler	Description	Key References
	Multi-stakeholder platforms and citizen engagement	Establishing collaboration between governments, local administrators, private and public bodies, developers, local organizations and citizens are essential in reaching consensus to push local circularity agendas forward.	[52,62,75]
	Support for the development of sustainable tourism and mobility plans	Dedicated support from local administrative bodies for the development of sustainable tourism and mobility plans are important to enhance sustainable tourism development in the cities and regions.	[51,65]
	Environmental impact assessments and risk mitigation plans	With rising impact of climate change and other natural and human-induced threats, it is important to enforce the conduct of environmental impact assessment, and adoption of risk preparedness and mitigation plans at multiple levels.	[50,52]
	Scaling up public procurement for adaptive reuse	As public procurement decisions are predominantly based on economic concerns, often without considering the environmental costs, it is important to build and ensure a closer relationship between public procurement and circular economy agenda.	[55,70]
	Enhancement of policy communication and enforcement	Lack of communication between policy makers and stakeholders is an issue to be tackled with enhancement of policy communication for better implementation and promotion of reuse activities.	[50]
	Flexible land use regulations	Flexibility in land-use plans can facilitate culture- and tourism-led regeneration practices with temporary or permanent land use policies.	[60,61,75]

These multi-level enablers supporting policies for adaptive reuse were provided and tested among local stakeholders in terms of their usefulness and feasibility at local context through an online survey.

3.3. Assessment of Policy Enablers for Adaptive Reuse

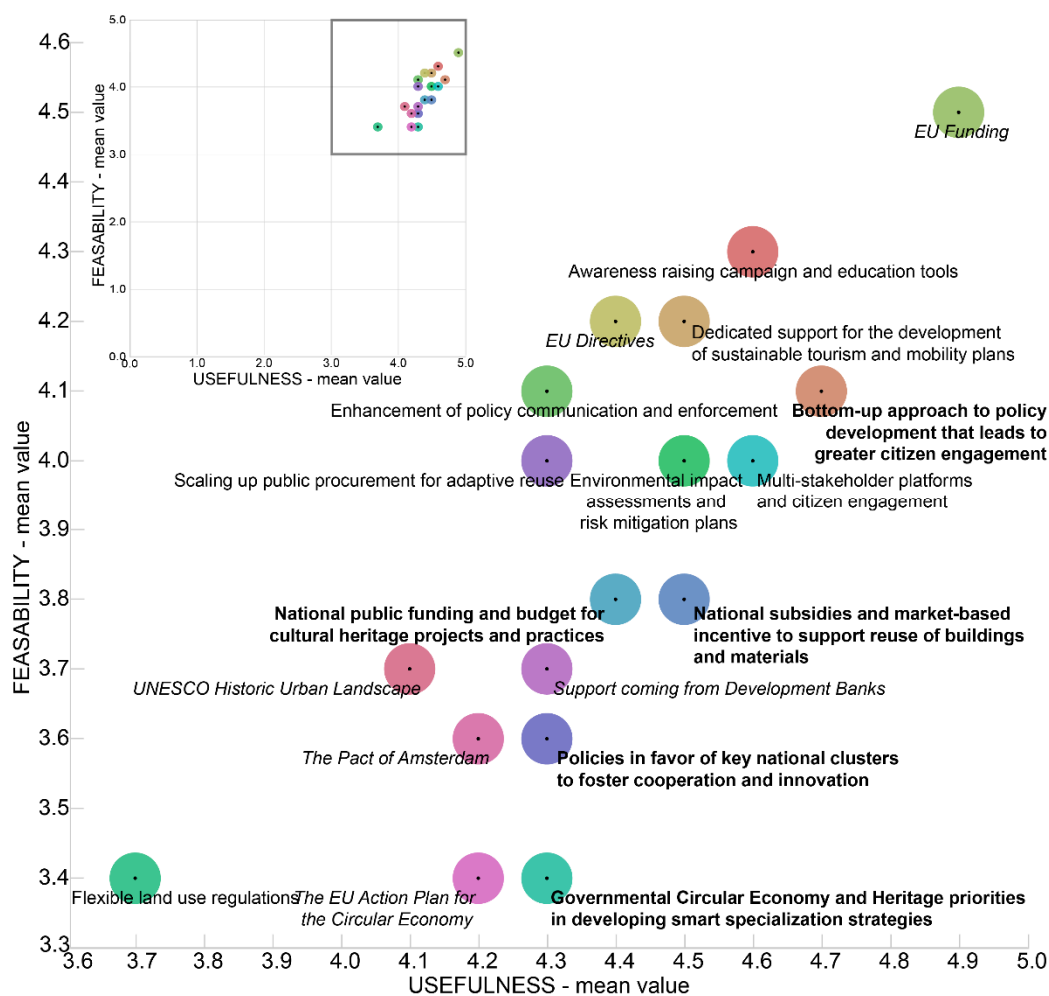
This section reports on the sample of 23 full responses collected from the survey. In the survey, the three sets of multi-level policy enablers (Table 3) were presented to the respondents, and they were asked to rate their usefulness and feasibility for their local contexts based on a 1–5 points Likert scale. To test for internal consistency within the survey results, the Cronbach's alpha was measured for each set of enablers. The Cronbach's alpha value of the European level was calculated 0.89, national level is 0.90, and the local level is 0.91. These values are acceptable as they are higher than 0.7, the generally accepted lower value for this parameter [85]. Although values of Cronbach's alpha higher than 0.9 may suggest redundancy, it is disregarded as the enablers are all independent [86].

