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Porqueddu, Elena

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Exploring Synergies in Different Spatial Design Disciplines: A multi-scale approach to adaptive cycles in public-private interfaces

Elena Porqueddu

The physical construction and modification of space in cities are often associated with the disciplines of urban or landscape design, which entail a wide-scale overview and long-term interventions. Nonetheless, complex city theories show how vibrant streets and neighbourhoods, to a large extent, organically evolve, adapt, and self-regenerate over time, thanks to a series of incremental temporary and tiny spatial adjustments emerging from the spontaneous initiatives of multiple individuals. These interventions are linked to the knowledge developed in other spatial design disciplines related to micro-scale short-term transformations, such as architecture, interior and product design. They rarely address, however, problems related to urban adaptive cycles – of streets and neighbourhoods – which unfold beyond the scale of their usual action. In this respect, the present paper highlights how: (1) spatial designers who aim to foster processes of self-regeneration need to observe and understand the multiple rhythms and scales of social-spatial adaptation, (2) such systemic understanding enhances the potential for unexpected synergies between different approaches, techniques and scales of intervention that belong to the various spatial design disciplines, and (3) these synergies could improve the capability of spatial designers to trigger/accelerate processes of self-regeneration in cities. The specific topic of the spontaneous evolution of public-private interfaces over time is here used to illustrate the argument.

KEYWORDS: adaptive cycles, spatial design, public-private interfaces, urban regeneration, multi-scale thinking, systems thinking

RSD TOPIC(S): Architecture & Planning

The specificity of scales in spatial design disciplines: limits and potential

The physical construction and modification of space in cities is mostly associated with the disciplines of urban or landscape design, which entail a wide-scale overview and long-term interventions. Nonetheless, complex city theories (Allen & Sanglier, 1981; Batty, 2013; De Roo & Rauws, 2016; De Roo, 2017; Hillier, 2012; Johnson, 2001; Portugali, 1999) highlight how vibrant streets and neighbourhoods organically evolve, adapt, and self-regenerate over time thanks to a series of incremental temporary and tiny spatial adjustments emerging from the spontaneous initiative of multiple individuals (Jacobs, 1961; Moroni & Cozzolino, 2019; Cozzolino, 2019; Porqueddu, 2018ab). Such interventions are linked to the knowledge developed in other spatial design disciplines related to micro-scale temporary transformations, such as architecture, interior and product design (Porqueddu, 2018a, 2023-forthcoming), which, however, rarely address problems related to urban adaptive cycles – of streets and neighbourhoods – that unfold beyond the scale of their usual action.

On the one hand, the specific body of knowledge of each of these disciplines enriches the range of solutions available for interventions on specific scales. On the other, the fragmentation of their action decreases the potential of these disciplines to proactively interact with spontaneous adaptive cycles of self-regeneration and decline that develop across scales and over time (Porqueddu, 2021). In this respect, the present paper highlights (1) how spatial designers who aim to foster processes of self-regeneration need to observe and understand the multiple times and scales of social-spatial adaptation, (2) how such systemic understanding enhances the potential for unexpected synergies between different approaches, techniques and scales of intervention that belong to the different spatial design disciplines, and (3) how these

synergies could increase the capability of spatial designers to trigger/accelerate processes of self-regeneration in cities.

The argument is illustrated by focusing on the specific topic of public-private interfaces and their adaptive cycles in cities. Public-private interfaces are here considered emblematic as they play a significant role in cycles of regeneration and decline, and their spontaneous evolution raises questions about the role of the various design disciplines – interior and product design, architecture, urban and landscape design – in navigating these spontaneous cycles across scales. The paper builds on the study of the adaptation of public-private interfaces conducted by Dovey, Wood and Symons across several neighbourhoods in the Australian cities of Melbourne, Brisbane and Sydney (Dovey and Wood, 2011-2015; Dovey & Symons, 2014).

