

BIM trends for Smart City solutions

Real Estate Management Centre



Mihaela Meslec
Research Associate,
mesl@zhaw.ch

Smart City solutions for the whole life cycle management of real estate portfolios can be enabled by Building Information Modelling (BIM) which now has the potential to extend its applications when blended with latest complementary technologies. The related research outcomes were presented at the most important Smart Cities conference in North America.

Since the real estate industry is lagging behind when it comes to digital transformation, it has become essential to engage in conferences for the development and diffusion of new technologies as part of the process of implementation of good practices. An example is the contribution to the Ibero-American Congress of Technology and Innovation for the real estate industry framed under the umbrella term “Smart Cities” which took place in Guadalajara, Mexico. Responding to the invitation of the CITI AEC 2019 Organising Committee, the author presented her initial findings on the way BIM ecosystem could facilitate Smart City solutions.



From BIM to GeoBIM enabled Smart City solutions

Most real estate professionals focus on buildings even though real estate value is greatly influenced by the macro and micro location qualities. Consequently, the BIM processes are limited to improving the way buildings are designed, constructed and managed, through increased collaboration and so forth. However, BIM is not just about buildings; it is information modelling for the built environment. BIM platforms are starting to integrate information related to the urban context of real estate projects. On the other hand, GIS platforms are more detailed with the possibility to

integrate BIM models. Also known as the GeoBIM approach, this new integration supports sustainable development of cities which in combination with other trends, enable Smart City solutions.

BIM digital ecosystem for Smart Cities

As shown in the model below, BIM integrated with GIS can trigger Smart City developments when augmented by other digital trends, for example, extended realities, artificial intelligence, digital twins, Blockchain and so on. Based on a state-of-the-art literature review and an industry use cases review, the research identified seven digital development streams, which can extend the use of BIM in urban context to address sustainability challenges of real estate portfolios. These were identified in relation to user interaction, business models, financial and environmental modelling, whole life cycle phase, data use and stakeholder collaboration.

From the well-established BIM processes, as a step further in the real estate digital transformation, BIM has

extended its applications and impact into the whole life cycle management of real estate portfolios. This enables Smart City solutions by capitalising on blended technologies. One example is the transition from Project Information Models to Asset Information Models and ultimately Digital Twins of cities stored on decentralised data and collaboration platforms secured by Blockchain, an evolved form of a typical BIM common data environment. Furthermore, Extended Reality interfaces enable another level of interaction between the real urban context, the digital real estate and end-users.

To conclude, the technologies blend centred around BIM has unexploited possibilities in real estate. There is potential to develop new applications in urban projects such as real time life-cycle simulations, faster and more accurate valuations to maximise yields while minimising the environmental impact. The BIM digital ecosystem shows how integrating emerging technologies with BIM can make the transition from Smart to the next generation of Responsive Cities. ■

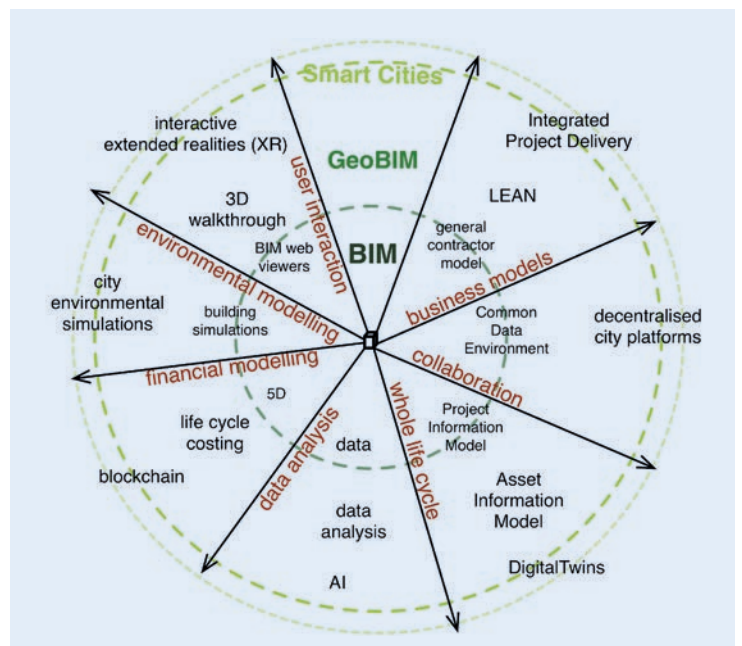


Fig. 1: BIM digital ecosystem for smart cities

Shedding light into the application thicket of hospitals



Dr. Nicole Gerber
Lecturer,
Senior Research Associate,
geri@zhaw.ch

Competency Group Hospitality Management

In a PhD thesis, a procedure reference model for the alignment of non-medical support service applications in hospitals was developed. It helps hospital ICT managers to align applications in a systematic, iterative manner and thus to improve transparency, stakeholder communication, resource management and controllability while reducing complexity, risk and cost. In so doing, the model can make a meaningful contribution to the development of a more effective healthcare provision.

