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STAR (Sustainable Temporary Adaptive Reuse) Toolkit: Innovation for Value Creation in Commercial Property

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Abstract

The Covid pandemic has affected society in many ways. In the built environment, it has impacted how buildings are used and by whom. These changes have affected market behaviours as owners look to reposition assets and meet altered demand paradigms. Changes to work praxis following Covid, particularly working from home (WFH), have affected commercial office values in central business district (CBD) markets. This has resulted from companies needing less space and taking advantage of discounts on higher-quality office space. With incentives increasing and rental growth stagnating due to decreased demand, particularly in lower-grade assets, capital values have declined, and the investment market has slowed. In response to these shifts, efforts to rejuvenate the commercial property sector in Australia include the development of the Sustainable Temporary Adaptive Reuse (STAR) toolkit. The STAR toolkit developed a series of resources that enable owners to assess the short-term reuse potential of an asset. The aim of the toolkit is to reduce vacancy and drive uplifts in rental income, through temporary adaptive reuse. This article demonstrates the capacity of the STAR toolkit to help reposition an asset by sustainably reusing some, or all, of the vacant space. The approach provides a strategy for owners to improve usage and rejuvenate assets, creating value uplifts and income stream security in challenging market conditions.

Keywords

adaptive reuse; central business district; Covid; vacancy rates

1. Introduction

The Covid pandemic began in Wuhan, China, in December 2019. Soon after, it spread through Asia and globally by early 2020. The World Health Organisation (WHO) declared the outbreak a public health

emergency of international concern (PHEIC) on 30th January 2020 and assessed the outbreak as a pandemic on 11th March 2020 (Ghebreyesus, 2020). Many countries, including Australia, went into lockdown, whereby people remained at home. In late 2021, Australian state borders started reopening, and by September 2022, Australia ended daily reporting of Covid cases. On the 5th of May 2023, the WHO downgraded Covid from being a global health emergency.

Due to advances in technology, office employees could work from home during the lockdown, many preferring this way of working. Businesses continued functioning and, when employers asked staff to return to the office, this was met with resistance. A compromise was reached for many, with a hybrid of working from home (WFH) and the office. This reduced traffic in the central business districts (CBDs) of Australian capital cities has impacted demand for office space and supporting retail spaces. CBDs, commonly referred to as downtown, are known to be the epicentre of economic and professional life, characterised by the concentration of business headquarters, retail, food and beverage, and transportation infrastructure (Murphy, 2017).

Questions have arisen around what alternatives there are to promote innovation and new uses in existing commercial property, and how we can measure the value created. The value of an asset is primarily expressed monetarily (Morri & Benedetto, 2019). Value can be defined from the customer's point of view as well as the company's (Lackéus, 2018). In this research, the intention is to understand how temporary adaptive reuse can add value through increased income to property owners and value creation through improved utilisation.

This article explores the changing demand for office buildings in Australian state capitals, pre- and post-Covid, focused on B & C grade stock. The article reviews the Sustainable Temporary Adaptive Reuse (STAR) Toolkit Project, funded by the City of Sydney from 2022 to 2024. This research encompasses Melbourne and Brisbane to allow for comparative analysis. The STAR toolkit, through a series of workshops, co-developed seven tools with industry and community stakeholders. The project aimed to develop resources to support sustainable temporary reuse of underused and vacant buildings. The tools developed and analysed in this article are the first six tools (see Table 2; Tool 7 is a video suite and thus excluded). This is a qualitative research undertaking, comprising thematic analysis to identify patterns of value creation through review of each of the tools in the toolkit.

2. Covid, Changing Dynamics, and the STAR Toolkit

Demand for property, particularly commercial office, is shifting post-Covid. This is impacting value, tenancy covenants, usage patterns, and market performance (Gupta et al., 2022). These changes affect owners, developers, and occupiers. Changing demand profiles are increasing the level of portfolio risk that can impact the retirement savings of Australians who are invested in commercial assets through their superannuation (Robertson, 2020).

The rigidity of the commercial office model was highlighted during, and following, Covid. Deficiencies include little flexibility to adapt stock to new demand profiles and an inability to offer responsive layouts and changed space formats sought by tenants (Barath & Schmidt, 2022). This was highlighted in Australia by low sub-lease vacancy in state capitals post-Covid (Property Council of Australia, 2025). Covid revealed weaknesses in the economy and in the built environment, particularly office markets. Gaps in knowledge became evident; managers and owners lacked the capacity for quick, adaptive responses to rapid change in

the office work dynamic (Hou et al., 2021). The office sector has faced headwinds, typified by low rental growth and high vacancies since (Harley, 2025).

Changed commercial property use impacts CBDs, both directly and indirectly. Fiorentino (2024) asserts that the Covid "crisis" caused "long-term structural, socioeconomic and political shifts" that are impacting the way we live and work in cities. As work preferences and modalities change, the use of office-adjacent retail, particularly food retail, is shifting, and large swathes of CBD areas have become more, or less, popular, particularly during office hours. Certain areas are much less frequented, as certain days become favourable for WFH (Australian Institute of Health and Welfare, 2024).

Covid impacts are wide-ranging in CBD areas with multiple property classes interacting, affecting structure, footfall and traffic flows, resident population behaviours, and consumption patterns (Hermann et al., 2021). So far, councils have used retailing as a tool to rejuvenate CBDs; however, we believe that the adoption of short-term tenancies and the application of the STAR toolkit could enable unutilised or underutilised office space to play a larger role in the rejuvenation and adaptation of CBD areas to a "new normal" (McKinsey, 2023). This article explains how the STAR toolkit can be applied directly to a building and can have a broader positive impact.