Spontaneous adaptive cycles in private-public interfaces: the challenges for planning and spatial design

Public-private interfaces are specific types of borders that lie between the inner space of private properties (interior ground levels, private gardens, industrial precincts, etc.) and the public space of sidewalks, streets, plazas and parks. In urban design, architecture and planning, borders have long been studied because they also frame the multiple ways in which the transition between public and private, individual and social space is shaped and negotiated (Carmona et al., 2003; Madanipour, 2003). In this sense, public-private interfaces have been considered fundamental in supporting city life and cycles of self-regeneration since the pioneering studies of Jacobs (1961) and Alexander (Alexander et al., 1977).

Interfaces have often been investigated to identify typologies which stimulate street-life vitality. Gehl (1987; Gehl & Gemzoe, 1996), for example, has for many years classified interfaces around a “soft-hard” contrast, where “soft” refers to the social, permeable and active membranes, and “hard” to the passive, antisocial and impermeable boundaries. The soft interfaces are built for slow pedestrian traffic and belong to fine-grained urban fabrics; the hard are shaped according to the fast flow of cars. Many other current studies highlight the importance of active, permeable edges (Bentley et al., 1985; Ford, 2000; Mehta, 2007).

Although these arguments are extremely valid, this taxonomy often leads to a design approach based on an a priori idea of what is good and what is not, which interface types should be eradicated, and which ones should be promoted and designed. This linear approach often leads designers and planners to shape top-down wide-scale actions aiming at eliminating blank, passive, antisocial facades and designing new active street edges (Gehl, 1987; Gehl and Gemzoe, 1996). While the aim is laudable – fostering street life and guaranteeing a synergy between street life and private activities – this approach contrasts with the emergent self-organising nature of complex urban systems (Porqueddu, 2018ab), which evolve and regenerate in a non-linear manner over time thanks to adaptive cycles and processes of self-organisation emerging from the unpredictable and distributed action of multiple individuals (Moroni and Cozzolino, 2019; Porqueddu, 2018b, 2021).

In complex adaptive urban environments, public-private interfaces change and spontaneously adapt over time thanks to a wide range of initiatives emerging from the bottom up and in response to unpredictable changes occurring in the public space or in the social-cultural-economic realm. In this respect, such a linear top-down design approach might inhibit incremental interface adaptation over time, thus threatening the capacity of a specific neighbourhood to constantly evolve and self-regenerate over time (Porqueddu, 2018ab).

In this sense, the studies conducted by Dovey and Wood (2015) – across the creative clusters situated in the inner areas of three Australian cities (Sydney, Brisbane, and Melbourne) – is illuminating because it shifts the focus from interface types towards their dynamic development over time, in relation to rhythms of flows, activities and uses.

These inner-city neighbourhoods are characterised by nineteenth-century morphologies, which developed prior to modernist monofunctional top-down planning, where factories and warehouses were interwoven with housing. Today these neighbourhoods house a mix of residential, retail, light-industrial and cultural uses within walking distance of the central city (Dovey, Woodcock and Wood, 2009; Dovey and Wood, 2015). (Figure 1).

After setting a series of six complex twofold interface types, Dovey and Wood map their heterogeneous fine-grain mix, and they explore the endless slippage between them. Their study shows how the social-economic vitality of these neighbourhoods is not linked to a particular prevalence of certain types of private-public interface. What is, in fact, relevant in these creative clusters is that interfaces are heterogeneous and responsive (Figure 1, 2), adapting endlessly to individual private initiatives and reacting to ever-changing situations which develop in public space.

