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Editorial Introduction

Sustainable, Smart and Systemic Design Post-Anthropocene: Through a Transdisciplinary Lens

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Abstract

Sustainability as related to the environment is now just over 50 years old. In that time, especially in regard to human artifacts such as architecture, it has largely focused on human priorities, and how they need to be modified to address or rectify environmental and ecological challenges. A new, post-anthropocene view suggests that it is also important to consider the environment as more than a backdrop whose state and appearance must be maintained, but rather as an actor in its own right, with its own interests, including the interests of the living non-human actors in the local ecology. This special issue seeks to explore this wider notion, and the editors view our introduction as an opportunity to present the journal theme, to introduce the authors and place its papers in context, and to welcome researchers and practitioners to explore this topic further.

Keywords: *sustainability, post-anthropocene, environment, non-human actors, "more-than-human", systemic design, transdisciplinary*

1. Introduction and Overview

This special issue consists of five papers exploring sustainable, smart, and systemic behaviour and design.

Society and the planet need to move beyond a focus on short- and medium-term human needs into design and behaviour that considers longer-term effects on the entire ecosystem and environment. The division of the technology and nature is not really helping the problem (Capra, 2002). The avenue toward post-humanism is a reckoning with planetarity and its incompleteness (Bratton, 2013). No geological age lasts forever. After the Anthropocene, in which human activity became the dominant influence on the planet, the Post-Anthropocene is dawning (Bratton, 2019).

With regard to the term "Post-Anthropocene", it should be noted that authors were encouraged to discuss all aspects, including Anthropocentrism and/or elements thereof (Horsthemke, 2019). In addition, transdisciplinary and systemic notions were considered relevant, since the topic in question required a range of disciplines and existing interdisciplinary approaches to explore, enhance, blend and bring forward key concepts being presented in this issue. Some of the papers are following current common trends of recalling indigenous cultures and implementation of their thinking into today technology (Kera, 2012; Vink, 2022; Zavoleas et al., 2023). This topic is becoming increasingly important when discussing the interconnectedness and inclusivity this planet needs to approach. We are all coliving, coperforming, and codesigning 'Gaia' (Lovelock, 2000).

Sustainable Smart Behaviour (SSB) is a recently developed methodological approach to investigate interaction between users and various environmental parameters for improving comfort, efficiency, and well-being through smart solutions within and beyond the built environment, that at various granularities take into account its embedding ecosystem and environment. Specifically, the context for the terms "smart and behaviour" in relation to systemic design, refers to ubiquitous technological developments, for observing, enhancing, modelling biological behaviour, via holistic, circular, iterative systemic approaches.

These terms can lead to an understanding of second-order cybernetics ("Cultural Patterns and Technical Change (from the 'Tensions and Technology Series'): A Manual," 1954; Glanville, 2004; Hall et al., 2012; Nousala & Hall, 2008).

Moreover, these concepts can also be used to explain how users can make a place sustainable and smart (Habibi, 2018). The term "sustainable" here should be understood as an ability to sustain, maintain, and strive for equilibrium (Nousala, 2009; Nousala et al., 2018).

The special issue focuses on human and/or non-human social interaction, behaviours and cohabitations supported by smart technologies for advancement of sustainable futures of Post-Anthropocene era (Bratton, 2013; Davidová, 2020; Davidová & McMeel, 2020; Davidová & Zavoleas, 2020). The approach is both data-driven and sensitive to ethical and other philosophical concerns. While continuing to address human social, economic, and societal needs, and acknowledging political realities, it looks carefully at the underlying biological, physical, and environmental strata. It is aware of concepts of 'hyperobjectivity' (Morton, 2013), and recalls the 'transition design' (Irwin, 2015) to Post-Anthropocene of possibly 'flourishing futures' (Ehrenfeld & Hoffman, 2013).

2. The Papers

In the first paper, Ing (2023) presents an overview of the history, background, and philosophy of System Change Learning, integrating classical Chinese thought with Western professional practices to revisit the Aristotelean trilogy of doing (*praxis*), thinking (*theoria*) and making (*poiesis*) to construct a distinctly inter-/trans-disciplinary and collaborative approach that unifies the three.

