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Culture, capital or carbon? Understanding priorities in adaptive reuse

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Abstract

Purpose – Adaptive reuse is a key strategy in the transition towards a circular built environment, offering social, financial, cultural and environmental benefits. The abundance of vacant buildings found in our cities demonstrates that this strategy is not yet used to its maximum potential. A systematic overview and categorisation of the drivers and barriers influencing the adoption of adaptive reuse is necessary and it can contribute to better decision-making.

Design/methodology/approach – A systematic literature review was conducted to identify the drivers and barriers of adaptive reuse. From the initial database of 13,495 publications, 45 were included in the final analysis. A thematic analysis revealed recurring concepts, which were classified into seven categories: regulatory, financial, environmental, cultural, social, building-related and stakeholders-related factors.

Findings – The most significant barriers to adaptive reuse are building codes, the building's physical limitations to adaptation and a lack of skilled workers. The most critical drivers are instead the desire for heritage conservation, the opportunity to revitalise the larger surrounding area, favourable legislations and regulations, and fundings and financial incentives. Despite increasing awareness of the environmental benefits of adaptive reuse, environmental factors are found to be less compelling than cultural and financial factors.

Originality/value – This article provides a systematic synthesis of the drivers and barriers of adaptive reuse and introduces the "stakeholders-related factors" category. This addition highlights how the complexity of adaptive reuse projects is amplified by the involvement of multiple actors with diverse values and priorities. Further research on stakeholder dynamics could offer valuable insights into how these interactions shape adaptive reuse outcomes.

Keywords Adaptive reuse, Barriers, Building conversion, Drivers, Systematic literature review

Paper type Literature review

Introduction

The European building and construction sector is responsible for 34% of energy-related greenhouse gas emissions (European Environment Agency, 2024), 38.4% of waste generation (Eurostat, 2022) and 50% of material extraction (European Commission, 2020). Therefore, it plays a key role in reaching climate neutrality by 2050. The decarbonisation of the building and construction sector is a complex challenge, but it can be tackled holistically by transitioning towards a circular economy.

Circularity in the built environment can be primarily achieved by implementing the well-known R-strategies. Reuse is one of the most desirable R-strategies, and it can be implemented at various scales: from materials and components reuse, to the reuse of entire buildings. Reusing existing buildings should be the first circular strategy to consider (Tarpio *et al.*, 2022), as it allows to retain materials and components in their most useful forms (Gillott *et al.*, 2022) while reducing the environmental footprint of the built environment (Bullen, 2007; Wilkinson *et al.*, 2014).

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Adaptive reuse refers to the change of use of an existing building (Wilkinson *et al*., 2014), meaning the retention of as much of the original structure and fabric as possible while introducing a new use. It is triggered by premature functional obsolescence: the constantly changing market demands and user needs impact the usefulness and effectiveness of buildings, resulting in their declining commercial and operating performance (Bullen and Love, 2010). A possible response to this declining performance, and an alternative to demolition and redevelopment, is the optimisation of the residual utility of existing buildings through adaptive reuse. It is considered a more effective circular strategy compared to using obsolete buildings as material mines for new projects (Conejos *et al*., 2013; Langston *et al*., 2008) as it allows buildings to respond to changing requirements, and reduces the need for demolition and new construction, which are associated with higher lifecycle costs (Alba-Rodríguez *et al*., 2017; Hasik *et al*., 2019; Nydahl *et al*., 2022; Tsikos and Poli, 2024). This strategy is regarded as a combination of sustainable development efforts and conservation efforts, being often applied to historical buildings with the goal of pursuing social and cultural benefits such as heritage preservation (Conejos *et al*., 2016).

Previous studies have considered the factors influencing the implementation of adaptive reuse from the point of view of various stakeholders, such as investors (Fang and Wu, 2025), construction professionals (Aliu *et al*., 2025), and municipal officers and developers (Sanchaniya *et al*., 2025). These studies are, however, limited in scale and scope, focusing on either specific case studies or on a limited geographic area. Further, a study by Vafaie *et al*. (2023) addressed the success factors of the adaptive reuse of heritage buildings. It is not unusual for drivers and success factors to overlap (Ahmad, 2023), as the motivations for starting an adaptive reuse project may be influenced by the awareness of critical conditions required to successfully complete such a project. In the context of the current study, drivers are defined as all those factors that influence or motivate stakeholders in opting for adaptive reuse as an alternative to building demolition or abandonment, whereas success factors enable the successful outcomes of said projects. While success factors have been systematically addressed before (Vafaie *et al*., 2023), there is a lack of a systematic overview and categorisation of the drivers and barriers of adaptive reuse. The aim of this article is to understand the factors affecting adaptive reuse decisions, thus contributing to better decision-making in practice and paving the way for further research in the decision-making process. Accordingly, this research employs a systematic literature review approach to answer the following question: *What are the main drivers and barriers of adaptive reuse?*

Methodology

A systematic literature review was conducted to identify the barriers and drivers of adaptive reuse. The PRISMA reporting guidelines were followed to identify, select, appraise and synthesise relevant studies to ensure a transparent, complete and accurate account of all review stages. The PRISMA statement (Page *et al*., 2021) consists of a checklist of items and sub-items that should be addressed in a systematic literature review; the following methodology sections follow the steps delineated in the checklist. Each step was reviewed by all authors to mitigate the risk of bias.