The assessment results from the survey were summarized using the values of mean and standard deviation (SD) per each question. The enablers of heritage adaptive reuse presenting mean values higher than 3.00 were considered useful and/or feasible. We further classified the enablers as slightly, moderately, or very useful or feasible based on their mean value (Table 4). The score of 3.00 represents a neutral assessment. The overview of the descriptive statistics per each set of policy-related enablers is reported in Figure 3 and Table 5.

According to the results, all selected enablers have been assessed as useful and feasible to a certain extent. A greater mean value generally signifies assessment of usefulness over feasibility. Almost all the enablers thus reported higher scores for their usefulness compared to their feasibility. Among the 18 enablers examined, half of them were assessed as very useful and the other half as moderately useful. In comparison, only one policy enabler (EU funding) was evaluated to be very feasible, whereas 12 of them were seen moderately feasible.

Table 4. Classification of enablers presenting a mean value equal or greater than 3.00.

Class	Range
Neutral	Mean = 3.00
Slightly	$3.00 < \text{Mean} \leq 3.66$
Moderately	$3.66 < \text{Mean} \leq 4.33$
Very	$4.33 < \text{Mean} \leq 5.00$

**Figure 3.** Distribution of the enablers per mean value of usefulness and feasibility. The bold line delimits the domain of enablers that are both useful and feasible.**Table 5.** Summary of the simple statistical analysis of the policy-related enablers ordered by decreasing mean value of usefulness.

Lv	Enabler	Usefulness					Feasibility				
		N ¹	Perc	Mean	SD	CI	N ¹	Perc	Mean	SD	CI ²
	European										
	EU Funding	21	91%	4.9	0.3	V	22	96%	4.5	0.8	V
	EU Directives	21	91%	4.4	0.7	V	20	87%	4.2	1.0	M
	Support coming from Development Banks	18	78%	4.3	1.1	M	18	78%	3.7	1.3	M

Table 5. Cont.

