Challenges for circular urban development

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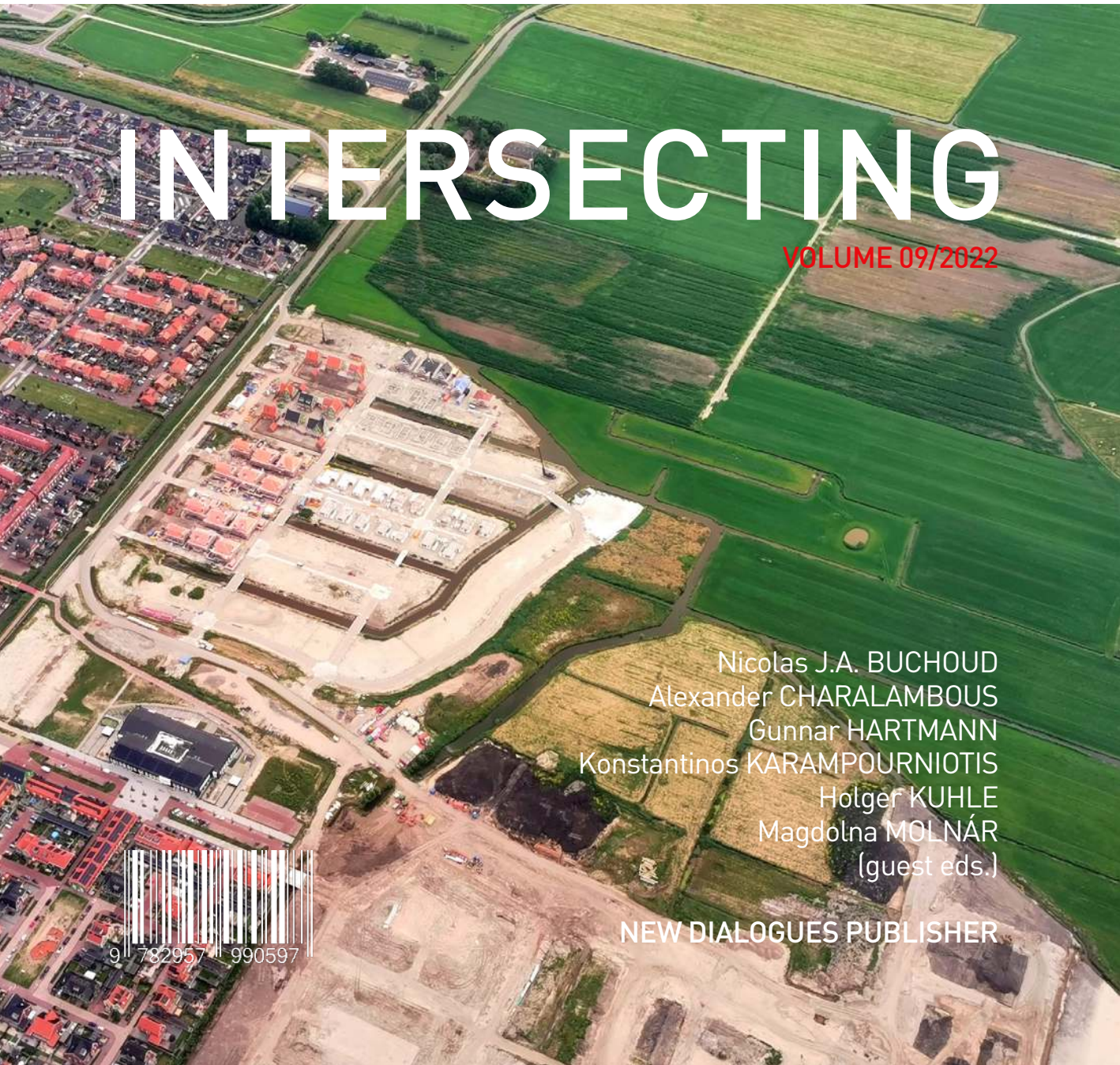

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"The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."
—Alvin Toffler (1980)

That our world is growingly complex is hardly a radical revelation. The challenge is to act accordingly. To widen our knowledge, we specialize and consequently isolate ourselves in various silos.

In face of overwhelming evidence of our interrelatedness and interdependencies, from our bodies to our environment and our actions within it, we have no other choice than to work at the edges and at the crossroads.

