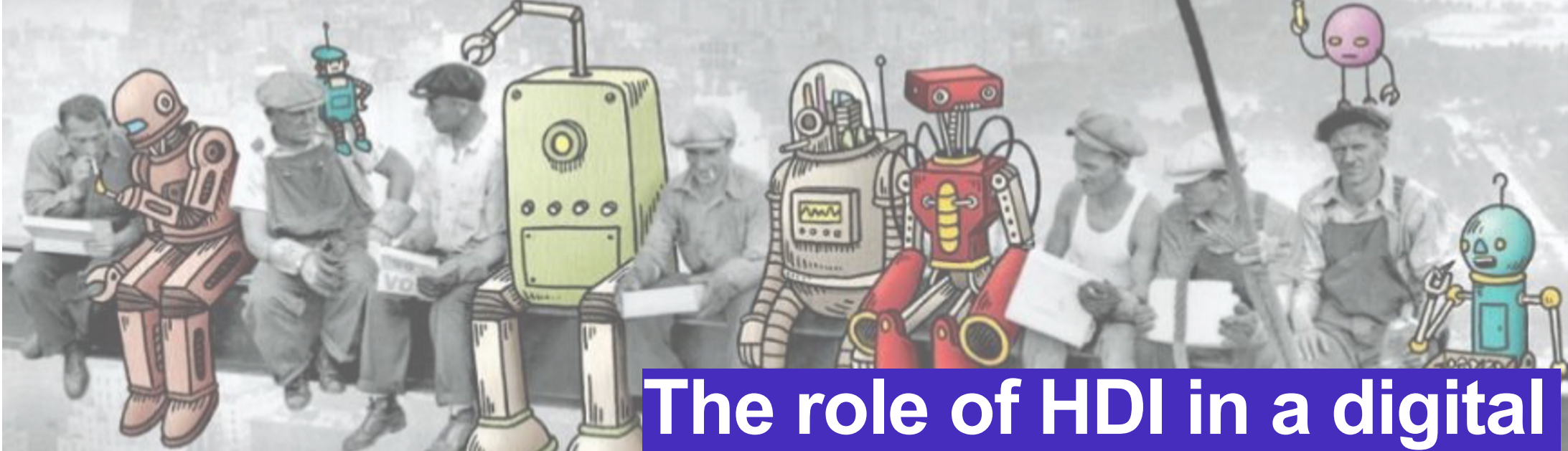




International Council
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**The role of HDI in a digital
infrastructure that can enable the
delivery of affordable housing at scale**

Dimosthenis Kifokeris

What is Human-Data Interaction (HDI)?

- HDI examines how people create, interpret, use, influence, and are affected by data and data-driven systems
- **In the built environment:** Interactions between humans and data throughout planning, design, production, operation, and use
- Understanding HDI can improve the economic, environmental, and societal outcomes of built assets for both involved and affected stakeholders
- Three principles of effective HDI:
 - Legibility: Data and algorithms are understandable
 - Agency: People can influence how data are collected and used
 - Negotiability: Data-driven decisions can be revisited as needs and contexts change
- Central HDI concerns: Trust, accessibility, safety, human control, empowerment, and enhanced understanding



<https://www.burohappold.com/articles/construction-needs-to-embrace-a-data-led-built-environment/>

HDI in a digital infrastructure for affordable housing at scale

- **Demand and needs interaction:** Residents, housing providers, municipalities, and communities contributing data on affordability, household needs, accessibility, location, and service priorities
- **Participatory configuration:** Residents and clients interacting with understandable BIM, dashboards, or immersive environments to evaluate predefined layouts, options, and trade-offs
- **Production feedback loops:** Designers, factory workers, suppliers, and managers continuously creating and consuming data on design status, materials, quality, progress, logistics, and defects → Supporting learning across projects and replicating successful solutions in production
- **Operational and resident feedback:** Occupancy, energy, maintenance, comfort, and space-use data feed back into design and production platforms → Potentially reducing whole-life costs (e.g., energy performance, operational efficiency) beyond just the initial production cost
- **Human-centred governance:** Residents and workers retain visibility and appropriate influence over data access, automated recommendations, and consequential decisions



<https://blogs.uwe.ac.uk/built-environment/human-robot-collaboration-in-construction-project-presented-in-uwe-research-events/>

HDI <> industrialised construction <> Total BIM

- User interfaces through which management, preparation, and control of activities, flows, resources, and results, become visible, interpretable, and improvable across design, factory, supply chain, site, and use
- Reconciling production repetition with human needs by feeding structured resident, worker, supplier, and operational data into platform development
- **Scale alone ≠ affordability:** Speed must benefit the client, and factories require suitable and continuous demand; shared demand, capacity, supply, cost, and performance information can clarify these dependencies
- Viewed through HDI, Total BIM can form an interaction infrastructure connecting designers, production planners, workers, suppliers, and managers around a shared representation of the evolving housing product
- Production data can support monitoring and data-informed decisions while capturing knowledge for reuse in subsequent housing projects
- **For affordable housing at scale: Ind. construction provides the repeatable physical production system; Total BIM provides the shared digital information backbone; HDI ensures that people can understand, shape, trust, and learn through that system**



Lindbäcks (2026) and Lidellöw (2026)



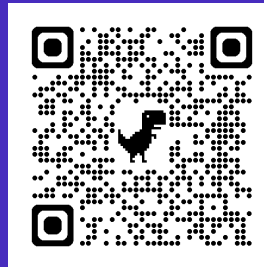
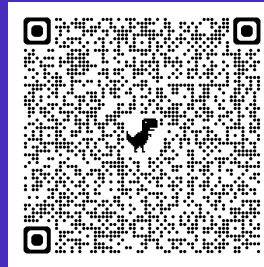
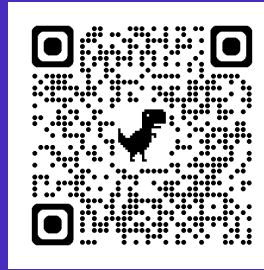
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**Kassem and Kifokeris (2024): The
official White Paper on HDI by the HDI
Committee of the European Council on
Computing in Construction (EC3)**

The HDI Committee of EC3



Thank you!

