A Collaborative Life-Cycle Process to Enable Optimum Building Operation

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INTRODUCTION

- Building consumed 41% of primary energy consumption in Europe 2010.
- Most of buildings operate inefficiently, as they consume 20-30% more energy than necessary.
- Given that there are 190 million buildings in EU as of 2009 and 80% of these buildings will exist in 2050, an approach to efficient operation of existing and new buildings is required.

Objective(s):

- **Create and implement a methodology that fosters collaborative stakeholder interaction over the entire Building Life Cycle (BLC)**
- **Develop and demonstrate a novel interoperable process to bridge the gap between design intent and actual operation**

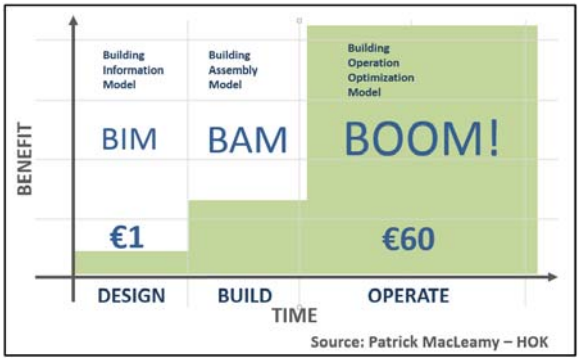

Fig. 1 *The financial and operational benefits of BIM are most evident during operation but this area has not yet been exploit*

RESEARCH QUESTIONS

1. What are the data exchange requirements that would facilitate interoperable data exchange among life-cycle project stakeholders?
2. Is there a collaborative process that would facilitate the life-cycle performance optimisation of buildings?
3. What is the appropriate ontology to represent performance definitions for life-cycle evaluations by multiple stakeholders?

METHODOLOGY

- Develop a novel methodology for the explicit purpose of qualitative and quantitative life-cycle performance analysis of buildings by collaborating project stakeholders.

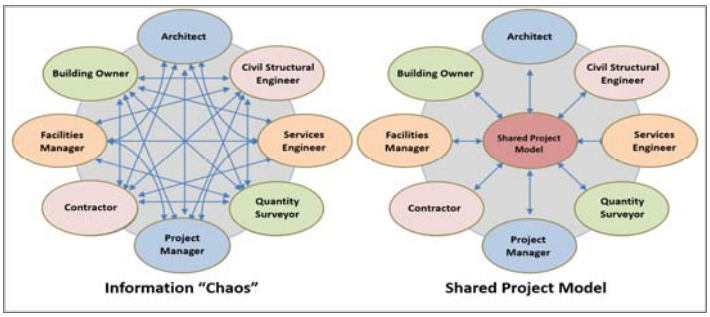

Fig. 2 *Interoperable or shared data models offer enormous efficiency benefits over point-to-point data exchange between project stakeholders*

- Enable collaborative decision making through a virtual and physical environment such as iRoom which contains a central server and a number of interconnected smart boards.

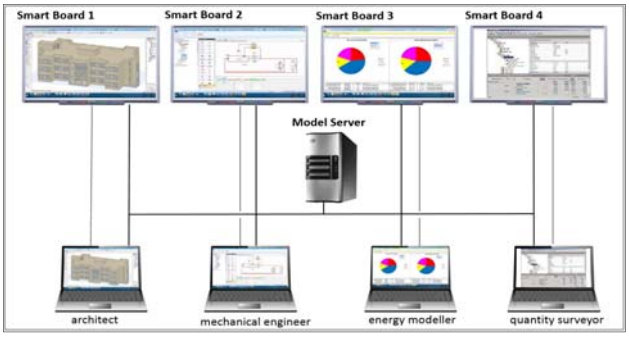

Fig. 3 *Example setup for collaborative design session*

- In this case the MVD will adhere to the ISO standard IFC format and facilitate standardised information exchange for the purpose of performance analysis.

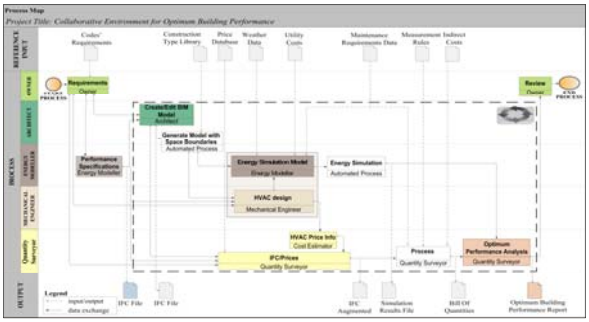

Fig. 4 *Preliminary collaborative process to deliver optimum building performance*

FUTURE WORK

- Extensive literature review
- Established the data exchange requirements for the collaborative process
- Development of the new methodology
- Testing and validation of the optimum operation concept in an appropriate test case building

ACKNOWLEDGEMENT

This work was conducted in the Electricity Research Centre, University College Dublin, Ireland, which is supported by the Electricity Research Centre's Industry Affiliates Programme (http://erc.ucd.ie/industry/).

Sergio Pinheiro is supported by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).