As we move into a new era of property usage, illustrated by the decline of the office-working model and an increase in WFH, and flexible working arrangements proliferating post-Covid (Vij et al., 2025), the momentum to adjust how commercial property, particularly offices, are used, is growing. The need to optimize assets must drive more and better adaptive reuse approaches (Oladiran et al., 2023). As many office buildings are now less populated with workers, and staff are fulfilling their roles more efficiently with a lesser space requirement (Fox, 2023), there is capacity to deliver benefit to multiple stakeholders if office space that is underutilised is adaptively reused.

Building owners can capitalize on shifting work models and differing staffing arrangements influencing changing property uses, which can lead to more productive and efficient use of assets long term (Parker, 2020). Increasingly, sustainability is a major tenet for building owners and occupiers, and a "reuse" approach is preferred to a "re-develop" one, as this aligns with important environmental, social, and governance (ESG) imperatives (Ramírez Pacheco et al., 2020). Stakeholders can benefit from adaptive reuse assessment tools with respect to practical knowledge gain and how this approach can dovetail with sustainability in a sector increasingly aligned with corporate social responsibility (CSR), and looking for ways to meet these objectives (Škare & Golja, 2013).

3. The Evolving Market in Brisbane, Melbourne, and Sydney

Tracking Australia's commercial office market over the last decade shows peaks and troughs; from 2015 to 2025, the market was most severely impacted by Covid in 2020–2021 (Bessant & Watts, 2021); however, following the initial shock of the pandemic, office markets have failed to recover (Lenaghan, 2024). Sustained, elevated vacancy figures feature most Australian CBD office markets. Data found in industry reports, such as Colliers' *Quarterly Asset Class Snapshots Q2 2025* (Henderson et al., 2025), provide metrics including net absorption and rental growth. See Table 1 for key metrics.

Table 1. Office market indicators—Sydney, Melbourne, and Brisbane (2019 & 2025).

Location and Grade	Net absorption (annual, sqm)		Net additions (annual, sqm)		Average gross face rent ($AUD)		Average incentive (%)		Yield	
	2019	2025 (Aug)	2019	2025 (Aug)	2019	2025 (Aug)	2019	2025 (Aug)	2019	2025 (Aug)
SYD Prime	33,446	99,704	−20,101	−12,587	1,326	1,546	17.5	36.2	4.62	6.03
SYD Sec	42,890	−43,172	−44,326	−59,937	962	1,145	19.5	35.3	5.25	7.19
MELB Prime	108,422	−64,031	−20,101	−42,330	680	718*	17.5	47	4.77	6.58
MELB Sec	−25,110	3,634	−44,326	−16,412	591	538*	19.5	47.9	5.55	7.46
BNE Prime	20,507	30,467	0	0	771	1,104	35.5	38.5	5.5	7.25
BNE Sec	13,632	−16,561	−31,723	−23,810	610	775	38.3	39.5	6	8.5

Notes: Sec = Secondary; * net face.

Continuing from a recovery in the early 2010s, after the global financial crisis, Australia's commercial office market showed momentum. As per Figure 1, rents across grades showed growth; by 2015, east coast capital city office vacancy rates were low (Brisbane 15.6%, Sydney 7.4%, and Melbourne 7.7%; Knight Frank, 2025a, 2025b). Yields at the end of 2015 were generally sub 6% (prime), a figure indicative of a strongly performing asset class. Interestingly, at that time, Melbourne's quoted yield range was 4.75–6.50%, while Sydney was