Eligibility criteria, information sources and search strategy

A systematic search of two academic databases, Web of Science and Scopus, was conducted to identify relevant studies. The search queries used in this study are divided into three sections: the first section includes terms related to drivers and barriers, the second section is dedicated to adaptive reuse and the third section is used to retrieve data regarding the built environment. These terms were interrelated using Boolean operators, as shown in Figure 1. The search was

limited to articles, reviews, conference papers and book chapters published in English between 2000 and 2026.

Selection process

To identify relevant studies for this review, a selection process in three sequential phases was followed: title screening, abstract screening and full-text screening (see Figure 2). A set of inclusion and exclusion criteria (see Table 1) was applied in all three selection phases, leading from an initial database of 13,495 records to a final database of 45 records. The inclusion and exclusion criteria were chosen with the goal of identifying papers dealing with the adaptation of existing buildings. Some papers that did not meet the inclusion criteria and were excluded from the critical analysis still have valuable input to this article and are therefore included in the reference list.

Data collection process

The data analysis process started by identifying the authors, publication years, titles, methodologies and findings of the selected studies. To consider the findings in the appropriate setting, the geographical context of the studies and the subject areas of the journals in which the studies were published have been examined.

An iterative thematic analysis was performed following the guidance provided by Wolfswinkel *et al.* (2013) in their "Stage 4 – Analyse". Initially, each paper was thoroughly read and any insights deemed relevant to the study's scope and aim were highlighted. The highlighted excerpts were then re-read to identify any recurring concepts: this is the "open coding" step, where concepts were organised using codes, such as "lack of funding" and "reduced project costs". Subsequent phases of data exploration and collection enriched and solidified the codes. Through axial coding, connections between codes were highlighted, thus forming larger categories such as "financial factors". The final step, selective coding, was used to consolidate and refine the previously identified categories.

Throughout all coding steps, the identified categories were regularly compared, related and linked with each other and the studied papers. This activity is known as "comparative analysis" (Wolfswinkel *et al*., 2013), and its goal is to continuously improve and refine the identified concepts, categories and links among them.