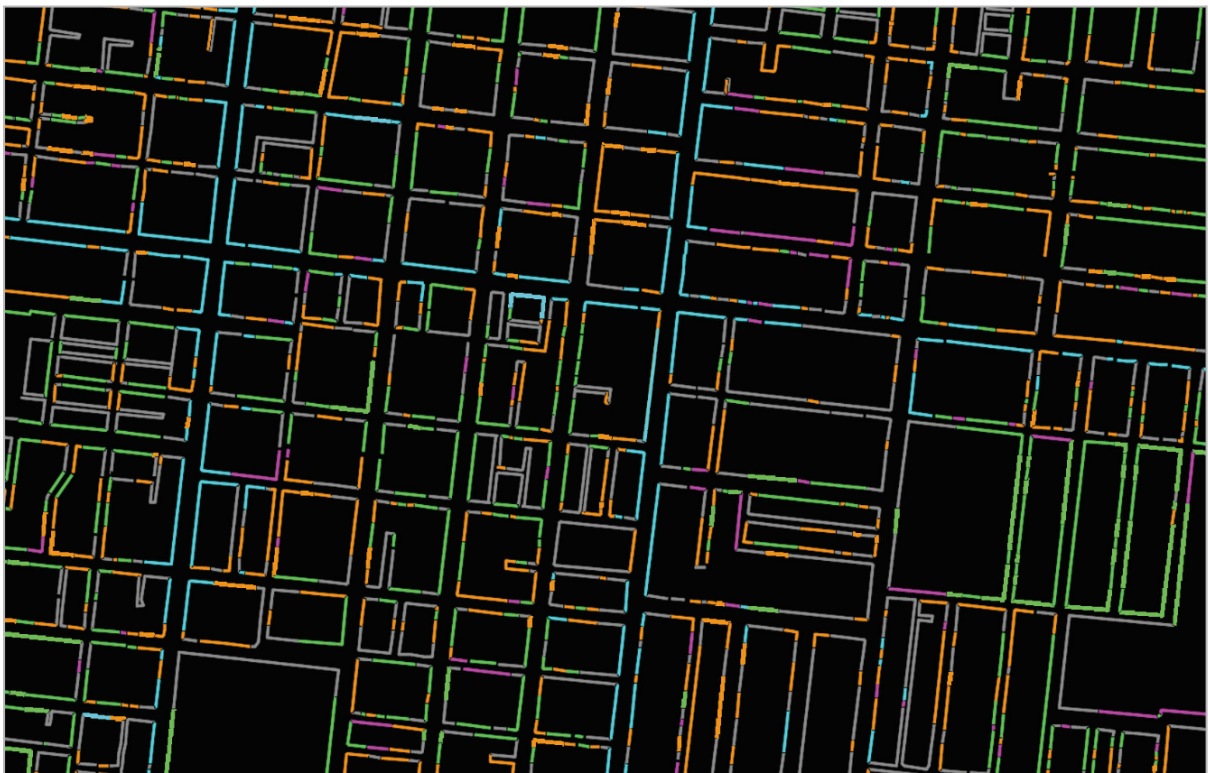


Figure 1. Heterogeneous interfaces – Fitzroy, Melbourne (2011) (Dovey and Wood, 2015).
Courtesy of Kim Dovey.



Figure 2. Adaptations of impermeable/blank interfaces (Dovey & Wood, 2015). Courtesy of Kim Dovey.

- A. A shop emerges from a garage door.
- B. A former factory becomes a car/setback for professional offices.
- C. A café emerged from a blank interface creating a pedestrian setback in a laneway.
- D. Conversion of a blank interface to a public entrance for a restaurant.
- E. A rear entry converted into a car/setback access.
- F. A blank interface converted into a garage-top housing.

Setback interface: this is when the primary entry into private space is set back from the legal boundary behind a semi-private space of private ownership. There is an interstitial space between private and public (Dovey & Wood, 2015).

In spatial terms, the unpredictable incremental adaptation of single interfaces stimulates a change in street life, while emergent street life endlessly influences adjustments in private interfaces (Porqueddu, 2018ab). Furthermore, a change in function often requires a new access mode and a different iconic front, thus stimulating interface mutation. These endless adaptations also follow heterogeneous rhythms: some of them can follow daily rhythms, others are affected by seasonal rhythms, while other transformations generate longer-term changes in interfaces (Dovey & Wood, 2015).

An interesting outcome of Dovey and Wood's study is that blank interfaces, widely considered anti-adaptive anti-social edges (Gehl et al., 2006; Bobic, 2004), revealed significant adaptive potential. In Melbourne's creative clusters, several blank impermeable edges were transformed into transparent, permeable, direct, and setback types of interface (Dovey & Wood, 2015) (Figure 2).

This has not been achieved through a top-down intervention; rather, it results from market-driven enterprises that incrementally adapt under-utilized spaces to more profitable use (often based in former industrial buildings). A key point is that these are all small-grain adaptations emerging from the initiative of several micro-enterprises. They often comprise only part of an existing land title and mainly occur in areas adjacent to high pedestrian flows (Dovey & Wood, 2015; Dovey & Symons, 2013).