Lv	Enabler	Usefulness					Feasibility				
		N ¹	Perc	Mean	SD	CI	N ¹	Perc	Mean	SD	CI ²
	The EU Action Plan for the Circular Economy	19	83%	4.1	1.0	M	19	83%	3.7	0.9	M
	The Pact of Amsterdam	19	83%	4.2	0.8	M	18	78%	3.4	0.7	S
	UNESCO Historic Urban Landscape	18	78%	4.2	0.7	M	17	74%	3.6	0.9	S
National											
	Bottom-up approach to policy development that lead to greater citizen engagement	22	96%	4.7	0.7	V	20	87%	4.1	1.1	M
	National subsidies and market-based incentives to support reuse of buildings and materials	21	91%	4.5	0.8	V	20	87%	3.8	1.2	M
	National public funding and budget for cultural heritage projects and practices	22	96%	4.4	1.0	V	21	91%	3.8	1.2	M
	Policies in favor of key national clusters to foster cooperation and innovation	20	87%	4.3	0.9	M	19	83%	3.6	1.0	S
	Governmental circular economy and heritage priorities in developing smart specialization strategies	18	78%	4.3	0.9	M	17	74%	3.4	0.9	S
Local											
	Awareness raising campaign and education tools	22	96%	4.6	0.7	V	21	91%	4.3	0.9	M
	Multi-stakeholder platforms and citizen engagement	21	91%	4.6	0.9	V	20	87%	4.0	1.2	M
	Dedicated support for the development of sustainable tourism and mobility plans	22	96%	4.5	0.7	V	21	91%	4.2	0.8	M
	Environmental impact assessments and risk mitigation plans	22	96%	4.5	0.8	V	21	91%	4.0	0.9	M
	Scaling up public procurement for adaptive reuse	22	96%	4.3	0.8	M	21	91%	4.0	0.9	M
	Enhancement of policy communication and enforcement	21	91%	4.3	0.9	M	20	87%	4.1	1.1	M
	Flexible land use regulations	20	87%	3.7	1.0	M	19	83%	3.4	0.9	S

¹ The variation in the number of answers is explained by the possibility of respondents to select “I don’t know”. ² The column “CI” reports the class of usefulness and feasibility: S stands for “slightly” ($3.00 < \text{Mean} \leq 3.66$), M for “moderately” ($3.66 < \text{Mean} \leq 4.33$), and V for “very” ($4.33 < \text{Mean} \leq 5.00$).

3.3.1. Assessment of European Policy Enablers

Among the European enablers of heritage adaptive reuse, EU Funding was assessed to be both very useful (mean = 4.90, SD = 0.30, n = 21) and very feasible (mean = 4.50, SD = 0.80, n = 22). It presented a homogeneity in its usefulness assessment (SD = 0.30), as shown in Figure 4. It has also been the only enabler that was evaluated to be both very useful and very feasible with the highest scores for both usefulness and feasibility variables among all enablers assessed independently from their level. Another European enabler recognized to be very useful has been the EU directives, despite its assessment as moderately feasible.

The remaining European enablers were assessed to be moderately useful, and their feasibility assessment showed variety. For instance, support from the Development Banks and the UNESCO Historic Urban Landscape Recommendation were both considered to

be moderately feasible to adapt, whereas the EU Action Plan for the Circular Economy and the Pact of Amsterdam were assessed as slightly feasible to implement. The EU Action Plan for the Circular Economy, specifically, was ranked as neutral for feasibility by half of the respondents. Support from the Development Banks collected the lowest assessment scores: 2.00 for usefulness and 3.00 for feasibility. This enabler also received a high number of “I don’t know” responses, suggesting limited knowledge and awareness on this policy-related instrument.

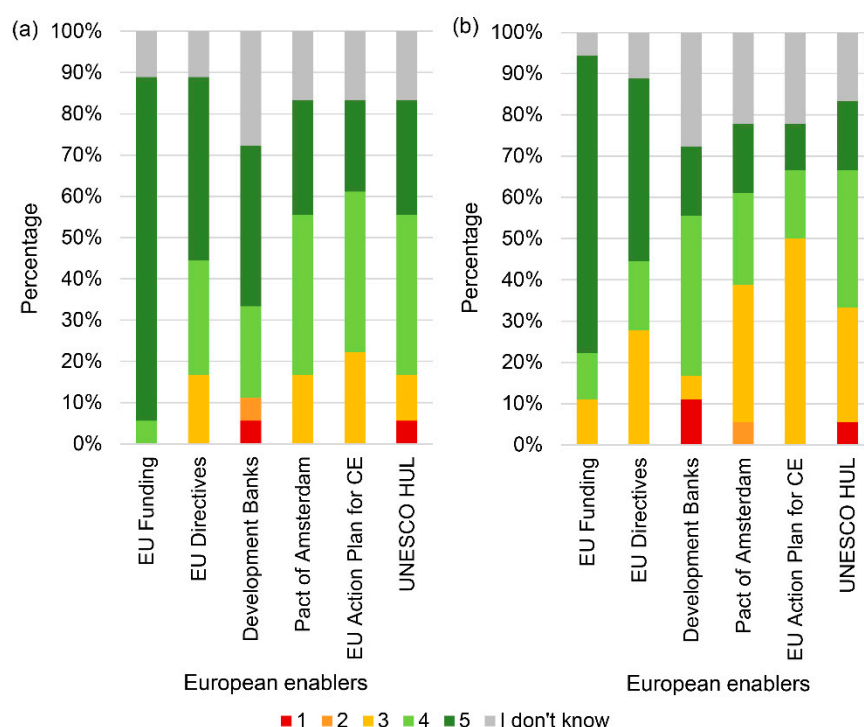


Figure 4. Distribution of the ranking score for the assessment of the European enablers. (a) Usefulness. (b) Feasibility.