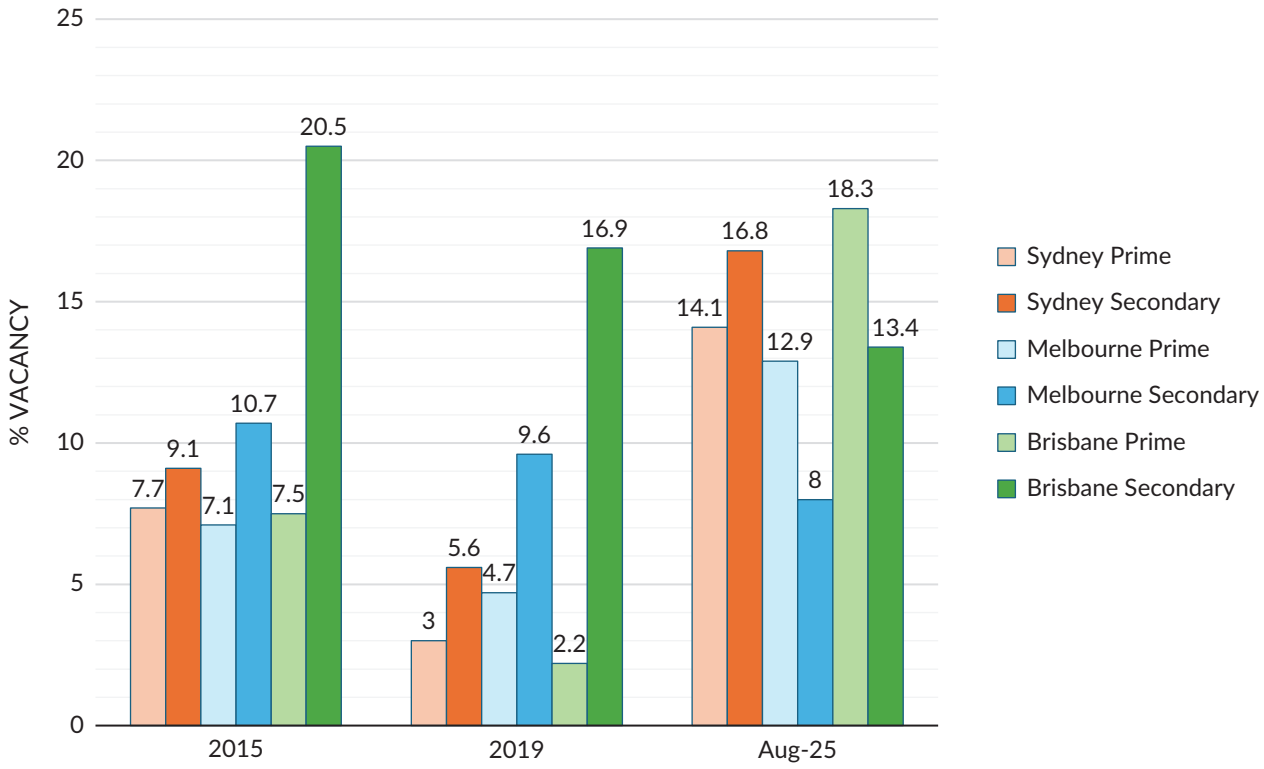

Figure 1. Prime and secondary commercial office vacancy over time—2015, 2019, and 2025. Sources: Knight Frank (2019a, 2019b, 2025a, 2025b).

5.50–6.75%, positioning Melbourne as the nation's best-performing office investment market, a position that has changed now (Kwan, 2024). From 2016 onward, the office markets of Brisbane (and Perth) were significantly underpinned by resource-sector growth and marked by construction commencements, high demand, and low supply (Property Council of Australia, 2025). The growth of the mining sector strengthened the office sector nationally, and economic strength could be attributed to the mining sector as positivity reverberated through the economy (Weldegiorgis et al., 2024).

Another key performance metric—supply—ballooned as new stock under construction and nearing completion came to market when demand was subdued. The Property Council of Australia notes that Melbourne has the largest pipeline nationally, with over 300,000 sqm coming online between 2025 and 2027 (Property Council of Australia, 2025), which will further exacerbate vacancy. Melbourne presents the most notable change from pre-Covid to post-Covid. The increase in the vacancy rates across both prime and secondary markets, the blow-out of incentives to be sitting at what is 50% in both markets, and clear softening in yields, particularly prime, shows the significance of the issues. As various metrics indicate, the Melbourne market was most heavily impacted and is widely considered a "basket case" (Lenaghan, 2024). The most recent data for Melbourne office space showed that prime vacancy has moved from 12.4% to 20% (Henderson et al., 2025). The Prime incentive at this time was 41%; this is now 47%, indicating the worsening situation in the market, even in quality, typically "safe" assets. This clearly indicates the applicability of the STAR toolkit outside of its formative market, Sydney.

The dynamics of Australian cities have changed, resulting in impacts on workers, visitors, and residents. By adaptively reusing a single asset and optimising available space, the benefit of STAR principals extends beyond just increasing worker and visitor populations; there is the real possibility to combat negative socioeconomic impacts that the weakened office market has caused (Maginn & Mortimer, 2020). An adaptively reused asset can revitalise an area, increase leasing demand or retail tenancy occupancy, and, in turn, drive footfall uplifts and "attractiveness" of an area for all city users (Fieger et al., 2023).

4. The STAR Concept and Value Creation

The STAR toolkit was a research project in response to the vacancy rates in commercial buildings post-Covid, in the Sydney CBD. As the interest in WFH grew, so too did the underutilisation of the offices and facilities in the CBD (Hensher et al., 2023). The toolkit was developed to address the sustainable temporary use of buildings to bring people back into the CBD, and to identify and discuss opportunities for doing this.

The stakeholders engaged throughout the process included industry experts, property owners, property designers, tenancy market specialists, experts in building codes and compliance, and council representatives, alongside the research team with their backgrounds in urban planning, building surveying, financial and asset management, and architectural science (Armstrong et al., 2024). To identify positive impacts that adaptive reuse provides, the social, environmental, and economic benefits were considered when identifying the different tools in the STAR toolkit (Armstrong et al., 2023), and stakeholders were asked to focus on the key social, economic, and environmental issues that needed to be addressed.

By opening commercial office buildings to even partial adaptive reuse, there is capacity to rejuvenate and reimagine CBD areas as they struggle to respond to new retail, visitor, and worker occupancy patterns

post-Covid (Connell-Variy & Wilkinson, 2026). WFH rights have recently been introduced as legislation in Victoria's parliament (Willingham, 2025), suggesting that a return to pre-Covid workforce patterns can be ruled out, and the need for adaptive reuse consideration will become more common. An appropriate adaptive reuse approach to a building can have positive impacts on CBD areas or quadrants, increasing footfall, outside hours activation, and community facility inclusion, leading to increased community development and engagement (Lundgren, 2023).

The aim of the STAR toolkit was to identify: (a) positive social outcomes, such as social inclusion, community development, and innovative response; (b) positive impacts that not only add value economically but also environmentally; and (c) productive and efficient asset use of assets by capitalizing on the new working model (Wilkinson & Remøy, 2017).

Covid impacted the social structures of cities and reinforced the influence commercial property has in shaping cities and the communities therein (Futcher et al., 2017). As CBDs evolve in line with changing work models and new usage patterns of CBDs (Perez et al., 2022), there are myriad opportunities for owners to optimize their assets through adaptive reuse, thereby increasing tenancy levels and demand from space users (Bullen & Love, 2011). And while relationships are continuing to emerge, there is evidence to suggest Covid created a snowball effect, both within the office sector and within CBDs generally—as workers went remote, working patterns changed and certain days became favoured (Visontay, 2023).