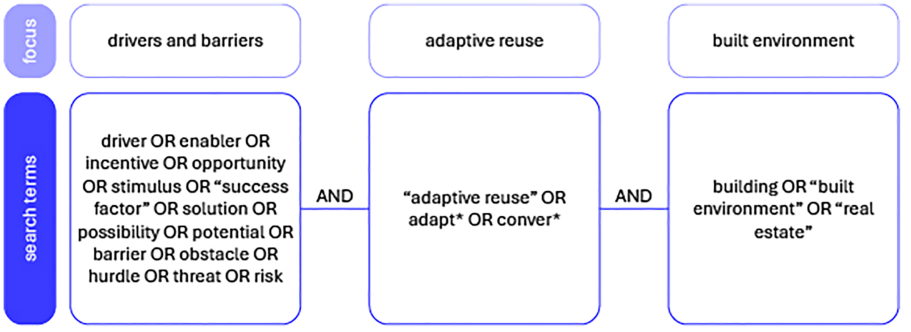

Figure 1. Search term. Source: Authors' own work

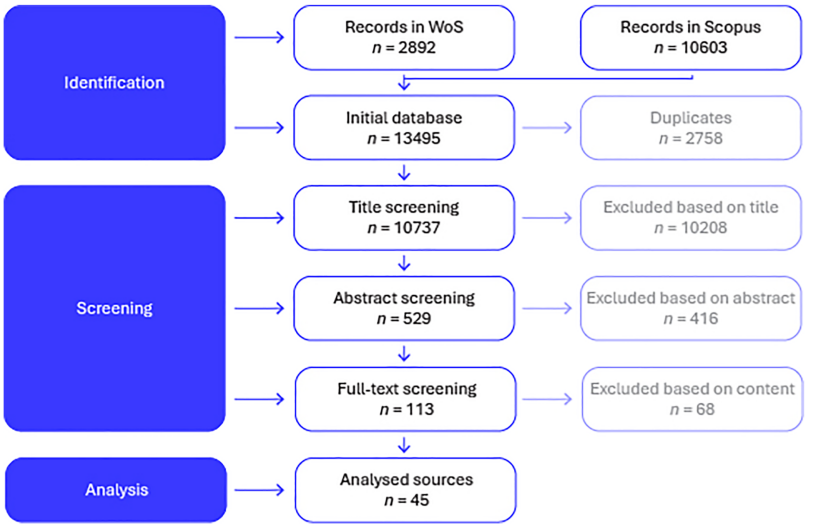

Figure 2. Selection process. Source: Authors' own work

Table 1. Inclusion and exclusion criteria

	Inclusion	*Exclusion*
Field	Built environment	Other fields
Subject	Adaptive reuse, building conversion, building adaptability	Design for disassembly, material and component reuse, climate change adaptation, energy efficiency
SCALE	Building scale	District, neighbourhood, urban scale, infrastructure

Source(s): Authors' own work

Results

Descriptive data

The studies considered for this review are published in a variety of different journals, belonging to seven different subject areas as defined by SCImago Journal and Country Rank: engineering; energy; economics, econometrics and finance; social sciences; arts and humanities; environmental sciences; business, management and accounting. The studies employ different, and in some cases multiple, methodologies. The four most used methodologies are: case study, interview, survey and workshop. Qualitative methods are clearly favoured when the drivers and barriers of adaptive reuse are investigated: indeed, qualitative approaches can facilitate the understanding of complex interactions and the extrapolation of findings to similar situations (Daly *et al.*, 2013). No study conducts a systematic literature review. The studies focus on different geographical contexts, either considering one specific country or multiple countries at a time. Most of the studies focused on the European context, which can be explained by the large number of research projects on adaptive reuse receiving funding under Horizon 2020 (Lanz and Pendlebury, 2022).

Factors influencing adaptive reuse

The literature review revealed fifteen barriers and twenty-one drivers that were recurrently mentioned in at least four studies (see Table 2). These factors are grouped into seven

Table 2. Factors influencing adaptive reuse, as identified in each study. The codes used to identify each factor refer to it being a barrier (B) or driver (D). Further, each category is identified by a letter: regulatory (R), financial (F), environmental (E), social (S), cultural (C), building-related (B) and stakeholders related (T). Table continues on the next page

	Regulatory					Financial						Environmental					Cultural				Social			Building								Stakeholders				
	B_ R1	B_ R2	B_ R3	B_ R4	D_ R1	B_ F1	B_ F2	D_ F1	D_ F2	D_ F3	D_ F4	B_ E1	D_ E1	D_ E2	D_ E3	D_ E4	B_ C1	D_ C1	D_ C2	D_ C3	D_ S1	D_ S2	D_ S3	B_ B1	B_ B2	B_ B3	B_ B4	D_ B1	D_ B2	D_ B3	D_ B4	B_ T1	B_ T2	B_ T3	D_ T1	D_ T2
Aigwi *et al.* (2022)									x	x	x							x	x	x			x							X					
Aigwi *et al.* (2026)	x							x															x									x		x		x
Aliu *et al.* (2025)					x			x	x	x			x	x	x			x	x	x															
Baker *et al.* (2017)		X			X			X									X	X		X					X	X	X								
Baker *et al.* (2021)								X				X						X	X																	
Barbaro *et al.* (2022)																					X									X					
Bullen and Love (2011)	X	X	X			X	X	X	X					X	X	X		X	X			X			X	X		X		X		X			
Canelas *et al.* (2022)	X				X					X									X											X			X		
Conejos *et al.* (2016)		X		X								X												X	X						X				
De Silva *et al.* (2019)		X	X				X					X		X	X				X					X	X			X			X		x		
De Souza Rocha *et al.* (2024)	X	X			X																			X	X						X	X			
Eray *et al.* (2019)																																X			
Fang and Wu (2025)		X		X									X					X	X				X					X			X				
Gillott *et al.* (2022)			X		X		X		X	X			X	X		X								X	X						x		X	X	
Gravagnuolo *et al.* (2025)	X			X														X	X									X							
Hamida *et al.* (2023b)	X				X	X																		X	X						X		X	X	
Heath (2001)		x	x		X	x		X			X										X	X			X		X		X	X					
Ikiz Kaya *et al.* (2021a)					X			X										X																	
Ikiz Kaya *et al.* (2021b)					X			X		X				X	X	X		X					X								X				X
Ikiz Kaya *et al.* (2025)		x	x		X	X		X									X															X			
Karabeyeser Bakan *et al.* (2025)				X								X						X		X															
Kyrö *et al.* (2024)		X		X	X		X		X					X	X	X		X	X	X				X	X	X					X			X	
Langston *et al.* (2008)		X							X					X	X			X	X						X			X							
Langston (2011)		X					X		X	X		X	X	X	X			X	X			X														
Mohamed and Alauddin (2023)		x	x							x								x							x	x				x					
Nakanishi *et al.* (2020)																					X	X	x						X						
Oke *et al.* (2025)																								x		x					x	x			
Olivadese *et al.* (2017)	X	X			X																								X						
Owojori *et al.* (2024)													X	X				X	X				X												
Philokyprou (2014)				X														X	X	X															
Pintossi *et al.* (2021a)	x		x			x	x																								x	x			
Pintossi *et al.* (2021b)																	x							x								x	x		
Remøy and Van Der Voordt (2014)		x	x				x													x				x	x	x	x			x		x		x	
Remøy and Van Der Voordt (2014)		X	X	x					X		X			X	X	X			X		X	X		X	X	X	X		X	X			X		

