

INTRODUCTION: TIME/LESS. SENSING, PLANNING, DESIGNING IN COMPLEX CITIES AND REGIONS

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Time is a crucial and fascinating topic for spatial planners, but it often remains a peripheral element in both scholarly and practical discourses (De Roo, 2010; Moroni, 2015; Cozzolino & Moroni, 2024). Time is frequently treated as a neutral background condition rather than as an active force shaping cities and regions, as well as their planning approaches. Planners, designers, policymakers, and spatial analysts alike — whether passively or actively — operate at the forefront of these dynamics. Yet, the extent to which time is systematically understood, conceptualised, and actively leveraged remains an open question.

By embedding the debate within the complexity theories of cities (brought forward by, amongst others, Batty & Marshall, 2012; Portugali et al., 2012), this special issue acknowledges that socio-spatial systems dynamically transform over time in ways that are regularly not easy to grasp or understand (Batty, 2005; Marshall, 2011; Moroni & Cozzolino, 2019). Sometimes, across various scales, socio-spatial changes appear to follow linear, predictable patterns; at other times, they emerge spontaneously and unpredictably. Such variability generates fundamental uncertainty (Bertolini, 2010; Salvati & Serra, 2016; Sengupta, Rauws, & de Roo, 2016; Silva, 2016; Rauws, 2017; Wiechmann, 2024; Chang et al., 2025). In short, understanding and working with ‘time’ is central to spatial planning scholars and practitioners willing to engage with the complexity theories of cities.

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This special issue shows that the very notion of time — including its uses and challenges — can be approached from multiple perspectives and research questions. Time is a cross-cutting and omnipresent dimension of planning. On the one hand, it is one of the discipline's most practical concerns. Planning is fundamentally a future-oriented activity (Boelens & De Roo, 2016; Portugali, 2020; Moroni, 2023); it sets objectives, establishes timelines, and often materialises in implementation phases: steps, project plans, and even rigid Gantt charts that one can see as symbolic of a desire to exert control over time or gain certainty against temporal flows. On the other hand, it is also a profoundly philosophical issue (Lynch, 1972; Isaacs, 2001). The ways in which time is interpreted and conceptualised, as well as the values associated with it, can fundamentally reshape its role and meaning within planning processes and design interventions (Alfasi & Portugali, 2004; Cozzolino, 2022). In this regard, it is important to emphasise that this special issue is not alone. It has been developed alongside growing recognition of a 'temporal turn' (Parker & Dobson, 2025) in planning theory and practice, as well as an emerging recognition of a collective lack of engagement with time before (Chang et al., 2025; Wiechmann, 2024). This special issue aims to further contribute to such debates and invites readers to join the debate.

Motivated by a broad interest in exploring one of the most fundamental dimensions of planning, the Association of European Schools of Planning (AESOP) Thematic Group *Planning and Complexity* organised a conference between 28 and 29 November 2024 in Aachen (Germany) dedicated explicitly to these considerations. The aim was to advance a more explicit and nuanced engagement with time by situating these reflections within the scientific frame and legacy of complexity science (Weaver, 1948; Jacobs, 1961). The conference brought together contributions exploring time-sensitive dynamics and methodologies, alongside interdisciplinary perspectives proposing innovative analytical, design, and governance approaches. Within this framework, 34 submitted papers and three keynote speakers (see Acknowledgements) engaged with the topic through three interrelated avenues of inquiry: sensing, planning, and designing.

The first avenue, *sensing*, addressed the multiple dimensions through which socio-spatial change is perceived and interpreted, including spatial, corporeal, cognitive, mediated, and technological modalities (Boeing, 2018; Wohl, 2019). Central to this discussion was the question of how diverse rhythms, layers, and dynamics of transformation can be conceptualised, and how they can generate recognisable spatial-temporal patterns. Of particular relevance was the role of emerging data sources, digital infrastructures, and sensing technologies in redefining how urban change is observed, understood, and rapidly reshaped in both reality and perception.

The second avenue, *planning*, focused on developing temporal awareness in both planning theory and practice. It examined how planning interventions can become more responsive to issues of timing, speed, sequencing, unforeseen effects, time-induced uncertainties, and robust yet adaptive long-term scenarios. While planning traditions are often grounded in established practices and institutional frameworks, they are also increasingly challenged by the accelerating and uneven pace of socio-spatial change. This raises critical questions about how planning can engage with transformations that extend beyond and radically challenge dominant and established modus operandi. Contributions in this area explored innovative strategies and instruments for spatial governance as well as conceptualisations and roles of planning itself.