The retail sector had to respond and adapt quickly as restrictions on movement disrupted traditional consumption patterns and this impacted this market sector (Fieger et al., 2023). At the same time, tourism stopped, and CBD residential populations contracted considerably. McKinsey (2023) highlighted that many became "untethered" from their daily commute and moved away from the urban core. As both metrics bounce back, they are changing in makeup, and the built environment must recognize changes and contribute to the next evolution of the modern CBD (Vigiola et al., 2022).

4.1. Foundations and Theoretical Framework

Sustainability in property has increasingly been seen positively, beginning with its introduction in a policy context in the 1987 Brundtland report (Kuhlman & Farrington, 2010), and followed by the Rio Declaration on Environment and Development, signed at the 1992 Earth Summit (Isa et al., 2014). As early as 1994, issues around transforming concept development into policy emerged (Owens, 1994). While the evolution of sustainability in property has been slow, the new century spurred growth in research (Cerin & Karlson, 2002), activity in the industry increased, development of sustainable built form became more common, and knowledge increased through rating tool development (Reed et al., 2009).

The increase in adaptive reuse and retrofit practices has run concurrently with increasing research and adoption of sustainability within the property sector (Menassa, 2011). As research and practice in the industry accelerated, ratings tools became more widely understood and utilised (Gasparatos & Scolobig, 2012), the prominence of sustainability increased, and metrics developed (Ortiz et al., 2009), which investigated the "democratic allocation" of resources and how this added to built form sustainability, further supporting the uptake of "re-use" (Yılmaz & Bakış, 2015). Williams and Dair (2007) explored barriers to adoption of sustainable approaches, including the "lack of consideration of sustainable approaches,"

highlighting the continuing need to overcome early-stage hurdles through increases in sustainability education to stakeholders as a way of increasing adaptive reuse best practice adoption (Wang, 2009).

More recent research in the field focusing on reuse and refit has solidified theory and advanced knowledge considerably, larger reuse projects show scale is possible (Wan et al., 2022), a re-focus to user satisfaction occurred looking at more complete sustainable practices and outcomes for all stakeholders (Kwon et al., 2019), smart technology integration is increasingly explored (Azouz & Elariane, 2023), and net-zero objectives in reuse are pioneered (Luo, 2022). Together, we see an evolutionary development occurring in both the theoretical underpinning of what adaptive reuse and retrofitting means and a shift in analysis, assessment, and application of the practical.

This research contributes by extending knowledge around sustainability in commercial property, post-2020. Specifically, the application of sustainable practices and development of education and analysis tools to proliferate adoption, which Häkkinen and Belloni (2011) identified as key. It does this through exploration of sustainable temporary adaptive reuse of commercial assets in the post-Covid environment, a new paradigm (Croom et al., 2020), thereby making the contribution to knowledge two-fold. We examine emergent and rapidly changing economic conditions apparent in CBDs post-Covid, typified by increased WFH modalities, smaller spaces leased, and changing office type preferences, which contribute to differing interactions from stakeholders with commercial assets (Balemi et al., 2021), and look at building reuse, optimisation, and increased sustainability performance through the lens of a new demand paradigm.

5. Research Methodology

This research adopted a qualitative method through thematic analysis, which looks at identifying patterns in a data set (Naeem et al., 2023). Qualitative research enables the researchers to gain a deeper understanding of issues under investigation; here, to firstly understand the potential for sustainable temporary adaptive reuse of commercial buildings as the market adjusted to the changes influenced by the Covid lockdowns; and secondly, by analysing each tool in the STAR toolkit to understand the potential value that can be created. Qualitative data were collected by thematically analysing the STAR toolkit, to identify patterns according to values that each tool created. These patterns were grouped into Social, Economic, and Environmental values, which were analysed against each of the tools to identify value creation. See Figure 2 for the methodology design.

To define the value created through the innovation of the toolkit, value creation mechanisms were reviewed through urban development and adjacent journals, and key value creation processes were identified. Eakin and Gladstone (2020) assert "to add value to analysis, researchers need to be able to 'penetrate' data and bring into view new possibilities for meaning and interpretation." To do this, we assessed the validity and reliability of the STAR tools by triangulating each tool to market data, leasing practices, and costs (Williamson, 1981), broader community needs in CBDs (Putnam, 2001), adaptive reuse opportunities (Bullen & Love, 2011), and optimising resource allocation in respect of social, economic, and environmental criterion (Deng et al., 2024).

Reliability and validity are important characteristics of qualitative research; they add rigour and are necessary for replication of the research design, as Franklin and Ballan (2001) assert: "Consensus between two or more observers is necessary for establishing reliability in the study." To determine if other researchers would generate similar interpretations, two authors were present at the time of the workshops for the STAR toolkit, and two authors were not.