Looking at the geographical distribution of the scores assigned to EU funding, it is observed that this enabler scored highest for both usefulness and feasibility in all four cases (Figure 5). In terms of feasibility, the assessment was similar in Amsterdam, Rijeka, and Västra Götaland with most respondents giving a score of 5.00. In Salerno, on the other hand, one third of the respondents expressed a neutral assessment. In sum, the stakeholders from Salerno regard EU funding to be slightly less feasible compared to the other three cases.

3.3.2. Assessment of National Policy Enablers

Regarding the national policy enablers of adaptive reuse, their usefulness values were generally higher than their feasibility. The ones that were very useful were assessed moderately feasible, and the moderately useful enablers were regarded slightly feasible.

The very useful enablers have been bottom-up approach, national subsidies and market-based incentives, and national public funding, respectively. The bottom-up approach scored highest among national enablers for both usefulness and feasibility, but it also reported 3 negative scores (Figure 6). The enablers that were assessed moderately in terms of usefulness have been the key national clusters to foster cooperation and innovation, and the governmental circular economy and heritage priorities. Both enablers were evaluated to be moderately useful but scored low in feasibility. Governmental circular economy and heritage priorities reported to be the least feasible among all enablers across levels (Table 5). The high number of “I don’t know” responses might suggest limited knowledge and awareness of these enablers.

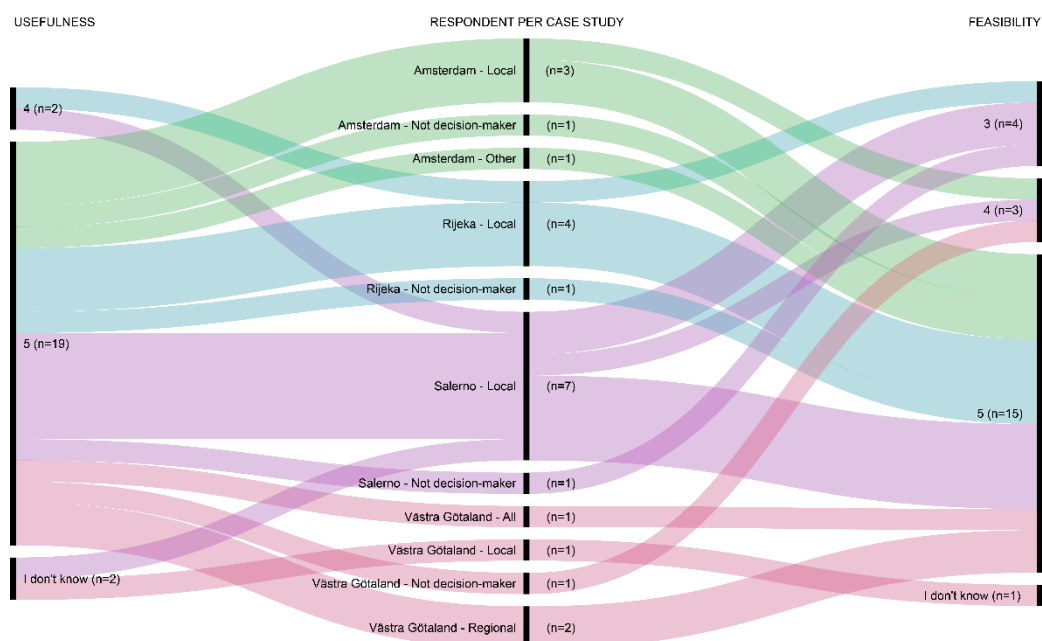


Figure 5. European enabler "EU funding": distribution of the ranking score for the assessment of usefulness and feasibility at local level per geographical origin of respondents and their administrative role.