The third avenue, *designing*, investigated design processes that foreground time as a constitutive dimension of spatial production (Wohl, 2018; Cozzolino, 2020; Alexander, 2021; Çalışkan & Stolk, 2023; Porqueddu, 2025). It highlighted the tensions that exist between delivering effective short-term solutions and addressing long-term, uncertain, and emergent dynamics. Contributions examined how design logics negotiate such temporal tensions and explored frameworks that accommodate change and complexity. Focusing on both the composition and production of built and natural environments, the discussion reflected on whether contemporary prevailing design ideals and practices may reproduce limitations in how the temporal dimension is understood and operationalised.

This special issue presents six of the many conference contributions. It does not cover the full breadth and depth of the two-day workshop, but it investigates the interplay between time and complexity from multiple facets: beauty, data and spatial analysis, temporary use, post-growth, short-term intervention vs long-term impacts, and participation. The collection includes an elaboration by one of the keynote speakers (Yodan Rofé) as well as five contributions that have been further developed on the grounds of the joint event in Aachen.

In *Time and Timelessness in Alexander's Search for Beauty*, Yodan Rofé explores Christopher Alexander's influential ideas on architecture and complexity, and argues that urban beauty arises spontaneously through processes that unfold over time and are embedded in human life and experience. The article advocates for environments that can adapt and grow with life, memory, and meaning.

In *Complexity-informed analysis in data-scarce cities*, Fabio Bayro Kaiser presents an exploratory framework for spatial analysis in 'data-scarce' environments using Earth observation data. Guided by non-linearity, emergence, and constrained observation, the author applies these concepts to La Paz–El Alto (Bolivia); providing a basis for interpreting spatial evolution and change.

In *Beyond Dichotomies in Temporary Use of Space*, Kobe Tilley, Tim Devos, and Angelos Varvarousis utilise complexity theory to move beyond 'narrow' academic dichotomies regarding temporary (re)use. By analysing cases in Flanders (Belgium), they argue that these practices should be understood as iterative and adaptive components of broader planning processes.

In *Navigating Post-Growth Planning: Leveraging Complexity for Being Intentional Unintentional*, Christian Lamker connects the emerging concept of post-growth planning to complexity theory. In challenging traditional assumptions of linear control, he suggests the intriguing idea of 'intentional unintentionality'. The article draws on Niklas Luhmann's social systems theory and suggests an alternative approach to planning that intentionally reshapes its own roles to more effectively exert "unintentional influence".

Focusing on Expo '92 in Seville (Spain), Javier Ostos Prieto, in *From temporary to timeless: World Expos and their impact on cities*, examines the relationship between ephemeral global events and their permanent urban legacies. The study investigates how short-term interventions shape long-term urban complexity.

In *Beyond Before and After: Time-Based Participatory Urbanism*, Ardalan Tayefehhosseinlou offers a stimulating understanding of participation as 'participation-in-use'. The paper proposes the idea to generate 'minimally intrusive interventions' — reversible, open-ended designs — that allow for continuous learning and adaptation rather than striving for a fixed final state.

Looking across these contributions and the discussions surrounding the development of this volume, we believe that it fulfils exploratory ambitions. Compiling the special issue served as a collective exercise as well as presenting an opportunity to bridge the gap between the practical application of complexity theories of cities and the (understudied but highly intriguing) dimension of time. We shed light on versatile theoretical directions within sensing, planning, and designing for and with complexity; and on how incorporating conceptualisations of time advances thinking. The convergence of diverse disciplinary interests, viewed through shared theoretical frames, has enabled us to advance a dialogue that both rediscovers time as an indispensable foundational factor while also finding common ground in complexity science. We equally hope that strengthening visible engagement with complexity theories within spatial planning will provide grounds to further enrich the relevance and meaning of these underpinnings.

Finally, it was never the intention for this collection to yield an exhaustive understanding of the relationship between time and complexity. Looking back at 20 years of working with planning and complexity since the establishment of the thematic group in 2005, we realise the relevance of time for such discussions themselves, and the many adaptive steps related to advance our collective knowledge. Placing time and complexity at the heart of the discussion has enabled us to move collectively, as a thematic group, toward new knowledge horizons and the formulation of new questions.