In this perspective, the crucial issue is not to establish a priori what interface types should be promoted and designed (as this depends on local, immanent conditions, which are hopefully in a continuous state of becoming). Over-design and over-regulation could even prevent the adaptation of interfaces over time, thus blocking the individual initiative, which endlessly nourishes the capacity of a neighbourhood to self-regenerate over time.

Nonetheless, this is not an argument for less design or planning. Emergent incremental transformations can accumulate small improvements "until the place crosses a threshold and begins to thrive" (Dovey & Symons, 2014). However, they can also lead to the self-destruction of diversity (Jacobs, 1961). Jacobs foresaw how the same forces which nourish city diversity could also contribute to its self-destruction. The recent

theory of Complex Adaptive Systems has validated Jacobs's insights by demonstrating how complex systems spontaneously follow cycles of self-regeneration and decline (Gunderson & Holling, 2002; Miller & Page, 2007). In terms of interfaces, on the one hand, an incremental set of micro-adaptations can lead to a more vital and adaptive neighbourhood — with active street edges and diverse, responsive interfaces. On the other hand, a lack of planning and design can easily lead to the self-destruction of the adaptive capacity of interfaces and the emergence of homogeneous blank anti-social edges.

In this respect, another study conducted by Dovey and Symons (2014) across the Southbank hinterland inner-city precinct in Melbourne shows how an excessive lack of government control can lead to the emergence of homogeneous anti-social street edges. The Southbank hinterland is a former industrial area situated directly behind the Southbank waterfront precinct and adjacent to the art precinct lining St Kilda Road – home to the National Gallery of Victoria, concert halls, several theatres, ABC headquarters and the Victorian College of the Arts (Figure 3).

In the early 1980s, an urban renewal strategy was elaborated with the aim of turning the declining industrial area into a mixed-use residential, commercial and arts precinct. Most of the initial focus was on the river frontage, while the hinterland has also developed since the 1990s into one of the most densely populated mixed-use precincts in Australia (Dovey & Symons, 2014). Within the initial urban design strategy – which was developed between 1986 and 1992 – a set of detailed guidelines was established with the aim of avoiding blank walls at ground level and guaranteeing the development of active frontages with pedestrian access (Government of Victoria, 1986-1992; Dovey and Symons, 2014).

Nonetheless, after the successful opening of the adjacent Southgate River frontage (1990), the Southbank hinterland area became a hotspot for apartment construction and was removed from local government control. Height limits (which were initially 24 metres) were progressively abandoned. Market pressure for apartments with walkable access to the new waterfront led to the construction of one of the densest residential neighbourhoods in Australia. Here the demand for off-street parking, in turn, produced a demand for towers surmounting parking garages, where parking competes with retail

and the social usage of the street interface (Dovey and Symons, 2014). The guidelines of the first planning documents, with regard to active edges, were ignored, and this led to the production of a harsh and uninviting streetscape (Gehl, 2004) characterised by streets lined with the blank walls of car parks, which do not support street life (Government of Victoria 2007) (Figure 4).

