

# Improving Build-in Quality by BIM Based Visual Management

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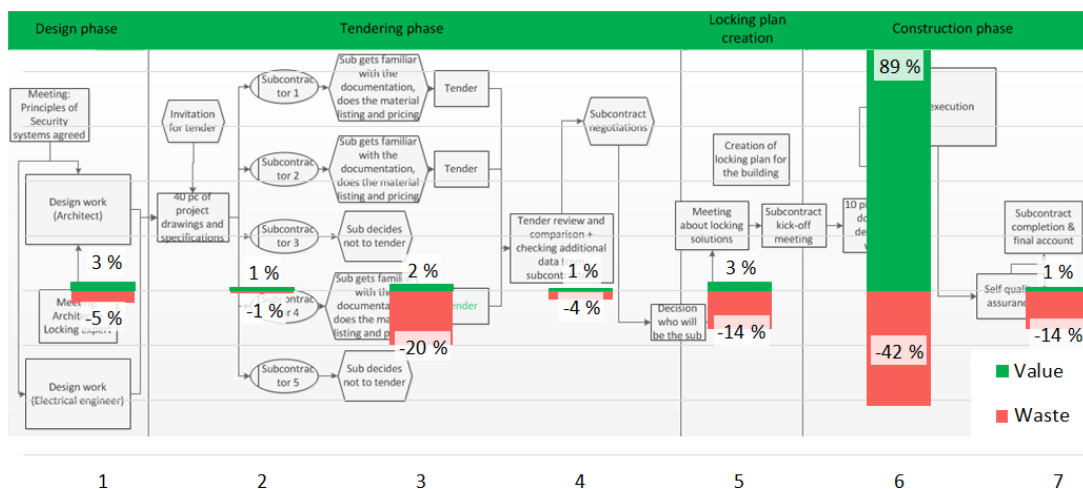
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## I. Background

Seven deadly types of waste exist also in construction business, especially due to poor information management. In order to improve the information management it is crucial to understand the importance of integration of three core areas, namely people, process and information systems. Those companies, which have already recognised this and are implementing the integration, are on their way in transforming from good to great companies.

## II. Current conditions

- Efficient and flawless information management plays a key role in successful execution of construction projects, but it has been difficult to implement in the traditional document-based environment
- Even in a relatively small work package, like locking and iron mongery, a significant amount of waste can be created as depicted in Value Stream Map below:



- A root cause for waste in construction projects is inaccessible, inadequate or missing information. Typically the necessary information is produced by several parties and it is often fragmented, inconsistent or in an impractical format.

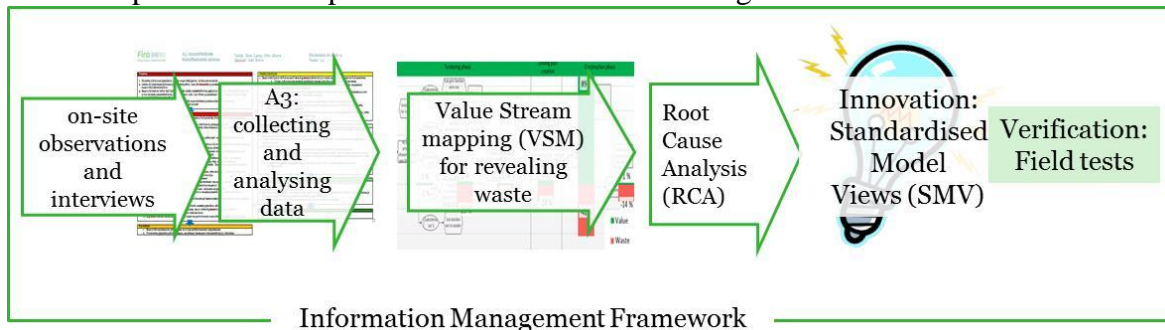
## III. Working hypotheses

- 1) Information Technology (IT) is widely used by the participants in construction projects, but the information delivery and exchange between participants fails
- 2) If people, process and technology are not integrated, the information management will fail
- 3) Efficient process implementation requires combining Visual Control and BIM

4) Waste can be substantially reduced by creating Standardised Model Views (SMVs) based on the needs of the information consumer. Also, the use of SMV enables process re-engineering.

## IV. Research Method

The research was conducted by observing and analysing the case project on site for one year. Research process was implemented in Information Management Framework as shown below:



## V. Research Findings

Three SMVs were designed and tested in the case project: 1) Visualisation view for the client with passage ways of doors, 2) mobile user interface for the locksmith and 3) Spread sheet view for tendering phase.

The SMVs were simple and visual, easily understandable packages of project information. The data content of SMVs was customized based on the information needs of the information users in a predefined process.

The SMVs diverge from Information Delivery Manuals (IDMs) because they combine information from several BIMs as well as other project information which in many cases is not even in IFC-format, while IDMs are defining the information exchange requirements between two individual parties using IFC-format.

## VI. Conclusions

In summary, by using SMVs through the whole project, the waste detected in VSM would reduce 10% of the working hours for a single contractor. From the main contractor's perspective, the standardized model views would enable delivery of built-in quality by the subcontractors.

However, the use of SMVs is a solution only to a part of the detected root causes for waste and decreased quality. They are extremely efficient in those cases where new working methods or processes are accepted because of their benefits for individuals or single companies. Remaining problem is the change required for the whole network of subcontractors, since it would require designing and deploying a relatively large number of SMVs and each subcontractor should change their processes and train their personnel simultaneously.

The most efficient way to change the incentive for participating companies is changing the business model of the construction industry. Relatively new contracting models, such as IPD and Alliance, provide a totally different type of earning logic compared to currently popular hard-bid contracts where the participants are interested to minimise their own work rather than optimising the value of the whole project. A change in earning logic could create the much needed common incentive for renewing both processes and information management, which is mandatory for built-in quality.