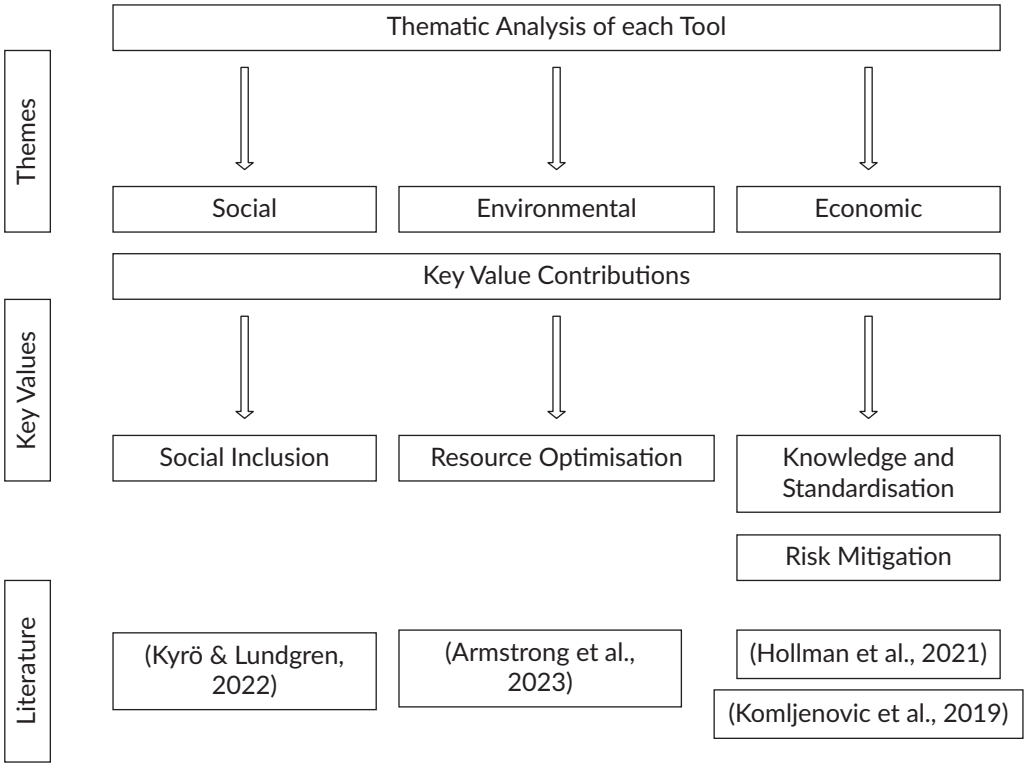

Figure 2. Methodology for thematic analysis.

Further detailed thematic analysis would be required for internal and external validity, to ensure the generated themes match the analysis performed in this research. The authors identify that this detail is lacking and notes the validity issues of this gap.

6. The STAR Toolkit and Value Creation Analysis

This section provides a comprehensive examination of the tools, using established theories of adaptive reuse, and the inhibiting factors defined by Hamida et al. (2026), to assess the contribution to value creation across environmental, social, and economic dimensions while addressing contemporary urban challenges.

6.1. Overview

Activating underoccupied buildings offers multiple advantages; using existing structures is highly sustainable, it retains embodied carbon, and reduces the risk of premature obsolescence (Aytac et al., 2016). Over time, underoccupied buildings tend to decay faster (Eliote et al., 2025); they fail to reveal maintenance issues, enabling cost-effective repairs (West et al., 2024). Additionally, underoccupancy can harm local businesses by decreasing foot traffic, which hampers the local economy (Longtin & Mitchell, 2021). Thus, the positive economic impacts extend beyond the building itself. This section presents value creation analysis for each of the six tools. The analysis is structured around three dimensions of value: social, environmental, and economic, using the inhibiting factors identified by Hamida et al. (2026). Table 2 provides an overview of the key value contributions across all six tools, with a summary of each value for each tool provided in Section 6.2.

Table 2. Summary of value analysis by tool.

Tool	Name	Social Value	Environmental Value	Economic Value
1	STAR Guide	Democratises urban planning knowledge; enables civic engagement	Frames temporary use as environmentally legitimate; reduces demolition pressure	Reduces information asymmetries; enables community access to affordable space
2	STAR Visions	Visual democracy; democratises participation; shapes planning education	Embeds sustainable design; extends circular economy to secondary building stock	Reduces design risk; prioritises social and environmental purpose over financial returns
3	STAR Matchmaking Resource	Expands community access to central space; advances spatial justice	Maximises building utilisation; reduces vacant building periods and demolition pressure	Reduces search costs; enables community organisations to access otherwise unaffordable space
4	STAR NCC Checklist	Ensures safety, accessibility, and universal design for all users	Integrates energy and sustainability standards; prevents resource waste from failed implementations	Reduces regulatory risk and uncertainty; enables early cost estimation
5	STAR SDG Mapping	Connects local action to global SDG commitments; supports participatory planning	Operationalises circular economy and climate commitments; links to Paris Agreement targets	Facilitates ESG reporting and access to sustainable finance mechanisms
6	STAR ESG Scorecard	Centres community benefit, equity, and well-being in property decisions	Integrates social and environmental sustainability assessment holistically	Redefines property value to include social and place-making outcomes beyond financial returns

Note: NCC = National Construction Code.

6.2. Tool 1: STAR Guide

The STAR Guide is the foundational tool, offering clear definitions and a contextual framework for later tools. Through a shared understanding among stakeholders, the tool standardises the STAR concept within existing commercial property frameworks.

6.2.1. Social Value: Democratising Urban Planning Knowledge

The STAR Guide addresses inequities in access to urban planning knowledge and processes and builds on social capital theory, which posits that transparent information and shared frameworks enable civic engagement by lowering participation thresholds. When communities understand what temporary adaptive reuse entails, how it relates to existing building classifications, and what temporal parameters apply, they can more effectively advocate for temporary uses serving community needs rather than solely property owner interests. Inclusive urban planning requires accessible knowledge enabling diverse stakeholders to engage meaningfully in decision-making processes.

6.2.2. Environmental Value: Operationalising Circular Economy Principles

Building reuse achieves 50–75% reductions in carbon emissions compared to demolition and new construction, as existing structures embody substantial energy investments. The Guide's explicit framing of temporary adaptation as "improving the building's overall longevity while minimising the environmental impact" shifts stakeholder thinking from binary occupied/demolished to recognising temporary use as environmentally valuable. By clarifying that temporary adaptation extends the building's utility without requiring a full permanent conversion, the Guide reduces pressure for premature demolition decisions. The Guide's environmental value lies not in direct carbon reduction but in creating conceptual space for temporary use as a legitimate environmental practice, potentially influencing building lifecycle decisions across the Sydney CBD and beyond.