(*continued*)

Table 2. Continued

	Regulatory					Financial						Environmental					Cultural		Social				Building								Stakeholders				
	B_ R1	B_ R2	B_ R3	B_ R4	D_ R1	B_ F1	B_ F2	D_ F1	D_ F2	D_ F3	D_ F4	B_ E1	D_ E1	D_ E2	D_ E3	D_ E4	B_ C1	D_ C1	D_ C2	D_ C3	D_ S1	D_ S2	D_ S3	B_ B1	B_ B2	B_ B3	B_ B4	D_ B1	D_ B2	D_ B3	D_ B4	B_ T1	B_ T2	B_ T3	D_ T1	D_ T2
Remøy and Wilkinson (2012)				x	X					X									X	X		X							X	X						
Remøy and Wilkinson (2017)		x	x					X			X					X					X	X		X	X		X	X	X	X		X				
Remøy *et al.* (2011)		X	X																						X		X								
Saifi *et al.* (2025)						X		X	X									X				X	X		X										
Sanchaniya *et al.* (2025)		x	x				x	x								x							x			x	x					x			x
Savoie *et al.* (2025)		x			x															x						x				x	x		x	x
Tan *et al.* (2018)		x					x		x					x		x						x					x	x							
Volzone *et al.* (2025)	x	x		x		x												x	x				x												x
Vuscan and Muntean (2025)	X	X					X	X	X					X	X			X		X	X	X			X	X	X			X				X	
Wilkinson *et al.* (2014)		x		x			x	x	x	x		x	x	x	x	x		x				x			x	x	x				x				
Zeadat (2024)				X			X										X															X	X			
Total	10	23	12	11	14	12	6	14	12	9	4	10	6	13	10	9	3	20	16	10	6	11	9	11	18	11	10	6	5	11	5	14	7	7	6	5

Source(s): Authors' own work

categories: regulatory, financial, environmental, cultural, social, building-related and stakeholders related. The next sections will go through each category, illustrating the barriers and drivers in each of them. An overview of the factors identified in this systematic literature review and of the studies addressing them is provided in Appendix 1.

Regulatory factors

Regulatory factors play a key role in adaptive reuse projects: they include legislations, building codes, zoning and planning regulations, and the listed status of a building.

Inadequate or rigid legislations are recognised as a legal barrier to adaptive reuse, both when they actively challenge adaptation and when their lack of clarity regarding circularity inhibits the implementation of adaptive reuse (Aigwi *et al*., 2026; De Souza Rocha *et al*., 2024; Gravagnuolo *et al*., 2025) and of circular strategies in general (Hamida *et al*., 2023b). The inconsistent application of regulations also makes adaptive reuse an unappealing solution (Bullen and Love, 2011). On the other hand, favourable legislations are seen as an important driver of adaptive reuse: new and flexible regulation frameworks are fundamental to encourage the uptake of adaptive reuse practices (Aliu *et al*., 2025; Canelas *et al*., 2022; De Souza Rocha *et al*., 2024; Kyrö *et al*., 2024), and can drive the implementation of circular strategies when the industry alone is not able to (Heath, 2001; Olivadese *et al*., 2017).

Building codes and zoning plans pose a significant legal obstacle to adaptive reuse. Restrictive zoning plans may impede change in building use (Pintossi *et al*., 2021; Remøy and Van Der Voordt, 2014); allowing for changes in the zoning plan, on the other hand, would increase the adaptive potential of buildings (Remøy *et al*., 2011). In most countries, building codes differentiate between building types, and have different requirements for fire safety, disability accessibility, daylight levels and energy efficiency depending on the building function (De Souza Rocha *et al*., 2024; Remøy and Van Der Voordt, 2014; Remøy and Wilkinson, 2017). Older buildings are often not on par with these requirements (Baker *et al*., 2017; Langston *et al*., 2008; Remøy and Van Der Voordt, 2014) and may present the added challenge of hazardous materials (Savoie *et al*., 2025); undertaking the necessary alteration to meet the required standards can lead to high costs that make adaptation financially undesirable (Bullen and Love, 2011). When it comes to heritage buildings, the necessity to meet modern standards may clash with the desire to keep the original aesthetics and atmosphere of the building (Conejos *et al*., 2016; Kyrö *et al*., 2024).