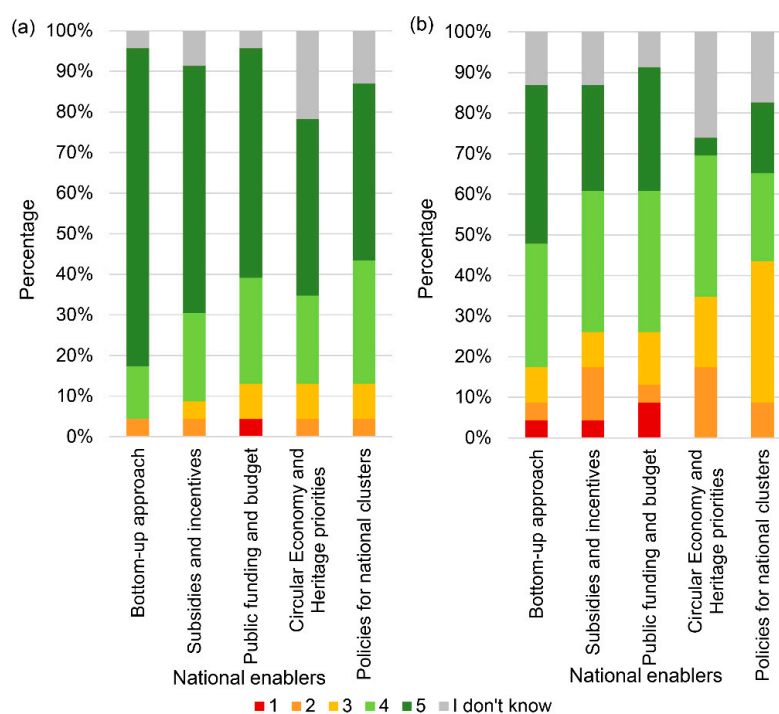


Figure 6. Distribution of the ranking score for the assessment of national enablers. (a) Usefulness. (b) Feasibility.

For the highest-ranking variable, the evaluation from stakeholders representing different case studies was also examined. Geographically, the enabler on bottom-up approach scored higher in usefulness across all four case areas (Figure 7). However, its feasibility was assessed differently per case area. Less than half of the respondents from Rijeka assigned a positive score of 4.00. On the other hand, half or more of the respondents from Amsterdam, Rijeka and Västra Götaland gave a score of either 4.00 or 5.00. In sum, the stakeholders of Rijeka assessed this enabler to be less feasible.



Figure 7. National enabler “bottom-up approach to policy development that lead to greater citizen engagement”: distribution of the ranking score for the assessment of usefulness and feasibility at local level per geographical origin of respondents and their administrative role.

3.3.3. Assessment of Local Policy Enablers

The assessment of policy enablers of heritage adaptive reuse at local level presented high scores in terms of usefulness. Flexible land use regulation was assessed to be the only slightly feasible enabler, whereas remaining were considered moderately feasible with mean values of 4.00 or higher. In general, the local enablers scored higher in feasibility than the European and national level enablers. Among the local enablers, multi-stakeholder platforms and citizen engagement ranked the most useful, followed closely by awareness raising campaigns and education tools. Education tools were regarded to be more feasible than multi-stakeholder platforms though. Compared to European and national enablers, local enablers received less “I don’t know” responses, which signifies higher acknowledgement and knowledge of these instruments among local stakeholders (Figures 4, 6 and 8).

Geographically speaking, multi-stakeholder platforms and citizen engagement received the highest score from at least more than half of the respondents per each case (Figure 9). Concerning its feasibility, this enabler was given a positive score, either 4.00 or 5.00, by at least half of the respondents representing Amsterdam, Salerno, and Västra Götaland. Among the stakeholders from Rijeka though, slightly less than half of them regarded it as feasible.