6.2.3. Economic Value

The STAR Guide reduces information asymmetries that inhibit efficient market functioning. Property owners previously lacked frameworks for assessing temporary use feasibility, while potential users could not determine which spaces might accommodate their needs. However, from an urban planning perspective, economic efficiency serves as an enabler of social and environmental objectives rather than the primary goal. The economic value lies in making temporary use economically feasible for property owners, thereby maintaining their willingness to participate, while enabling community organisations and social enterprises to access centrally located space otherwise unaffordable in Sydney's high-rent CBD market. This dual function, reducing barriers for both property owners and community users, distinguishes the Guide from purely market-driven approaches.

6.3. Tool 2: STAR Visions

The STAR Visions tool provides design examples and visual representations that facilitate communication between decision-makers and designers. This tool bridges the gap between conceptual frameworks and practical implementation through case studies and design precedents. STAR Visions offers an innovative perspective for the STAR toolkit research project, as it aims to inspire decision-makers, including building owners, property advisors, and community stakeholders. Created by design students from the University of Technology Sydney and Washington State University in Australia and North America, respectively, the Visions focus on revitalising vacant office spaces with new functions.

6.3.1. Social Value: Visual Democracy and Community Engagement

STAR Visions addresses a critical challenge in planning: the difficulty non-specialists face in visualising alternative futures for existing buildings. As Sandercock (1998) argues, planning processes often privilege verbal and technical communication modes, disadvantaging community members lacking architectural training or professional planning experience. Visual tools democratize participation by enabling stakeholders to engage with spatial possibilities without requiring specialised knowledge. Collaborative design processes involving emerging architects from the University of Technology Sydney and Washington State University also advance planning education objectives. By challenging students to design social impact and environmental sustainability rather than maximum returns, the Visions cultivate professional values aligned

with collective urban welfare. This pedagogical dimension extends STAR's impact beyond immediate toolkit users, influencing future planning and design professionals' approaches to adaptive reuse.

6.3.2. Environmental Value: Materialising Sustainable Design Practices

Beyond the conceptual environmental benefits of building reuse, STAR Visions embeds specific sustainable design practices within visual examples. The University of Technology Sydney student designs for 191 Thomas Street incorporated passive ventilation strategies, natural lighting optimisation, and material reuse from existing buildings, demonstrating that temporary adaptation need not compromise environmental performance standards. Well-designed adaptive reuse achieves environmental outcomes comparable to those of new green buildings while avoiding the embodied carbon impacts of demolition and construction. The Washington State University briefs explicitly focused on C and D-grade buildings, the secondary office stock facing the greatest vacancy and obsolescence risk. By demonstrating design possibilities for these buildings, Visions extend circular economy principles to building segments often dismissed as having limited reuse potential. This challenges the hierarchical logic that preserves only premium buildings while demolishing secondary stock, advancing more equitable approaches to urban sustainability.

6.3.3. Economic Value: Reducing Design Risk While Prioritising Social Purpose

From a transaction-cost perspective, design uncertainty represents a significant barrier to the implementation of temporary adaptation. Property owners and potential users face difficulty conceptualising how spaces could be adapted, leading to risk aversion. STAR Visions reduces this uncertainty by providing proven examples and visual references, lowering perceptual barriers to temporary use proposals. The Visions' economic value serves social and environmental objectives rather than maximising property returns. The design briefs explicitly prioritised "social equality, environmental impact, and sustainable reactivation" over financial optimisation. Examples included affordable co-working for social enterprises, community food ventures, and cultural venues that generate community benefit but may provide lower rental income than conventional commercial tenancies.

6.4. Tool 3: STAR Matchmaking Resource

STAR Tool 3 addresses the critical challenge of connecting building owners with suitable space seekers, serving as a facilitation mechanism for the marketplace. It streamlines the process of identifying compatible temporary users for underutilised spaces. This STAR Matchmaking Resource tool shares insights from our initial explorations of developing a platform to facilitate conversations between building owners and potential end-user organisations about STAR. It aims to help groups who want to operationalise the STAR Matchmaking Resource prototype and develop a fully operational STAR space.

6.4.1. Social Value: Access to Urban Space and Spatial Justice

In high-rent CBD markets like Sydney, community organisations, social enterprises, artists, and nonprofits face systematic exclusion from central locations despite the social value their activities generate (Madanipour, 2015). The Matchmaking Resource's social value lies in pragmatic incremental improvement, expanding community access to space within existing systems, while acknowledging that it cannot fundamentally transform unequal property relations.

6.4.2. Environmental Value: Maximising Building Utilisation

The Matchmaking Resource advances resource efficiency by maximising building utilisation. Vacant buildings represent wasted embodied energy and materials. The resources invested in original construction sit idle while new construction occurs elsewhere. By matching available space with potential users, the platform extends the usefulness of buildings, reducing the need for new construction to accommodate temporary users. Furthermore, by reducing vacant building periods, matchmaking reduces demolition pressure. Property owners facing extended vacancy may conclude buildings have reached economic obsolescence, triggering demolition decisions. Temporary use maintains buildings in active service, preserving options for future permanent adaptation when market conditions or building conversion feasibility improve. This temporal flexibility proves crucial in uncertain post-pandemic markets where long-term CBD office demand trajectories remain unclear.