The listed or non-listed status of a building is also considered as an important regulatory barrier: indeed, listed buildings may be subject to restrictive conservation rules that challenge adaptation and limit the amount of changes that the building can go through (Conejos *et al*., 2016; Fang and Wu, 2025; Gravagnuolo *et al*., 2025; Karabeyeser Bakan *et al*., 2025; Kyrö *et al*., 2024), while non-listed building, such as many industrial buildings, are not protected against demolition (Wilkinson *et al*., 2014).

Financial factors

From an economic perspective, funding and subsidies play a vital role in promoting adaptive reuse as a more desirable option. The lack of incentives makes adaptive reuse unappealing (Bullen and Love, 2011; Ikiz Kaya *et al*., 2025; Pintossi *et al*., 2021), while the financial support by governments and public organisations is key, and can also have a snowballing positive effect on surrounding properties (Bullen and Love, 2011). National or international subsidies, public funding and market-based incentives are considered to be an extremely important driver of adaptive reuse (Baker *et al*., 2017; Ikiz Kaya *et al*., 2021b, 2025; Remøy and Wilkinson, 2017; Vuscan and Muntean, 2025), and they are crucial both in the case of heritage buildings (Saifi *et al*., 2025) and of structures that are considered less desirable for adaptation such as offices and commercial buildings (Vuscan and Muntean, 2025).

Several studies (Bullen and Love, 2011; Gillott *et al*., 2022; Kyrö *et al*., 2024; Langston, 2011; Langston *et al*., 2008; Remøy and Van Der Voordt, 2014; Saifi *et al*., 2025; Vuscan and

Muntean, 2025) agree that the reduced project costs associated with adaptive reuse in comparison to new build, favour the former. Adaptive reuse is therefore recognised as a quicker and more cost-effective alternative, with the added benefit of not only preserving, but increasing the value of the reused asset (Canelas *et al*., 2022; Gillott *et al*., 2022; Remøy and Wilkinson, 2012) when the new proposed function delivers a higher return on investment compared to new build (Langston, 2011). Still, the possibility of increasing the asset value at a reduced cost clashes with the uncertainties tied to the case-by-case variability characterising adaptive reuse projects (Gillott *et al*., 2022; Kyrö *et al*., 2024; Langston, 2011; Vuscan and Muntean, 2025; Zeadat, 2024). For this reason, investment uncertainty and commercial risk are considered as key barriers to adaptive reuse.

The final financial driving factor emerging from the literature review is the rent gap between old and new function. While this topic is only addressed by four studies, three of them (Heath, 2001; Remøy and Van Der Voordt, 2014; Remøy and Wilkinson, 2017) focus on office-to-housing conversion, clarifying that this driver plays a crucial role in this specific type of adaptation.

Environmental factors

The environmental sustainability of adaptive reuse compared to new build can motivate building adaptation. Avoiding the generation of waste and the release of embodied carbon emissions that would result from demolition is recognised as a key environmental benefit of adaptive reuse (Aliu *et al*., 2025; Bullen and Love, 2011; De Silva *et al*., 2019; Langston *et al*., 2008; Remøy and Van Der Voordt, 2014). Building adaptation also implies a smaller consumption of materials, energy and transport during construction compared to new build (Bullen and Love, 2011; Langston, 2011; Remøy and Van Der Voordt, 2014), therefore causing less environmental pollution (De Silva *et al*., 2019; Owojori *et al*., 2024) and limiting the construction costs (Langston *et al*., 2008).

The physical characteristics of older buildings can pose a challenge to meeting modern sustainability criteria (De Silva *et al*., 2019): this can pose a barrier to adaptive reuse when the costs and the level of intervention required are too high. On top of this, when the building's form or its heritage status prevents the achievement of a high energy rating, it can perform poorly in the current rating systems (Conejos *et al*., 2016). But it also offers an opportunity to address this "environmental gap" by implementing energy-efficiency measures during the adaptation process (Bullen and Love, 2011; Gillott *et al*., 2022; Remøy and Van Der Voordt, 2014). However, the potential to improve an existing building's energy efficiency is dependent on the building's physical characteristics and on the proposed new function (Baker *et al*., 2021; Conejos *et al*., 2016; Karabeyeser Bakan *et al*., 2025; Langston, 2011).