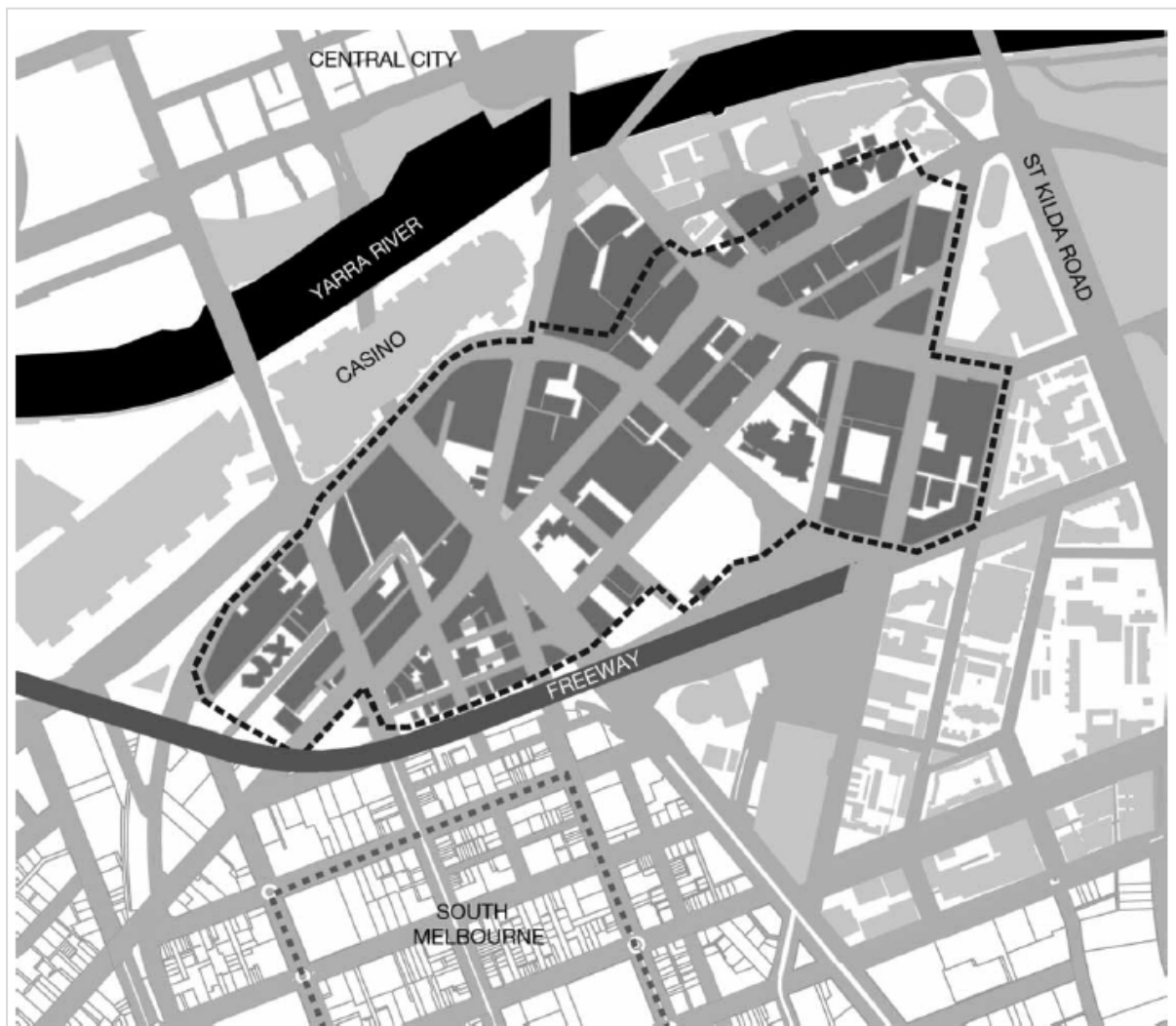


Figure 3 Southbank and hinterland study area (Dovey & Symons, 2014). Map by Felicity Symons, courtesy of Kim Dovey.