6.4.3. Economic Value: Market Efficiency in Service of Collection Objectives

Market design theory demonstrates that well-designed matching mechanisms can dramatically improve market efficiency by reducing search costs and facilitating beneficial transactions. The Matchmaking Resource applies this principle to temporary space allocation: Property owners facing vacancy gain structured processes for identifying temporary users, while potential users access centralised information about available spaces rather than relying on informal networks. From an urban planning perspective, market efficiency serves collective ends rather than being an end. The Matchmaking Resource's economic value lies in maintaining property owner participation by reducing their costs of temporary-use arrangements, thereby enabling community organisations access to space. As Parmar et al. (2010) argue, stakeholder value creation requires addressing all parties' legitimate interests rather than optimising for individual actors.

6.5. Tool 4: STAR NCC Checklist

This tool addresses the crucial aspect of compliance with the National Construction Code (NCC) for temporary change-of-use projects. The NCC Checklist guides conversations between space owners, space seekers, and regulators, ensuring compliance with building standards and safety requirements. The best way forward is to develop an NCC Checklist of critical issues to consider when proposing a STAR. The NCC Code, formerly known as the Building Code of Australia, establishes minimum building design and construction standards across Australia. It is a performance-based code, developed by the Australian Building Codes Board, which regulates new and existing buildings. As STAR developments inherently involve a change-of-use for a part or whole of an existing building, compliance with the NCC is essential.

6.5.1. Social Value: Safety, Accessibility, and Universal Design

The NCC Checklist's primary social value lies in ensuring that temporary adaptive reuse maintains appropriate safety standards and accessibility for all users, including people with disabilities. Built environment regulations represent crucial mechanisms advancing spatial justice by requiring universal design principles. The checklist's explicit focus on fire safety and disability access embeds these equity considerations within temporary use planning from the initial feasibility assessment.

6.5.2. Environmental Value: Integrating Sustainability Standards

Beyond safety and accessibility, the NCC incorporates environmental performance standards addressing energy efficiency, ventilation, and sustainable design. The checklist's guidance to "discuss sustainability matters with a building certifier and owner" embeds environmental considerations within compliance assessment, countering assumptions that temporary uses exempt buildings from environmental standards. By ensuring environmental performance assessment occurs during temporary adaptation planning, the checklist ensures incremental improvements, contributing to building stock sustainability. Compliance guidance reduces the risk of temporary use failures requiring remediation. When temporary adaptations proceed without adequate assessment, safety deficiencies or structural issues may emerge, potentially requiring expensive corrections or leading to occupancy termination. These failures waste resources and undermine temporary use legitimacy. The checklist's preventive approach advances resource efficiency by ensuring temporary adaptations succeed rather than generating additional waste through failed implementations.

6.5.3. Economic Value: Reducing Regulatory Risk and Uncertainty

Regulatory uncertainty represents a substantial barrier to temporary adaptation. The NCC Checklist reduces this uncertainty by providing a structured assessment enabling early identification of compliance issues and cost estimation. Economic efficiency serves collective safety and accessibility objectives rather than constituting the primary goal. The checklist does not facilitate regulatory avoidance; it clarifies legitimate requirements, ensuring temporary uses meet community protection standards.

6.6. Tool 5: STAR SDG Mapping

This SDG tool is an integral component of the STAR toolkit, which has the overarching goal of normalising the concept of STAR as a strategy to reactivate vacant spaces within existing commercial office buildings. This tool is designed to align the STAR toolkit with the UN SDGs, showing STAR's contribution to global sustainability objectives. It supports mapping STAR initiatives to the SDGs and provides a framework for measuring and communicating broader sustainability impacts. It enables alignment between local temporary adaptation projects and global sustainability objectives.

6.6.1. Social Value: Connecting Local Action to Global Sustainability Commitment

The SDG Mapping tool addresses a critical challenge in contemporary urban planning: connecting place-based interventions to global sustainability frameworks and municipal climate commitments. Achieving UN SDGs requires not only national policy, but urban-scale implementation demonstrating how local actions contribute to global objectives. The tool enables temporary adaptive reuse projects to document their contributions to SDG 11 (Sustainable Cities), SDG 12 (Responsible Consumption), and SDG 13 (Climate Action). The mapping to SDG Target 11.3 (Inclusive Urbanisation and Civic Engagement) proves particularly significant from planning perspectives. By positioning temporary use as a civic engagement mechanism enabling communities to shape building reuse rather than accepting property owners or municipal decisions, the tool connects temporary adaptation to participatory planning principles. This reframing shifts temporary use from a property management tactic to a democratic urban planning practice.

6.6.2. Environmental Value: Operationalising Circular Economy and Climate Commitments

The SDG Mapping tool operationalises circular economy principles (identified through the World Business Council for Sustainable Development's Circular Transition Indicators) by connecting temporary adaptive reuse to measurable sustainability metrics: Resource Efficiency (SDG Targets 8.4 and 9.4) and Material Footprint and Circularity Rate (SDG Targets 12.2 and 12.5). These connections enable temporary use to contribute to municipal climate action plans and to national carbon-reduction commitments under the Paris Agreement. By mapping to SDG Target 13.3 (Climate Change Education and Awareness), the tool positions temporary use projects as public pedagogy, demonstrating sustainable building practices. When community organisations activate vacant buildings temporarily, they model adaptive reuse feasibility for broader audiences, potentially influencing future development decisions beyond immediate project boundaries.