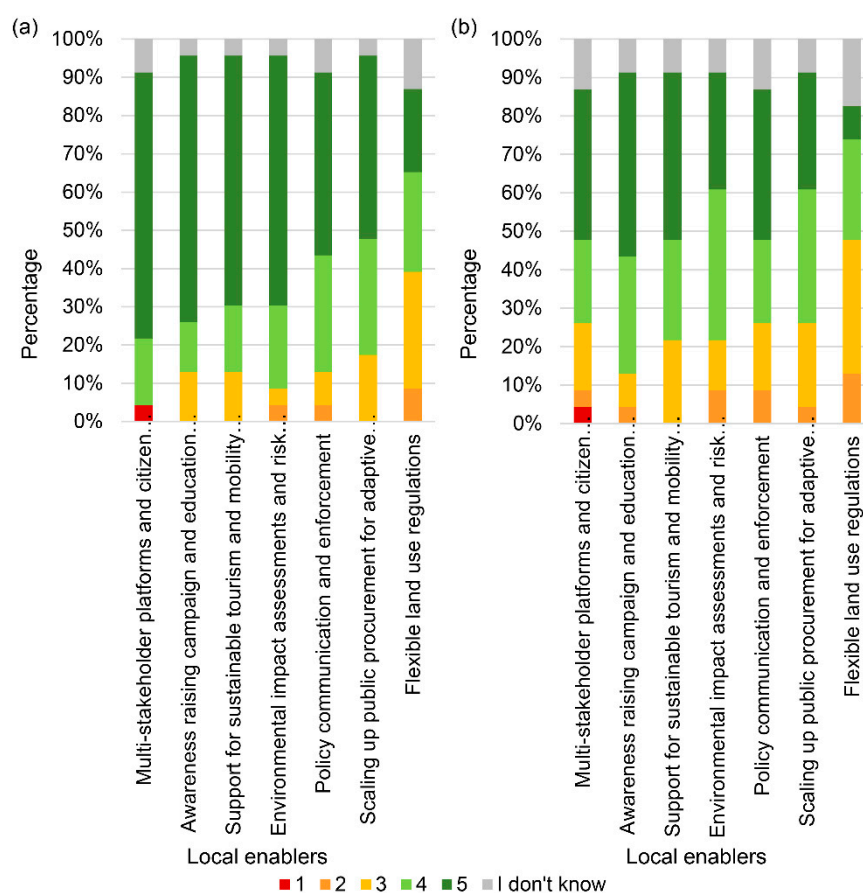


Figure 8. Distribution of the ranking score for the assessment at local level of the local enablers. (a) Usefulness. (b) Feasibility.

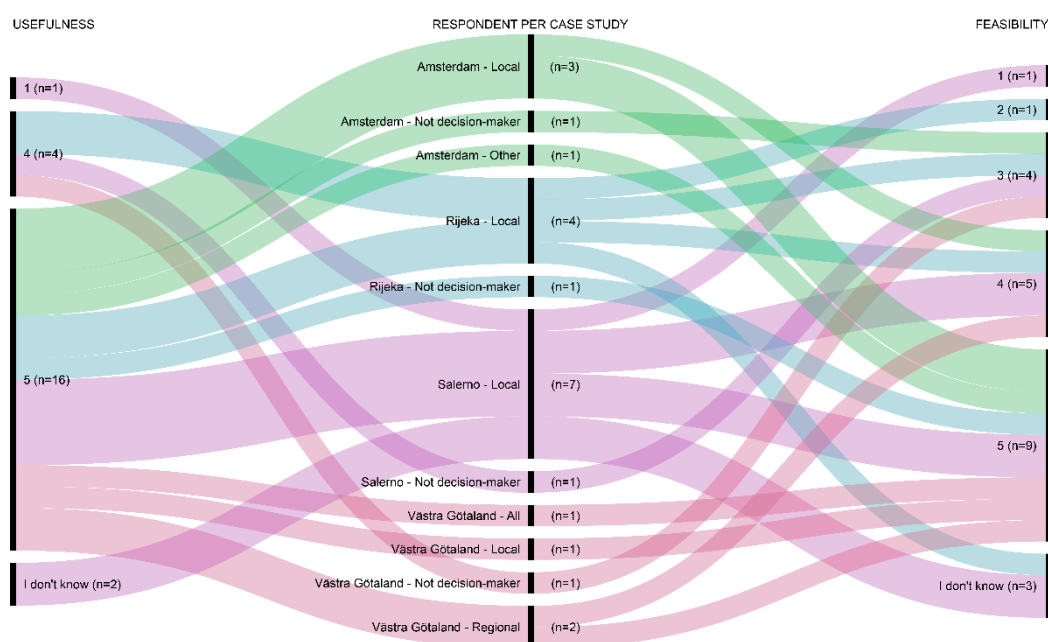


Figure 9. Local enabler "multi-stakeholder platforms and citizen engagement": distribution.