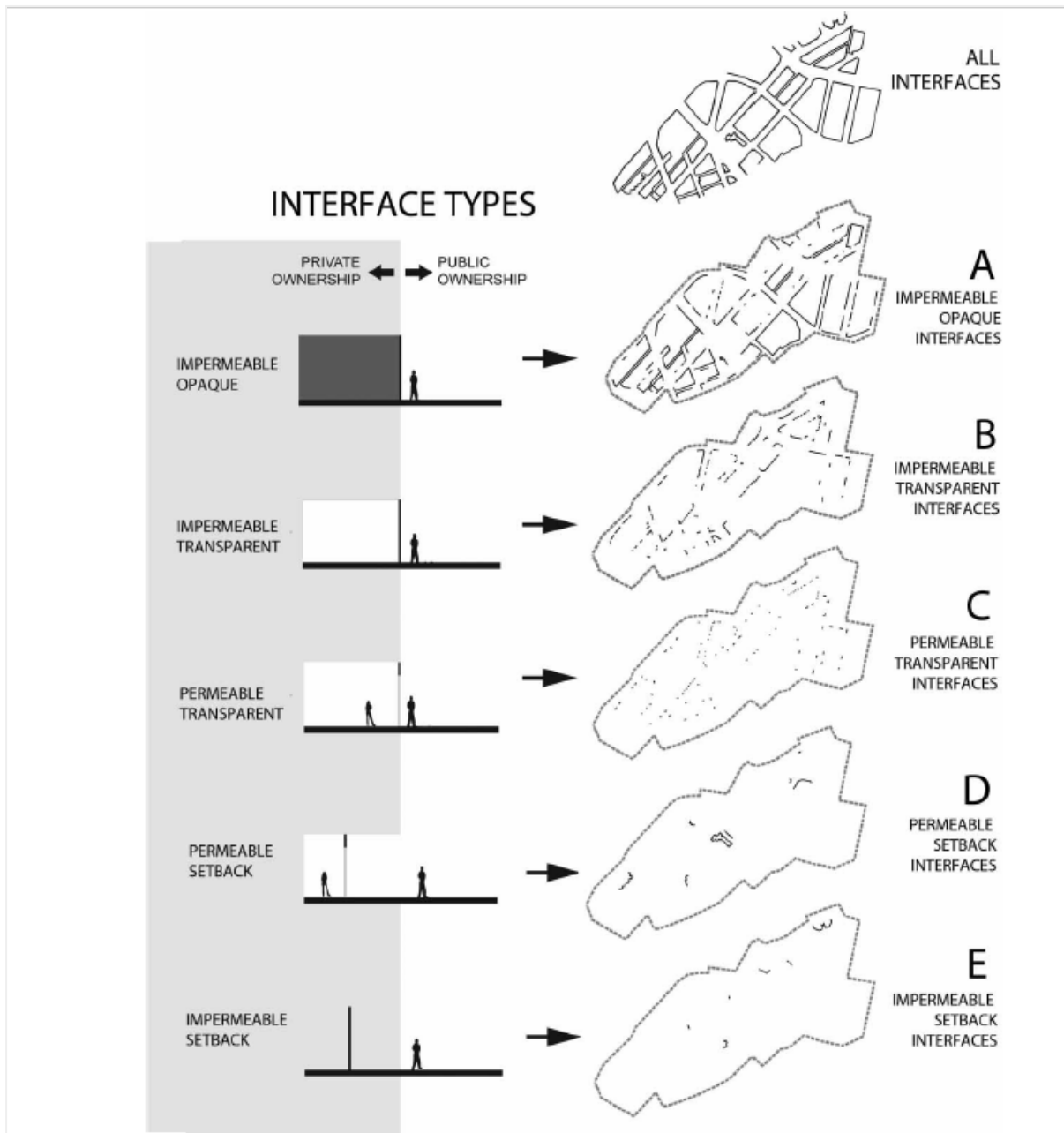


Figure 4. The Southbank hinterland: Interface types and distributions. The prevalence of impermeable interfaces (Dovey & Symons, 2014). Mapping by Felicity Symons, diagrams by Kim Dovey, courtesy of Kim Dovey.

In short, in this case, market-driven forces led to the construction of prevalent anti-adaptive impermeable interfaces with no pedestrian interaction between public and private realms. Even the transparent surfaces are mostly apartment lobbies or blank showroom facades. This generated the paradox of a dense neighbourhood totally lacking vibrancy and intensity, even though it was strategically adjacent to many important cultural facilities and vibrant pedestrian areas such as South Bank, and it contained a large quantity of job opportunities and dwellings (Figure 5). This shows how quantitative parameters, such as density in terms of floor area ratio (FAR) or the number of dwellings or job opportunities per hectare, do not guarantee the development of an intense and vibrant urban realm. Instead, it confirms how the spatial layout, the mix of public-private interfaces and their behaviour over time are crucial to generating an intense urban realm (Dovey & Symons, 2014; Porqueddu, 2015).

Although policies, regulations and design interventions have often been conceived to guarantee a certain consistency of (active) interfaces, the studies presented highlight the value of their diversity and their endless capacity for change. On the one hand, they indicate that over-regulation and over-design are incompatible with emergent adaptations of interfaces. On the other, they reveal that the importance of adaptation should not promote complete deregulation, which could also lead to the self-destruction of the diversity and adaptivity of interfaces.