Contributing in the background for a more effective healthcare provision

In hospitals, the application landscape is complex and – due to the fact that in the past ICT strategies were hardly ever holistically defined or implemented – often lacking transparency. At the same time, digitalisation currently poses various new challenges for healthcare organisations, both in the medical and non-medical context.

The goal was therefore to develop a model providing the necessary information about a standardised procedure and its significant aspects for aligning non-medical support service applications in hospitals so that relevant key performance indicators for systematic controlling and optimisation can be generated and configured as a basis for decision-making in the future. In a broader sense, the aim was to contribute to the development of a more effective healthcare provision and to bridge the gap between academia and practice.

Iterative, multi-methods approach

The model was developed based on a pragmatic philosophical grounding in a multi-methodological iterative approach including Design Science Research (DSR) principles for the modelling actions and mixed methods principles for the empirical research. In a first iteration, the relevance of the topic was researched in a survey. In a second iteration, the requirements for a possible model were determined by means of expert interviews based on which, in a third iteration, a procedure reference model was developed. In a fourth iteration, experts were asked to evaluate the model. Based on the findings, the model was then re-designed in a fifth iteration and in a sixth and final iteration, validated.

May I introduce: The model

The outcome of the thesis is the systematically developed and empirically validated “Procedure Reference Model for the Alignment of Non-medical Support Service Applications in Hospitals”, illustrated in Figure 1. The model comprises

- six component models,
- the metamodel
- two input documents and
- a documentation for application as integral parts.

All documents are available and downloadable under

zhaw.ch/ifm/fm-healthcare/procedure-reference-model

Most importantly

The key findings of the research were that

- the model implementation should be carried out in small steps, iteratively and with a long-term perspective
- the challenge of the context is not the technology, but rather the systematic stakeholder management
- the lead should be taken by someone who understands both the model and the business in addition to having the competence to influence the development together with the stakeholders involved
- the proper implementation causes an initial effort which, however, pays off mid- to long-term if done well.

Benefits for practice and scientific community

For practice, the benefit of using the model increases by the extent of the adaptation according to specific individual needs and by the degree of inclusion into the internal continual improvement processes. When applied regularly and competently, in a mid- to long-term perspective, the model can help to reduce complexity, increase transparency and security, improve stakeholder communication and controllability, optimise resources and thus to reduce cost. For the scientific community, the thesis contributes to the development of multi-methodological DSR approaches suitable particularly for complex and multi-disciplinary environments. ■

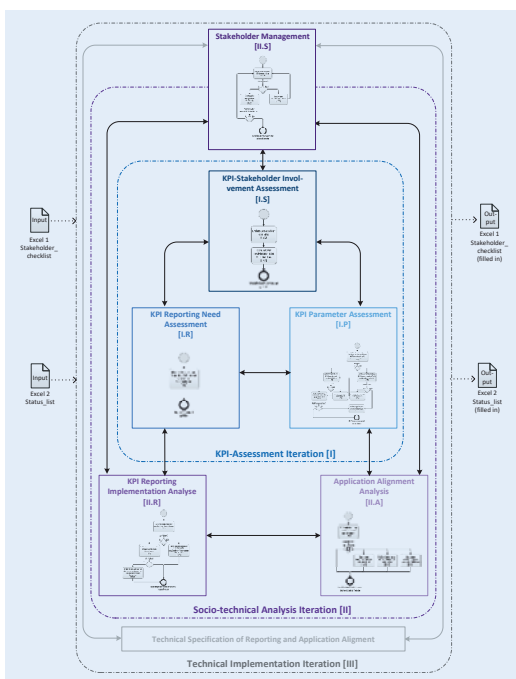


Fig. 1: Procedure Reference Model for the Alignment of Non-medical Support Service Applications in Hospitals