A final environmental driver emerging from this research is the opportunity offered by adaptive reuse to effectively answer to changing demands while avoiding new construction, thus limiting urban sprawl and land consumption (Fang and Wu, 2025; Gillott *et al*., 2022; Langston, 2011). This factor is also related to the opportunity of using existing infrastructure (Fang and Wu, 2025), resulting in higher urban density and limiting the biodiversity loss and soil erosion caused by new developments (Owojori *et al*., 2024).

Cultural factors

Cultural drivers are crucial to ensure the successful adaptation of heritage buildings, but they also play an important role in motivating the reuse of non-heritage buildings.

The desire for heritage conservation often drives the decision to reuse vacant buildings (Baker *et al*., 2017; Fang and Wu, 2025; Langston, 2011; Langston *et al*., 2008; Saifi *et al*., 2025; Vuscan and Muntean, 2025), as they are considered vital contributors to the culture and history of a community (Langston *et al*., 2008; Owojori *et al*., 2024). Heritage conservation not only ensures the building's architectural integrity, which is at risk in the case of prolonged vacancy (Philokyprou, 2014), but it can also decrease the negative social impact of poorly

maintained or derelict buildings (De Silva *et al*., 2019; Langston *et al*., 2008; Remøy and Wilkinson, 2012). The adaptive reuse of a single significant building can often also lead to the revitalisation of the surrounding area (Aliu *et al*., 2025; Fang and Wu, 2025; Gravagnuolo *et al*., 2025; Owojori *et al*., 2024; Philokyprou, 2014; Remøy and Van Der Voordt, 2014) and contribute to place-making thanks to their distinctive character (Baker *et al*., 2021). This revitalisation through preservation (Ikiz Kaya *et al*., 2021b; Langston, 2011; Volzone *et al*., 2025) is largely seen in a positive light, with studies praising the arrival of different social groups in previously run-down neighbourhoods (Philokyprou, 2014) and the reduction in crimes and unsocial behaviours resulting from higher living standards (Langston *et al*., 2008). The discussion of potential negative impacts of revitalisation, such as gentrification, is absent from the papers analysed in this study.

Buildings with bold aesthetic features, such as industrial buildings, are often selected for adaptation (Karabeyeser Bakan *et al*., 2025; Remøy and Wilkinson, 2012) as they attract developers and designers looking for unique spaces (Vuscan and Muntean, 2025). The desire to preserve buildings of symbolic significance and to retain their character has also emerged as an important driver of adaptive reuse (Aliu *et al*., 2025; Philokyprou, 2014).

One cultural barrier was also highlighted, namely the lack of awareness of heritage and cultural values (Ikiz Kaya *et al*., 2025; Zeadat, 2024). Cultural and heritage values are intangible, and while it has been shown that they can be important drivers for the adaptation of buildings (Baker *et al*., 2017; Fang and Wu, 2025; Langston, 2011; Langston *et al*., 2008; Saifi *et al*., 2025; Vuscan and Muntean, 2025), they risk being seen as less important than other factors, such as the technical building features that can lead to successful adaptation (Baker *et al*., 2017).

Social factors

Social factors, such as changing demographics and user demands, emerge as key drivers specifically for the adaptation of non-heritage buildings. Demographic change, both in terms of population growth (Vuscan and Muntean, 2025) and decline (Barbaro *et al*., 2022; Nakanishi *et al*., 2020), combined with changes in household composition (Heath, 2001; Remøy and Van Der Voordt, 2014; Remøy and Wilkinson, 2017), is highlighted as catalysts for adaptive reuse. Demographic changes often come together with changing user demands, such as a renewed interest in city-centre living (Remøy and Van Der Voordt, 2014; Remøy and Wilkinson, 2017) and the desire to live closer to places of work (Heath, 2001), making certain building function redundant and creating the demand for new functions. Changing user attitudes may also stem from periods of crisis (Saifi *et al*., 2025), resulting in urgent demands for housing and healthcare. Adaptive reuse, being a quicker and more cost-effective alternative to traditional construction projects, can provide an answer to these demands.

Tackling social exclusion and promoting a lively community is seen as another social driver: the preservation of heritage buildings helps maintaining the community's cultural identity and memory (Aigwi *et al*., 2026; Fang and Wu, 2025; Saifi *et al*., 2025), while integrating new economic and educational enterprises in the adapted buildings can enhance the vitality and involvement of a community (Fang and Wu, 2025; Ikiz Kaya *et al*., 2021b; Nakanishi *et al*., 2020; Owojori *et al*., 2024; Saifi *et al*., 2025).