In this respect, these studies raise the following questions for spatial designers and planners: Which top-down minimum interventions could stimulate the bottom-up distributed actions which might invert a negative cycle? In terms of interfaces: Which top-down actions can foster incremental interface adaptation and dynamism when street edges tend to spontaneously crystallise into fixed homogeneous anti-social configurations? How can these negative cycles be inverted without reshaping all the interfaces from the top-down? Which top-down actions could trigger bottom-up adaptation from impermeable to permeable?

And in general: What is the role of spatial design disciplines in unlocking the potential for the spontaneous emergence of streetscape vitality? How can short and long-term interventions at different scales – and associated with different spatial design disciplines – be coordinated and channelled towards virtuous cycles of self-regeneration?



Figure 5 The lack of pedestrian activity and street life in the Southbank hinterland compared with the adjacent South Melbourne area (Dovey & Symons, 2014). Photos by Felicity Symons, courtesy of Kim Dovey.

Enhancing the adaptive capacity of interfaces: what is the role of spatial design?

On the one hand, these studies confirm that street vitality cannot be the direct result of top-down planning and design (Jacobs, 1961). On the other, they highlight the need for planning and design in order to avoid or invert cycles of decline.

In this regard, Dovey and Symons (2014) stress that a key point is to see the potential for adaptive change in blank interfaces. They identify key opportunities for adaptation, especially for those impermeable (primarily car-park) facades that line major or secondary pedestrian flows – prevalent in the Southbank hinterland (Figure 5). In this respect, they develop a site-specific framework aimed at enabling the potential adaptation of impermeable interface types — based on existing market-based practices and including infill of setbacks, appropriation of public space and reuse of car-park space. Their framework is conceived to invert a negative cycle across the Southbank hinterland without resorting to urban design or planning processes which focus on over-regulating or applying ‘active edges’ from the top down (Dovey & Symons, 2014). Rather, it is developed from a thorough understanding of how market-driven incremental micro-adaptations work, and it aims to put in place the governance framework and the design strategies that can encourage these adaptations.

In this perspective, the studies presented prompted us to rethink rather than minimise the role of spatial design disciplines. They suggest that the focus should be shifted from searching for ideal interface types and mixes towards shaping the conditions for the emergence of multiple, responsive, reversible interfaces capable of adapting easily to unpredictable situations and unforeseen individual-collective needs. In other words, design and planning strategies should not interfere with the spontaneous capacity of site-specific social-spatial networks to adapt, evolve and renew, but at the same time, they should intervene to prevent/invert its emergent decline (Porqueddu, 2018a, 2021, 2023-forthcoming).

In this perspective, the role of spatial designers and planners consists of enhancing the interfaces’ adaptive capacity by (1) shaping the essential spatial conditions (and governance frameworks) which can foster the emergence of diverse interfaces and of

their adaptation over time, (2) monitoring their evolution and (3) intervening only if a cycle of decline manifests itself.

In this respect, I argue that what is needed is a systemic understanding of site-specific adaptive cycles across scales and that this understanding is crucial to exploring the relations between formal top-down control and spontaneous cycles of self-regeneration and decline in cities (Porqueddu, 2023-forthcoming). In this perspective, Complex Adaptive Systems theory is crucial because it highlights how the scale in which we are interested is connected to and affected by what is happening at the scales above and below and how the linkages across scales play a major role in determining how the system is behaving on another scale. That is to say that a micro-cycle can be positively affected by wider-scale processes and vice versa. In this respect, if we fully consider the city as a complex adaptive system, we cannot successfully interact with it by focusing on only one scale. In this sense, CAS theory also resonates with Transition theory, which explores how patterns in system innovation emerge from the interplay between dynamics at multiple levels (MLP) (Geels, 2005; Öztekin & Gaziulusoy, 2019).

The next section highlights how a multi-scale understanding of adaptive cycles in public-private interfaces is crucial to enhancing the emergence of unforeseen synergies between different approaches, techniques and scales of intervention that belong to different design disciplines and how these synergies could improve the capability of spatial designers to trigger/accelerate processes of self-regeneration in cities.