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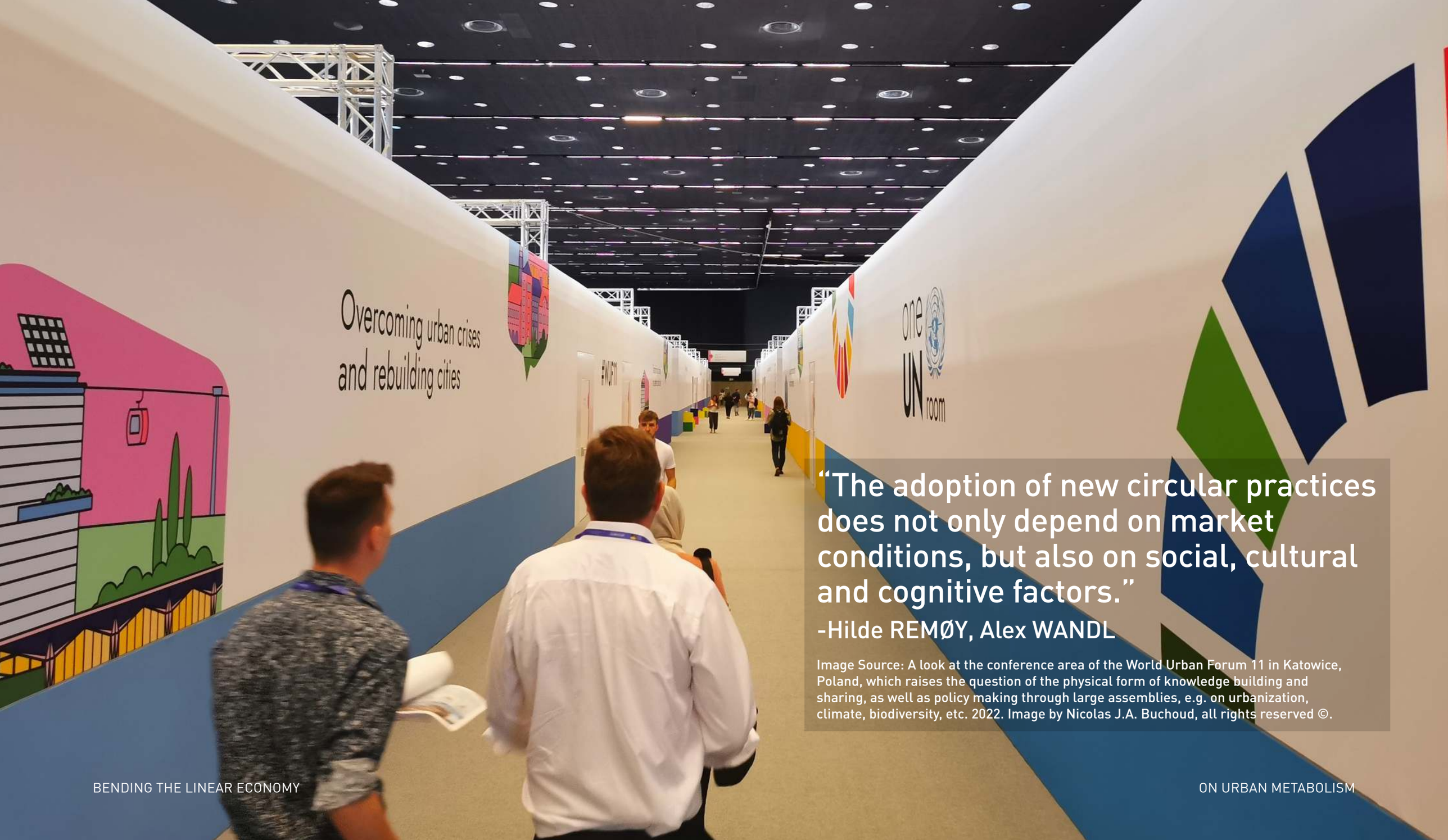

“The adoption of new circular practices does not only depend on market conditions, but also on social, cultural and cognitive factors.”

-Hilde REMØY, Alex WANDL

Image Source: A look at the conference area of the World Urban Forum 11 in Katowice, Poland, which raises the question of the physical form of knowledge building and sharing, as well as policy making through large assemblies, e.g. on urbanization, climate, biodiversity, etc. 2022. Image by Nicolas J.A. Buchoud, all rights reserved ©.