Building-related factors

While the previous sections focused on external factors, multiple building-related aspects affecting the feasibility of adaptive reuse emerged from this research as well. A reoccurring theme relates to the lack of data about the building (Conejos *et al*., 2016; De Silva *et al*., 2019; De Souza Rocha *et al*., 2024; Remøy and Van Der Voordt, 2014): unavailable, incomplete or inaccurate original construction drawings can pose major risks to the building's adaptation (Kyrö *et al*., 2024). This results in the need for a thorough inspection of the building (Remøy and Wilkinson, 2017), which can be costly and time consuming (Gillott *et al*., 2022), to verify

its material and structural quality (Gillott *et al*., 2022; Hamida *et al*., 2023b; Remøy and Wilkinson, 2017) and assess its adaptation potential.

Poor conditions and building's physical characteristics (Bullen and Love, 2011; Conejos *et al*., 2016; De Silva *et al*., 2019; Heath, 2001; Kyrö *et al*., 2024) undermine the adaptation potential: older buildings may be deteriorated to a point where the levels of maintenance and repair needed to suitably reuse the buildings are not economically viable (Baker *et al*., 2017; Bullen and Love, 2011). The building's layout and floor height may not be fitting for the new building function (De Souza Rocha *et al*., 2024; Remøy and Wilkinson, 2017), or the layout may be unsuitable for spatial reconfiguration (Hamida *et al*., 2023b; Vuscan and Muntean, 2025); unsatisfactory structural characteristics may also pose some limitations to adaptation (Gillott *et al*., 2022; Langston *et al*., 2008; Remøy and Van Der Voordt, 2014). On the other hand, buildings with strong structural integrity (Savoie *et al*., 2025) and that present a good degree of flexibility (Ikiz Kaya *et al*., 2021b) are prioritised for adaptation. This flexibility depends on the building's physical configuration, for example in terms of floor plans (Wilkinson *et al*., 2014) and façade (Aigwi *et al*., 2022),

The building's location may act as a critical barrier for its adaptation, as not all locations are suitable for every building function (Heath, 2001). For example, residential buildings benefit from easy access to public transport, amenities and services (Remøy and Wilkinson, 2017; Vuscan and Muntean, 2025), while locations with high levels of noise and poor air quality are deemed unsuitable for residential conversion (Remøy and Van Der Voordt, 2014; Vuscan and Muntean, 2025). The typology of the neighbouring buildings can also limit the adaptation potential. Indeed, industrial locations have been found undesirable for residential adaptation: the absence of other houses nearby can hinder adaptive reuse (Remøy and Van Der Voordt, 2014), as building owners may be reluctant to be the first ones to convert their buildings before similar non-industrial functions emerge in the neighbourhood (Tan *et al*., 2018).

The opportunity to ensure a longer functional lifespan, and the associated financial, social and environmental benefits, is recognised as a driver of adaptive reuse (Bullen and Love, 2011; De Silva *et al*., 2019; Fang and Wu, 2025; Gravagnuolo *et al*., 2025), though correctly estimating the residual service life of a building is problematic (Bullen and Love, 2011; Langston *et al*., 2008) Other studies highlight on the opportunity brought by functional obsolescence (Heath, 2001; Remøy and Van Der Voordt, 2014; Remøy and Wilkinson, 2017, 2012) to replace a redundant building function. Demographic change (Barbaro *et al*., 2022; Nakanishi *et al*., 2020; Vuscan and Muntean, 2025) and changing user demands (Remøy and Wilkinson, 2012, 2017; Vuscan and Muntean, 2025) result in vacant buildings, and prolonged vacancy erodes the buildings' value (Canelas *et al*., 2022). This can be an incentive for adapting vacant buildings and thus generating new income, increasing the financial feasibility of the project (Remøy and Van Der Voordt, 2014).

Stakeholders-related factors

The final factors affecting adaptive reuse relate to the stakeholders involved in such projects. Firstly, their relative novelty means that tradesmen often lack the necessary skills and technical expertise (Bullen and Love, 2011; Conejos *et al*., 2016; De Silva *et al*., 2019; De Souza Rocha *et al*., 2024; Fang and Wu, 2025; Remøy and Wilkinson, 2017) to tackle the complex solutions associated with building adaptation (Gillott *et al*., 2022; Hamida *et al*., 2023b; Kyrö *et al*., 2024; Zeadat, 2024). Coordination challenges (Eray *et al*., 2019; Zeadat, 2024) and poor communication (De Souza Rocha *et al*., 2024; Ikiz Kaya *et al*., 2025) between stakeholders are also highlighted as barriers to successful adaptive reuse projects.

The aversion to adaptive reuse, both at the corporate and at the individual level, also emerged as an obstacle (Canelas *et al*., 2022; De Silva *et al*., 2019). The owners' reluctance to adapt their buildings (Heath, 2001), the stakeholders' tendency to distrust innovative solutions and to prefer traditional business models (Hamida *et al*., 2023b), and the construction

industry's aversion to change (Gillott *et al*., 2022) can all be recognised as obstacles for adaptive reuse.