In the second paper, Nousala (2023) considers the impact of pre-existing conditions on design choices, and on the plausibility of (parameterized families of) transitions from the current state to possible short and longer-term successor states, specifically in regard to creating or preserving ecological support structures and possible long-term equilibria.

This is followed by three papers sharing an architectural and/or city planning perspective. First, Zavoleas (2023) considers the interactions of nature and architecture, mediated by technology and data analysis, while resisting the dehumanizing influence of the 'machinic' dogma, in which architecture (as well as other fields) is controlled by a combination of corporate and technical objectives, often following designs created by artificial intelligence. Rather, architecture is re-examined through a lens of systemic logic, ecosystem-focused ethics, and sustainability. To quote the abstract, this results in "a paradigm shift

that employs cross-disciplinary concepts, cultural knowledge, political ideologies, technology and computing altogether to respond to critical challenges of sustainable thinking for the Post-Anthropocene introduced in architecture's core discourse".

The second of these three papers, by Hu, Sibley, and Davidová (2023), examines one particular location and setting in depth, namely, the hillsides in the city of Chongqing, China. The paper looks at past changes and their (largely negative) effects on the local ecosystem, and suggests future strategies for landscaping and design based on a vision of sustainability and ecological stability, through an interaction of government, developers, citizens, and the local ecosystem. This is investigated through 'Systems Oriented Design' (Sevaldson, 2022).

In the last paper, also architecture-focused, after emphasizing the importance of viewing "green" and "sustainable" from a broad ecosystemic rather than simply human-focused perspective, Zimbarg (2023) looks at regenerative design of structures from buildings to cities, focusing on the former, with attention to environmental factors, and in particular, microclimate, which, as the paper observes, can differ from bottom to top of a building, and likewise, from lawn to sidewalk to street to intersection, and briefly describes a development platform to integrate these factors into design.

3. The Authors

David Ing is a Research Fellow for the Creative Systemic Research Platform (CSRP) Institute, incorporated in Switzerland. He is a past-president (2011-2012) of the International Society for the Systems Sciences, and continues as a trustee. He has authored and delivered course on systems thinking closer to home at OCAD University and University of Toronto, and internationally at Aalto University. In business activities, David had a 28-year career at IBM, with assignments in management consulting, market development, industry solutions and headquarters planning.

Yannis Zavoleas is Associate Professor of Architecture, University of Ioannina, Greece and Adjunct Senior Lecturer (honorary), University of New South Wales (UNSW), Australia. Prior to his current appointment, he taught architecture as Faculty member at UNSW, The University of Newcastle Australia, University of Patras and Technical University of Crete, Greece and has also been a Visiting

Academic at Dortmund Fachhochschule Germany, Architectural Association UK, and University of Cyprus. His research focus is on new modes of architectural thinking and practicing with interdisciplinary references from natural sciences, arts, and philosophy, as "tools for thought" by which to respond to challenges about the environment, culture and society for the Post-Anthropocene era. Yannis holds a PhD (2011) and a professional degree in Architecture (1996) from National Technical University of Athens (NTUA) Greece, an MSc in Comparative Media Studies (2004) From Massachusetts Institute of Technology USA, and a MArch (2000) from University of Los Angeles California USA.

Xiao (Bella) Hu is a current PhD student at the School of Architecture, Cardiff University, UK. Prior to this, she obtained two Master's degrees: one in Housing and Urbanization from the Architectural Association School of Architecture (AA School), and another in Architecture Design from Sheffield University. With nearly 7 years of work experience in architectural design, Xiao Hu has demonstrated a keen interest in exploring the intersection between landscape and building environments to achieve sustainable outcomes.

Magda Sibley, PhD, is an architect with 25 years' experience in full time academia, teaching and researching Architecture, and is currently with the Welsh School of Architecture at Cardiff University. Magda has an international reputation through her multidisciplinary research on Urban and Architectural Heritage in North African and the Middle Eastern cities, with a focus on courtyard housing and public bathhouses. She has mentored multiple PhD students in the UK, France, Egypt, Morocco, and Malaysia. Her recent research activities span History and Theory of Architecture and Environmental Design, with a focus on energy transition in heritage settings. Magda enjoys research-led, innovative teaching in Humanities and Architectural Design studios, to which she brings both interdisciplinary and international dimensions.