6.6.3. Economic Value: Accessing Sustainable Finance While Serving Public Goals

Property owners face increasing pressure from investors, lenders, and regulators to report ESG performance, with SDG alignment serving as a recognised metric. From an urban planning perspective, the critical question is whether sustainable finance mechanisms serve public sustainability goals or merely create new profit opportunities. Sustainability can become another accumulation frontier where environmental and social benefits generate returns for capital while marginalised communities see minimal improvement. The SDG Mapping tool's value lies in its dual potential: enabling property owners to access sustainable finance while simultaneously strengthening municipal capacity to advance climate commitments through temporary-use policies. Whether this balance can be achieved requires empirical research examining implemented projects' actual sustainability outcomes beyond reported SDG alignment.

6.7. Tool 6: STAR ESG Scorecard

The STAR ESG Scorecard evaluates potential social value benefits of STAR initiatives in reactivating vacant spaces within commercial office buildings, aiming to provide a fair and impartial methodology for assessing social impact. It addresses significant gaps in ESG reporting within the property sector, where the quantification of "social value" is nascent compared to environmental impact measurements. The ESG Scorecard identifies key social attributes, such as a project's potential to generate additional income for the area, attract new user categories (e.g., charitable organisations, start-ups), contribute to the community, promote diversity and equity, focus on community well-being, ensure health and safety, aid tenant retention, create a sense of place, allow for short activation timescales, add value through social initiatives, support innovation and sustainable employment, and benefit neighbouring businesses, thereby meeting tenants' ESG objectives.

6.7.1. Social Value: Centering Community Benefits in Property Decisions

The ESG Scorecard's primary contribution lies in centering social value assessment within temporary adaptive reuse feasibility evaluation. Historically, property decisions prioritise financial returns with social impacts treated as externalities or secondary considerations. By providing a structured methodology for assessing social benefits, community contribution, diversity, human rights, health and safety, and sense of place, the Scorecard positions social impact as a core evaluation criterion alongside economic viability.

6.7.2. Environmental Value: Integrated Sustainability Assessment

While focused on social value, the ESG Scorecard contributes to environmental objectives through an integrated sustainability assessment encompassing social, environmental, and governance dimensions simultaneously. This integrated approach recognises that environmental sustainability cannot be separated from social equity and community welfare, a principle central to environmental justice scholarship. The Scorecard's social focus complements environmental metrics (SDG Mapping, embodied carbon retention), ensuring temporary use advances both sustainability pillars.

6.7.3. Economic Value: Redefining Property Value Beyond Financial Returns

The ESG Scorecard's most radical contribution may be its implicit challenge to current, narrow financial definitions of property value. By systematically measuring social impacts, community benefit, equity promotion, and place-making, the Scorecard positions these outcomes as constitutive of value rather than externalities. The critical question remains whether ESG frameworks fundamentally shift property sector priorities or merely provide new language for profit maximisation under sustainability banners.

6.8. Discussion

The underlying premise of STAR is retention of existing assets, a major progression in sustainability theory as climate change impacts have worsened and become more frequent (Pörtner et al., 2022). The STAR toolkit provides new avenues for owners and managers to meet stakeholder demand for "greening," influenced by the increasing applications of ESG policies (Arvidsson & Dumay, 2022).

The development of STAR is embedded in extant sustainability research and has achieved multiple uplifts in the field, particularly in Australia where adaptive reuse knowledge and application lags Europe (Kurul, 2007). The STAR toolkit increases physical sustainability by using existing built form, saving embodied energy, and reducing emissions associated with a "knock down–re-build" approach (Power, 2008). It explores reuse on a temporary basis to introduce this emergent approach to the sector, allowing for testing, analysis, and review (Warren, 2010). A major progression achieved through the introduction of STAR is the ability to educate stakeholders on this type of sustainability, and recent work confirmed that there remain knowledge shortfalls in early-stage testing and adoption (Sharifi et al., 2021). STAR is a key tool to assess a building's capacity to be reused, which has hitherto been lacking (Lorenz & Lützkendorf, 2008).

The results reflect a strong addition to a suite of approaches used in decision-making around sustainability retrofitting and adaptive reuse, and these research outcomes can expedite application of practical reuse measures through value creation mapping and process identification to bypass previously identified inhibitors.

7. Conclusion

As urban areas worldwide grapple with post-pandemic property market disruptions, the STAR toolkit offers a replicable framework for transforming underutilisation challenges into value creation opportunities. Its emphasis on temporary adaptation provides flexibility to respond to uncertain market conditions while

maintaining options for future development, making it particularly relevant for contemporary urban planning and property management practices. The STAR toolkit's integration of sustainability principles, community engagement, and commercial viability enables value creation through the utilisation of adaptive reuse. This evolution reflects broader trends toward regenerative development approaches that seek to create positive impacts rather than merely minimising negative effects.

The STAR toolkit represents a significant advancement in addressing contemporary commercial property challenges through innovative temporary adaptation strategies. By integrating six complementary tools within a comprehensive framework, the toolkit enables systematic value creation across environmental, social, and economic dimensions. The toolkit's contribution to value creation operates through multiple mechanisms: market efficiency improvements, risk mitigation, resource optimisation, community activation, and sustainability enhancement. These benefits align with growing emphasis on ESG performance in real estate investment and management, positioning STAR as a forward-looking response to evolving market demands. However, successful implementation requires addressing significant challenges, including regulatory complexity, stakeholder coordination, and measurement difficulties. The toolkit's long-term impact will depend on its ability to demonstrate measurable value creation and achieve widespread adoption across diverse markets.

Future research and implementation efforts should focus on validating the STAR toolkit's effectiveness across diverse contexts, refining measurement approaches, and developing supportive policy frameworks to maximise its potential contribution to sustainable urban development and commercial property value creation.

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Conflict of Interests

The authors declare no conflict of interests.

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