On the other hand, having a knowledgeable and collaborative team is of critical importance: shared ambitions and goals (Kyrö *et al*., 2024), a knowledgeable team (Gillott *et al*., 2022) and a solid interdisciplinary collaboration between stakeholders (Hamida *et al*., 2023b; Vuscan and Muntean, 2025) are essential to realise the full potential of adaptive reuse. Moreover, non-professional stakeholders should not be forgotten in adaptive reuse projects: involving the local community and residents in the decision-making process fosters inclusivity and a sense of ownership of the project (Ikiz Kaya *et al*., 2021b; Savoie *et al*., 2025; Volzone *et al*., 2025), contributing to a successful building adaptation.

Discussion

This study revealed that the barriers to adaptive reuse most mentioned in the literature are building codes (23 out of 45 publications), the building's physical limitations (18/45) to adaptation and a lack of skilled workers (15/45). Counteracting these barriers are some critical drivers, of which the most commonly addressed are the desire for heritage conservation (20 out of 45 publications), the opportunity to revitalise the larger surrounding area (16/45), favourable legislations and regulations (14/45), and funding and financial incentives (14/45). Clearly, some of these factors act more on a conceptual level (such as the desire for heritage conservation) while others are more operational (such as compatibility with building codes). This same distinction between conceptual and operational factors is employed by a previous study (Vafaie *et al*., 2023), which considers the success factors of heritage adaptive reuse projects: here, some factors defined as "drivers" in the present studies are instead presented as "success factors". Conceptual factors can be understood to be more intangible and qualitative in nature, while "operational" factors are tangible and quantitative. Thus, the path that leads to adaptive reuse decisions is affected by factors that act on different levels, making it hard to compare the benefits and drawbacks of building adaptation, and increasing the complexity of such projects.

An important insight emerging from this study is that heritage and cultural drivers are typically stronger than environmental ones (Baker *et al*., 2021; Gillott *et al*., 2022; Gravagnuolo *et al*., 2025; Ikiz Kaya *et al*., 2021a; Vuscan and Muntean, 2025). The limited emphasis on the environmental aspects of adaptive reuse is particularly apparent in the case of heritage buildings, where conservation is the prime concern and the importance of environmental performance is often not recognised (Yung and Chan, 2012). Economic considerations, in the form of return on capital investment and increasing asset value, are also favoured over environmental concerns (Gillott *et al*., 2022; Remøy and Wilkinson, 2017). This misalignment between the awareness of the potential of adaptive reuse to decrease the carbon footprint of construction activities (Aliu *et al*., 2025) and the relative weakness of environmental drivers can be solved through regulatory interventions, for example in the form of tax incentives (Baker *et al*., 2021) and policies demanding a circular approach to construction projects (De Souza Rocha *et al*., 2024).

Conclusion

The primary contribution of this study is the comprehensive identification and categorisation of the drivers and barriers of adaptive reuse as described in the existing literature. Despite the increasing interest in adaptive reuse, which is reflected in the growing number of papers on this topic (Aigwi *et al*., 2023; Hamida *et al*., 2023a; Vafaie *et al*., 2023; Van Laar *et al*., 2024), and the role that this strategy can play in the transition towards a circular built environment, no literature review currently exists that systematically examines the factors working in favour, or against, building adaptation. Therefore, this study aimed to provide a comprehensive overview of these drivers and barriers, and to identify opportunities for future research.

A total of fifteen barriers and twenty-one drivers emerged from the systematic literature review. These were classified into seven categories: (1) regulatory, (2) financial, (3) environmental, (4) cultural, (5) social, (6) building-related and (7) stakeholders-related. Stakeholders-related factors as a category influencing adaptive reuse were not previously separated. The introduction of this new class of factors influencing adaptive reuse outcomes reflects how the inherent complexity of adaptive reuse projects is magnified by the involvement of many stakeholders, each with different ambitions and priorities (Aigwi *et al*., 2019; Arfa *et al*., 2024). Indeed, different actors hold different beliefs and opinions (Mısırlısoy and Günçe, 2016), and these influence their views on the barriers and drivers of adaptive reuse. Further research on this topic, adopting a stakeholders perspective, could offer valuable insights regarding how the divergent priorities held by different stakeholders involved in the decision-making process shape the outcomes of adaptive reuse projects.

Moreover, despite the growing awareness of the environmental benefits of adaptive reuse, environmental factors are found to be less compelling than both cultural and financial ones. Therefore, more research on the environmental impact of adaptive reuse would be beneficial to strengthen the environmental argument for building adaptation.

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Supplementary material

The supplementary material for this article can be found online.

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