How can we make data-driven decisions to reduce whole life cost and carbon?

7D BIM.

For
Housing
Associations

CARTWRIGHT
PICKARD

MACKINTOSH SCHOOL
OF ARCHITECTURE
THE GLASGOW
SCHOOL OF ART

What is 7D BIM?

7D BIM integrates advanced BIM (Building Information Modelling) with cloud-based whole life cost and carbon databases to allows those in the architecture, engineering and construction industries to more accurately predict whole life cost and carbon, enabling us to understand the long-term viability of alternative design options.
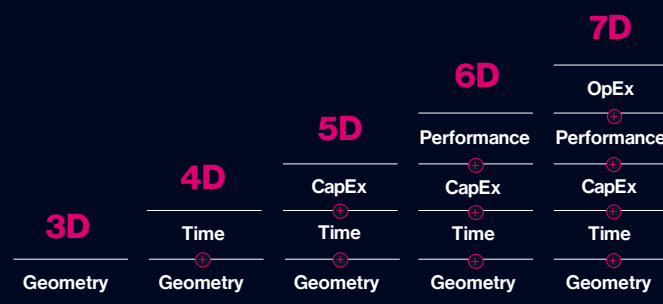
According to research, the cost of operating a building over a 30-year period can be four times the cost of designing and constructing it, and 80% of the operation, maintenance and replacement costs can be influenced in the first 20% of the design process.

Our research champions data-driven decisions for safeguarding the future, empowering you to deliver long-life, lower-cost buildings. This involves data collected during the design and construction phases of a project, as well as collating information once a building is complete, helping to inform new briefs and processes, providing accurate estimation of a building's performance.

The aim is to move away from historical data, instead defining information requirements and data structures to collect data in-use and therefore monitor performance. This will also allow accurate financial projections for a building in operation. It also directly addresses the Construction Sector Deal's goal of achieving a 33% reduction in the capital and whole life cost of buildings and 50% reduction in carbon emissions.

With the UK one of the most expensive locations to build in the world, 7D BIM will enable a new approach to design and construction, ultimately saving the industry huge financial strain whilst protecting the future of our planet.

"The concept of Building Information Modelling (BIM) is well established, but we haven't yet unlocked the full value of this approach. Drawing on the concept of 7D BIM, our research shows that whole life building performance, and therefore the cost of operating a building, can be estimated from the earliest design stages of a project."

3D	4D	5D	6D	7D
				OpEx
			Performance	Performance
		CapEx	CapEx	CapEx
	Time	Time	Time	Time
Geometry	Geometry	Geometry	Geometry	Geometry

Start

Design decision 1

Design decision 2

Continued process

Summary of WLC analysis for final design

What are the benefits for housing associations?

As a housing association who builds, manages and maintains your assets for the long term, we believe that 7D BIM has the potential to offer you significant benefits. These include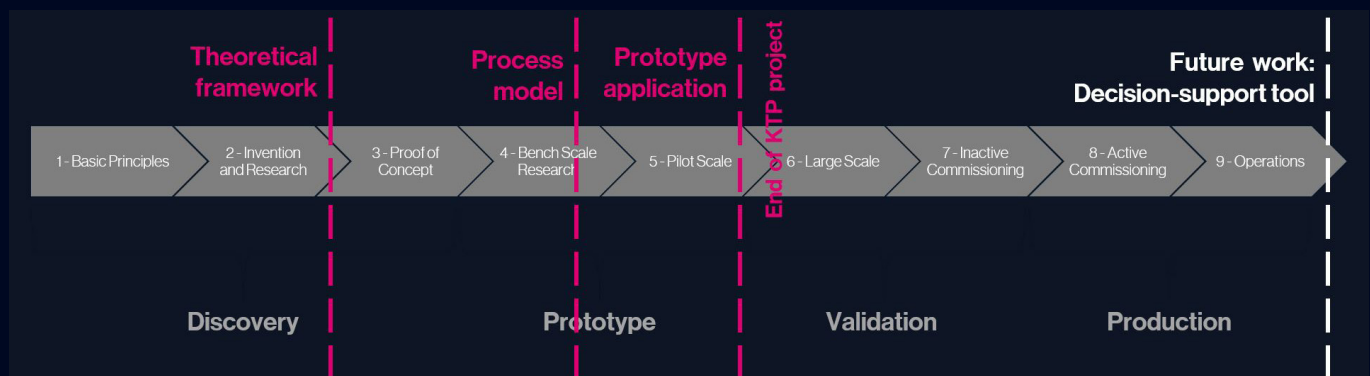 reducing the whole life cost and carbon of your built assets, minimising the maintenance burden and creating a feedback loop to inform future briefs and projects. The result? Higher quality buildings, healthier homes and happier tenants.

Lower whole life cost

Reduced carbon emissions

Improvements to productivity

Minimising maintenance

Less waste

Continuous cycle of improvement

Higher quality buildings

Happier, healthier occupants

What's next?

The working prototype application and process model that serve as proof of concept have been developed in a two-year Knowledge Transfer Partnership (KTP) research project which concluded in January 2020.

We are now looking for industry backing and investment to deliver the next phase, which will bring a software application to market and enable professionals across the construction industry to benefit from this pioneering research.

Theoretical framework	Process model	Prototype application	End of KTP project	Future work: Decision-support tool

1 - Basic Principles → 2 - Invention and Research → 3 - Proof of Concept → 4 - Bench Scale Research → 5 - Pilot Scale → 6 - Large Scale → 7 - Inactive Commissioning → 8 - Active Commissioning → 9 - Operations

Discovery	Prototype	Validation	Production

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Recent housing projects

The Reed

Wembley Park

Somerset Place

7D BIM industry partners

BLP INSURANCE

Vistry Partnerships

MORGAN SINDALL CONSTRUCTION

PROSPERITY CAPITAL

etex building performance

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