Cite this article
Dolan T (2020)
Editorial. *Proceedings of the Institution of Civil Engineers – Smart Infrastructure and Construction* **173(2)**: 17–18,
https://doi.org/10.1680/jsmic.2020.173.2.17

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Smart Infrastructure and Construction

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Editorial

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This special issue of *Smart Infrastructure and Construction* presents three research papers drawn from the 2019 International Symposium for Next Generation Infrastructure (ISNGI) 2019. It complements a previous special issue publishing research from ISNGI 2017. Moreover, a further ISNGI-themed special issue for 2021 is currently under development.

Since its inception in 2013, ISNGI has focused on promoting interdisciplinary research into, open-ended conversation on, shared understanding of, and industry, government and academic collaboration to address, future infrastructure challenges. In 2019, the sixth symposia in the ISNGI series was held in Buenos Aires, Argentina. ISNGI 2019 brought together an international community of interdisciplinary infrastructure practitioners to focus on systemic infrastructure research challenges linked to the themes: infrastructure system-of-systems thinking; sustainable infrastructure; intelligent infrastructure; adaptive infrastructure planning; funding and finance for infrastructure; value characterisation of infrastructure for society; infrastructure development in the face of climate change.

At the time of the symposia, a global pandemic on the scale of COVID-19 existed on national risk registers solely as a very low probability but high-impact risk. Therefore, the papers in this special issue predominantly present research developed in a pre-COVID world. However, in all cases the global experience of the Coronavirus pandemic strengthens, rather than diminishes, the importance of the themes covered by these papers. Moreover, this conviction is shared by the authors published here. For example, the lead author of the first Briefing paper (Leach and Rogers, 2020) has recently drawn on aspects of their work on interdisciplinarity to develop The UKCRIC prospectus 'Rethinking infrastructure and cities for a Covid-19 world' (Leach *et al*., 2020), and the second paper (Tyler, 2020) has been updated in the context of COVID.

In the Briefing paper, 'Embedding transdisciplinarity in engineering approaches to infrastructure and cities', Leach and Rogers (2020) explore the conceptual and operational challenges faced by specialisms (including civil engineers) as a result of the fundamental mismatch between the principles of certainty, accuracy, precision and prediction that underpin many approaches to the design, construction, operation, governance, management and maintenance of infrastructure and city systems; and the complex emergent systemic reality of interdependent infrastructures and city systems, which often require transdisciplinary approaches to the above. The paper concludes by proposing a set of four principles for successful transdisciplinary research, with the aim of laying the foundation for transforming research in infrastructure and cities by leveraging emergent, transdisciplinary approaches.

In the paper 'Next-generation infrastructure for next-generation people', Tyler (2020) makes a compelling case that understanding of next-generation infrastructure needs requires a broad historical perspective rooted in the history of the planet and explicitly linked to the needs of the people it serves. Tyler illustrates that since the beginnings of the Industrial Revolutions and increasingly in the past 100 or so years, these needs have been excluded from city design and infrastructure decision-making processes. He introduces the concept of sociality, the propensity to interact freely with unknown others and argues for a refocus for urban engineering, on the concept of sociality, so that infrastructure is directed to enhancing the ability of people to converse as a basic and initial form of the function of social interaction. The article issues a challenge to the infrastructure sector and proposes some initial lines of thought and ways forward to enable a successful response to the challenge posed.

The European Commission's 'Clean Energy for All Europeans' programme identifies 'citizen energy communities' as a core component of energy decarbonisation. In the paper 'Digitalised, decentralised power infrastructures challenge blockchains', Deconinck and Vankrunkelsven (2020) identify decentralised electricity generation, ubiquitous digitalisation, and the increasing electrification of the power supply as significant themes driving the emergence of local energy communities and opportunities for peer-to-peer energy trading, where customers buy and sell electricity among each other. They assess the potential role of distributed information technologies, including peer-to-peer control paradigms, and distributed ledger technologies such as blockchain in supporting the digitalisation and decentralisation of power infrastructure. They investigate and qualitatively evaluate the potential advantages of different implementations of blockchain technologies, and associated smart contracts, for larger-scale peer-to-peer energy trading. Comparison is made against a classic, centralised approach.

To learn more about ISNGI, including upcoming webinars and access a comprehensive back catalogue of outputs from previous ISNGI symposia including keynote presentations, conference proceedings, special issues, please visit http://www.isngi.org.

Additionally, we believe the papers published in this special issue complement the objectives of the SMIC journal, and the significant body of research published by SMIC. We would like to remind

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