4. Discussion and Conclusions

In this research, we examined the driving factors, policy-related instruments and enablers that facilitate and accelerate adaptive reuse practices towards circular economy transition. Based upon a semi-systematic review of academic and gray literature, 19 driving factors were identified that extend over all PESTEL-CA policy categories, but the policy documents and tools deduced were more concentrated on administrative, regulatory and financial mechanisms and instruments. This analysis led to the identification of policy enablers that can be adopted at three levels: European, national and local. To investigate how a variety of local stakeholders in the selected case cities and region evaluate the usefulness and feasibility of these enablers for their individual local contexts, an online survey was conducted. The findings showed that almost all the enablers were assessed to be useful and feasible, but their degree of adaptability changes significantly.

According to the findings, at the European level, EU funding was found as the most useful and feasible enabler of heritage adaptive reuse by the responding stakeholders. This enabler has not been extensively covered in the existing academic literature, in which the emphasis has been mostly on the public funding schemes [55–57]. The stakeholders, on the other hand, considered the public financial support, such as national funding and subsidies, less feasible compared to EU funding. This shows that EU funding instruments are already recognized as enablers of heritage adaptive reuse by stakeholders, thus should also be included in the circular economy frameworks. The EU Directives play a significant role in the facilitation of local actions and delegation of funds for the circular economy agenda [81,82]. At the national level, bottom-up approach to policy development, national subsidies and market-based incentives were found to be the most useful enablers whereas their feasibility was found to be moderate. To support and facilitate these enablers at the national level, again the EU funds, i.e., European structural and investment funds, and EU directives could be the catalyzers for better feasibility and integrated actions [47,84].

The academic literature which focuses on local and national levels, does not yet provide sufficient knowledge about the drivers and policy enablers of adaptive reuse within the circular economy framework. The ambition for connecting adaptive reuse of cultural heritage and circular economy framework has been rather new, and it has been guided mainly by the EU policies and programs [11]. Moreover, this integrated framework and its enablers are not yet fully grasped by the local stakeholders. The findings of this study indicate that the Circular Economy Action Plan and governance facilitation are the least feasible policy-related tools. To raise awareness on this new framework and to increase the usability and feasibility of these enablers, better policy communication and educational tools are necessary [18,62,63].

In the last decade, citizen engagement, collaborative and participatory approaches for urban regeneration, including heritage adaptive reuse, have gained more importance at the European level. The Faro Convention and the Pact of Amsterdam are examples for this [83,87]. The findings from our survey also highlighted the importance of bottom-up approaches to decision-making and policy development, in terms of its usability and feasibility as policy enabler by local stakeholders. In that sense, the challenges that emerge in participatory administrative structures and processes (i.e., lack of collaboration, communication and coordination between stakeholders) should be addressed, especially at the local and national levels, and the links between the European programs should be enabled [9]. Best participatory practices and existing toolkits and strategies, such as the Faro Convention Action Plan, can provide guidelines for more participatory and collaborative processes [88].

This assessment on multi-level policy enablers can stimulate innovative and collaborative projects on heritage adaptive reuse and can scale up actions across borders and regions. The evidence-based findings gathered from this multiple case study had been Europe-based, and the international policy documents examined had a Eurocentric focus. More empirical data can be collected from additional cases and adaptive reuse practices worldwide, complementing this study with an investigation at global scale. Further re-

search can provide an in-depth analysis of identified driving factors and associated policy instruments, and the possible interdependencies among them. A broadened examination of these factors at diverse local contexts can contribute to the improvement and extension of multi-level policy enablers and their upscaling globally. Considering the changing needs and trends with the Covid-19 pandemic, it is essential to investigate and update the policy fields regularly. The evidence-based results deduced from this study can further inform future policies at multiple-levels that will leverage and scale up circular actions through heritage adaptive reuse.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The raw datasets deposited are publicly available on the official website of the CLIC H2020 project (<https://www.clicproject.eu/>, accessed on 10 December 2019) under the file “Deliverable 1.5. Report on Barriers and Bottlenecks”.

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