Acknowledgements and conference presentations:

We express our gratitude to all presenting, non-presenting, and supporting participants of the 22nd workshop of the Association of European Schools of Planning (AESOP) Thematic Group on Planning and Complexity in Aachen on 28-29 November 2024. Where we mention our discussions in this editorial, we relate to all the following presenters:

Keynotes:

- Juval Portugali (Key Note): Time travel, homo planner and the city
- Filipa Matos Wunderlich (Key Note): Temporal Urban Design: Temporality, Rhythm and Place
- Yodan Rofé (Key Note): Time and Timelessness in Alexander's Search for Beauty

Regular presentations:

- Balázs, Bálint; Alföldi, György; Dúll, Andrea: Connecting the spaces and the socio-economic processes of the city: Transdisciplinary approach for better understanding the quality of life in small and medium-sized Hungarian cities
- Bayro Kaiser, Fabio: Exploring the spatiotemporal evolution of urban form with Big Earth Open Data
- Björling, Nils; Rönnblom, Malin; Scott, David Towards planning beyond pain-free politics
- Brownsword, Marlon: Temporal Perspectives and Initial Exploratory Movements of Cybernetics in Spatial Planning
- Can, Aysegül: Slow and Infrastructural Violence in Istanbul: A look at urban megaprojects
- Caramaschi, Sara: The role of temporariness, emptiness and improvisation in uncertain times: Evidence from COVID-19 temporary structures
- Chang, Robin A.: A Kairotic Relationship - The Unfolding and Non-Linear Temporal Dynamics that link Agile and Adaptive Planning
- Cormack, Liam: On the Ruin and Conquest of Nature and the Otherworld
- Cozzolino, Stefano: Planning with and for Emergent Urban Complexity. The Crucial Role of Time.
- Demiral, Gökçe: Dynamics Between Space and Time in Campus Areas
- Farooq, Aysha: Coping with Temporality: Space Appropriation of South Asian Migrants in Muscat, Oman
- Goose, Tom: Sensing with Citizen Science: Legacies of the Curieuz Neuzen project in Antwerp (Belgium)
- Haase, Andrea: Time/Less: Niches for Privacy
- Hågemark, Henrik; de Fine Licht, Karl: A contemporary call for traditional architecture - a temporal complexity in today's urban planning
- Hsiao, Wei-Shan; Huang, Shao-Yu: Rewilding Landscape: Exploring the Relationship Between Spatiotemporal Dynamics and Public Life at the Foothill Mountain in Taipei
- Kahya, Güzin Yeliz: Narrating Temporalities of Urban Landscape: Mount Erciyes in the city of Kayseri
- Kersting, Nicolas: Participatory Urban Design in Bolivia: Navigating Temporal Challenges and Community Dynamics
- Kresse, Klaas: Understanding policy failure through evolving planning-context dissonances – a new institutionalist approach
- Kretzschmar, Maya; Pfaffenbach, Carmella: Temporality of Living: Perceptions of Temporariness and Processes of Homing
- Lamker, Christian: Navigating Post-Growth Complexity: Growth-Less Roles in Time and Space of Planning
- Mancini, Micaela: Stakeholders' co-creation of the 15-minute City: The case of Trondheim, Norway
- Manna, Erna Megawati: Sustainable Smart Islands
- Meyer, Simon: Adaptability in German Land Use Planning

- Nel, Darren; Taeihagh, Araz: Fast tracking the adoption of complexity science in planning and policy: A Delphi study
- Ochoa, Rita: Planning with time. Intermittent Mobility as a promising concept for urban futures
- Ostos Prieto, Javier: Ephemeral urbanism? The Impact of the World Expo on the City of Seville
- Rauws, Ward; Buser, Maaïke; Plazier, Paul: Identifying uncertainties in policy processes: analysing practices of city logistics policy makers.
- Rosner-Manor, Yaara: Jerusalem as an 'accelerated time machine': how can we respond to massive development pressures without destroying the fragile qualities of historic cities?
- Stolk, Egbert; Caliskan, Olgu: A complexity-cognitive view on time in urban design thinking
- Tantoush, Mahmud; Solomou, Solon; Sengupta, Ulysses: Bridging Urban Big Data and Agent-based Modelling: A New Theoretical Framing for Uncovering Complex Patterns and Mechanisms
- Tayefehhosseinlou, Ardan: Dynamic Engagement: An Experimental Approach to Participatory Urban Planning
- Tilley, Kobe; Devos, Tim: Planning with/for temporality: applying a postgrowth lens to four Flemish cases of temporary urbanism
- Tiryaki Kesler, İrem Duygu: Temporal Dynamics in Urban Morphology: Exploring Socio-Spatial Processes
- Vanky, Anthony: Data Anecdotes & the Issues of Embodied Air Injustices

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