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Challenges for circular urban development

A shift towards a more Circular Economy is, in many policies, seen as crucial to achieving a more sustainable and inclusive built environment that meets future demands. In the last decade, the European Commission's research funding has supported numerous initiatives aiming to reduce waste generation through shifts towards Circular Economy approaches. Many cities and regions followed and started to develop circular economy strategies, action plans and circularity monitors. The difficulties and challenges of implementing a seemingly simple concept are mainly to narrow, slow down and close materials streams and thereby reduce our dependency on raw material input. Europe's geopolitical dependency on resource-rich countries has become very apparent during the last years. In this article, we identify some of those challenges and propose potential ways forward.

Neglecting the double role that the built environment plays in the transition to circularity is a fundamental issue. Most policies and activities focus on the fact that the building and deconstruction sector is one of the most polluting and resource-intensive sectors globally. Modular design, design for de- and re-assembly, a focus on refurbishment instead of demolition and the shift towards bio-based building materials are all state-of-the-art and have become more common practice, specifically in new building projects. However, the (perceived) housing shortage in many European cities and the call for quick and cheap production of houses may have adverse effects because it often leads to the linear, business-as-usual approach of the construction sector.

Widely underestimated is the role of the built environment in defining the spatial playing field for all other sectors of the economy that aim to go circular. The "circular city" has, as the car-oriented or the pedestrian-oriented city did, a specific urban form and structure as well as a dedicated infrastructure system. Since most industries focus on efficiency gains in their production and on material and energy synergies with other companies, there is little knowledge of how to (re)integrate forms of large-scale industrial symbioses, reuse, sharing and recycling into our cities while also

improving the quality and liveability of urban environments.

A specific challenge is that parts of the production chain, like mining, scraping and recycling, that were outsourced to countries with lower environmental and social standards – thus shifting our environmental burdens – will have to return to Europe if we want to have control over scarce resources. Automation, newer and cleaner technologies will help dampen the negative impacts. Still, urban planning and design in Europe will have to deal with environmental and social challenges, which we haven't dealt with for half a century.

Crucial for the aspects above is an understanding of the urban mine and the materials, components, and products at our disposal in the future. With building information models, building passports and digital city twins, we have the technology at our hands to gather the information for new buildings and infrastructure. However, implementation is slow and international (data) standards are lacking. The knowledge concerning the existing building and infrastructure stock is meagre and often limited to amounts of material. Still, knowledge of the quality and re-usability of building components sits with a few frontrunners in the sector. The situation asks for a fundamental change in the building sector, starting with architects, who have to design with the urban mine in mind; the builders who need to learn to apply new building techniques and the deconstruction companies that have to become material and components brokers. Developing buildings or parts of buildings as a service instead of selling it to future owners, may be one way of simplifying this process, as the responsibility for the materials components and related data stay within one entity.

The extended life span of buildings and infrastructure adds another level of complexity to the transition toward circular cities. To ensure that expected positive effects of the shifts towards a circular economy are actually becoming a reality, and to avoid or at least to indicate unintended negative consequences, monitoring systems have to be established. The few available urban circular economy monitors all suffer from the same weaknesses, and public data is often limited to waste. Cross (national) border data is insufficiently available. Data about the treatment of waste outside of Europe is sketchy at best. To improve this situation, legal changes on the European and national levels have to take place, which will take years.

A tendency to maintain current practices is one of the main barriers for developing a more circular built environment. Adoption of new practices does not only depend on market conditions, but also on social, cultural and cognitive factors. Considering the dynamics of diffusion of innovation, organizational change is essential to foster the transition to a circular built environment. While the exponentially increasing prices for materials and construction products encourage the shift to circularity in construction practices, this trend needs to be further accelerated. To achieve a broader uptake and the motivation for circularity in society, several paths

will need to be adjusted. Architects and real estate developers will need to change their business models and develop their design expertise. Real estate investors and asset managers need new value propositions and assessment models. The governments should steer circularity and prioritise circular initiatives. Finally, the end-users, being house, office, industry, retail or leisure owners or tenants, must also understand the necessity of change. In order to realize the transition towards a more circular environment, new forms of collaboration and participation of wider groups of industry and society are needed.

Image Source: The polder area of “The Pearl” in Doha, Qatar, with Bariya Beach (foreground) and Marsa Arabia (background) Marina. A real estate and infrastructure project worth over $10 billion led by UDC-United Development Company, a Qatari investment company. The Pearl is located on over 4 million m^2 of reclaimed land. September 2022. Image by Nicolas J.A. Buchoud, all rights reserved ©.

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