Towards emergent synergies between spatial design disciplines: a multi-scale approach

Adaptive cycles in private-public interfaces confirm Brand's (1994) insights: buildings properly conceived consist of several layers of longevity of built components, and the unit of analysis is not the building but its behaviour and use over time. The same observation is even more valid when we pass to the wider scale of neighbourhoods. By moving away from the conception of buildings and neighbourhoods as whole objects or sum of objects – where every detail is overdesigned from the micro-to-macro scale – and by shifting the focus towards the behaviour of their components across different time cycles, we can better understand the specific contribution of the different spatial

design disciplines and enhance their synergetic action in cycles of self-regeneration and decline.

For example, an interesting outcome of Dovey and Wood's study is that a key enabler of adaptation is the ability of a building's interior to accommodate uses different from the ones originally intended (which consequently influence interface evolution). In this respect, interior design — which is not usually associated with urban transformation — also plays a role in processes of urban regeneration/decline (although they extend far beyond the scale of its action) and becomes relevant to urban studies.

In this perspective, adaptive cycles in private-public interfaces need to be understood and navigated at multiple scales: the micro-scale of the single interface and adjacent public space, the medium scale of the single building or precinct, the wider scale of the neighbourhood that reveals the heterogeneous mix and grain size of activities, the macro scale that highlights the position of the buildings, lots or streets within the wider network of connections (both fast and slow) and within public services and amenities (local and supra-local). Each of these scales opens different challenges in specific spatial design disciplines – interior design, architecture, urban and landscape design — and in the governance framework, although the latter is not the main topic of the present paper.

In the case of a cycle of decline, a systemic understanding of the adaptivity of interfaces across scales and over time could reveal whether the problem concerns the rigidity and crystallisation of blank edges, an unbalance or disconnection between fast access and slow mobility, a lack of diversity of uses or a lack of spatial interconnections between existing activities. Furthermore, it would highlight whether the problem concerns the spatial layout or is related to the governance framework, to the property asset, to the regulations, or to social, economic, and environmental issues (Porqueddu, 2023 - forthcoming).

In the case of spatial layout, such systemic multi-scale understanding would make it possible to identify the site-specific minimum actions that can trigger an incremental process of self-regeneration and invert cycles of decline without recurring to the overall top-down redesign of public-private interfaces. In fact, it would reveal the most

appropriate types and scales of spatial interventions: the adjustment to the façade or ground floor typical of interior design and architecture, the design of edges and public space networks typical of landscape and urban design or the wide-scale rearrangements of fast-slow accesses and supra-local attractions associated with urban design. For example, Dovey and Symons mainly focus on the potential for micro-scale adaptation of impermeable interfaces because they refer to the Southbank hinterland, which is already very well situated on a macro-scale level. In fact, since the area is adjacent to the Victorian College of the Arts and to the vibrant Southbank riverfront, it has “significant potential for small-scale arts-related production, exchange and consumption infiltrating its barren streetscape” (Dovey and Symons, 2014).

Since, in adaptive neighbourhoods, as in buildings, the slow systems do not have to block the flow of the quick ones, and the quick ones do not have to tear up the slow ones with their constant change (Brand, 1995; Habraken, 1998), a key point is to coordinate the action at multiple scales of different design disciplines in such a way that

1. The wide-scale and long-term spatial interventions typical of the urban design discipline – and set by local government bodies – can shape frameworks that are able to foster rather than prevent progressive short-term micro adaptations that increase the ability of a specific neighbourhood to constantly evolve and self-regenerate over time.
2. The short-term micro-adjustments at the scale of the single interface, typical of architecture and interior design – and promoted by multiple individuals – can incrementally trigger/accelerate processes of self-regeneration or prevent/invert cycles of decline, thus producing positive long-term effects that extend far beyond the scale and time of each single micro-adjustment.

In this respect, a systemic understanding of adaptive cycles across scales can highlight and promote new synergies between the different disciplines involved in the construction and modification of the built environment at different scales and channel their specific action so that they can best contribute to navigating – without over-controlling – spontaneous adaptive cycles across scales in the context in which they intervene.

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