Finally, Ana Zimbarg is a Doctor of Design candidate at the College of Communication, Architecture and the Arts at Florida International University (FIU). She holds a Bachelor's degree in Architecture and Planning from Mackenzie University (2005), a Bachelor's degree in Visual Arts (2010) with a concentration in Multimedia, from the University of Sao Paulo, and a Master's Degree in BioDigital Architecture (2018) from the Universitat Internacional de Catalunya (UIC) in Barcelona, Spain. She is currently based in Melbourne, Australia, where she has been living and practicing architecture for over 10

years. Her current research interest consists of using technology to bring the built environment closer to the natural and biological environment as a strategy for sustainable architecture.

Capsule biographies for the two co-editors, Susu Nousala and Marie Davidová, also authors for this issue, may be found at the end of this introductory article.

4. Conclusions and Reflections

The first two papers provide an insight into approaches to sustainable, smart, and systemic design and behaviour as an interdisciplinary or even transdisciplinary approach. The first paper invites a change of perspective through thinking based on in-depth exploration and explanation of the background, and philosophical approach of systemic learning, and the relationship to change. The author does this by introducing us to the concept of System Change Learning and unpacking the potential and versatility of this thinking for future applications, in particular, collaborative approaches. In the second paper, the author discusses, explores and presents examples of the concept of pre-existing conditions, that perpetually impact and influence ecological support structures. The notion of such parameterized groupings, or families of transitional states, are truly noteworthy, since these tacit behaviours provide insight into the impact on structural balance of ecological, long-term well-being. The remaining three apply this approach in various ways to the integration of architecture, environment, and human and non-human values. They envision cities of Post-Anthropocene where multiple beings colive, coperform and codesign in synergy.

It is clear that the world needs to take this view into account, both for continued human and non-human experience and for the survivability and sustainability of the ecosystem. In the future, we would hope to see this analysis applied more broadly to domains beyond architecture and smart city planning, approaching design of everyday life. These likely should include, for example, information technologies for wilderness management and conservation, including citizen science and various forms of service design, but might also address corporate structures and planning, recommendations for legal frameworks and international agreements, resource use, and more.

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Susu Nousala, PhD, is the founder and current Co-President and Director of the Creative Systemic Research Platform (CSRP) Institute, which seeks to develop systemic project-based learning programs with international partners. Susu is also a Senior Researcher at Kaunas University of Technology, and the University of Melbourne, and a Professor at Global Humanistic University (GHU) in PhD program. She has previously held Professorships with the College of Design and Innovation, Tongji University, Shanghai, China and with Wuhan University of Technology, and has directed master's theses and doctoral dissertations at those and other institutions. Susu's research interests include social complex adaptive systems, creative systemic research, soft systems engineering and management, and the study of interdisciplinarity, with numerous workshops, presentations, and publications spanning these and related areas.

Thomas J. Marlowe is Professor Emeritus of Mathematics and Computer Science at Seton Hall University, where he taught courses for over 40 years, in mathematics, computer science, data science, and interdisciplinary studies, and was coordinator of the computer science program for over 20 years. Tom holds a B.S and M.S in Mathematics from Seton Hall University, and an M.S. in Computer Science, a Ph.D. Computer Science, and a Ph.D. Mathematics, all from Rutgers University. He enjoys collaborating and interacting, and actually (usually) likes detail editing. Although Seton Hall did not offer graduate programs in the formal sciences during his tenure, he has authored or coauthored over 100 papers, with scores of academic and industry collaborators, including undergraduate and graduate students. His publications span diverse areas across the formal sciences and decision science, including algebra, algorithms, collaboration (including risk analysis, intellectual property issues, and development structures and processes) and information science, language support for real-time systems, program optimization and analysis, software engineering, and computer science pedagogy (including problem-solving and critical thinking), as well as topics in mathematics, information science, and interdisciplinary studies. Tom is a founding member of the International Society For Transdisciplinary Communication (AFTC), and an active member of the Creative Systemic Research Platform (CSRP) Institute.