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	Business Case: Building Programing	bSI/Jan Karlshoej	20130312	a

Business Case

Descriptive name: Building Programing

Summary

Background

In current AEC practice client requirements are typically recorded in a building program, which, depending on the building type, covers various aspects from the overall goals, activities and spatial needs to very detailed material and condition requirements. This documentation is used as the starting point of the design process, but as the design progresses, it is usually left aside and design changes are made incrementally based on the previous design solution. As a consequence of several small changes and without any conscious decisions to change the scope, this can lead to a solution that may no longer meet the original requirements.

In addition, design is by nature an iterative process and the proposed solutions often also cause evolution in the client requirements. However, the requirements documentation is usually not updated accordingly. In the worst case the changes are recorded just in the memory of the participants, and in the best case in meeting or personal notes. Finding the latest updates and evolution of the requirements from the documentation is very difficult, if not impossible.

This process can lead to an end result which is significantly different from the documented client requirements. Some important client requirements may not be satisfied, and even if the design process was based on agreed-upon changes in the scope and requirements, differences in the requirements documents and in the completed building can lead to well-justified doubts about the quality of the design and construction process.¹

Objective & Proposal

The objective of this business case is to insure that the designed and constructed building is in accordance with the client's requirements. Client's requirements should be recorded precisely and updated if they change during the design project. The designed and constructed building should continuously be compared with the client's requirements in order to avoid identifying mismatches

¹ Based on *Requirements Management Interface to Building Product Models*, Arto Kiviniemi, Stanford University, TR #161

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as soon as possible, since this can lead to time delays and significant additional costs for both the clients, designers, contractors and suppliers in order to correct the problems. Another objective is to reduce the number and cost for lawsuits during or at the end of construction projects as it will be easier to monitor deviations between the requirements and the solution during the process.

The proposed solution is based on a registration of the client's needs in a computer interpretable format based on the buildingSMART Data Model and buildingSMART Data Dictionary. By identifying specific requirements for the building functions, spaces and components it is both possible to store the information in a structured way, monitor changes and automate validation of the suggested solution from the designers and contractors with the client's requirements.

By using well defined open standards both the client and suppliers have the freedom to use their own favourite buildingSMART compliant tool to create, validate and compare data.

It is possible to store a large amount of requirements in buildingSMART Data Model and Data Dictionary and there are tools that support parts of but not the full standards. There are anyhow a need for extensions of the standards and to define exactly how and which information that has to be delivered during briefing, design, and construction in relation to client's requirements. There is also a need for development of the tools and mechanisms that can guarantee that the created information is of sufficient quality. This can be done by certification procedures.

Alternatives

There are alternative to the proposed solution. One option is to continue the existing time consuming process of collecting and selecting a minimum of information from different media in order to managing the assets. This option will keep the situation as status quo and leave limited possibilities to increase the productivity and better use of the assets.

Another option is to leave the standardisation efforts to the market and let the dominate player on the market to decide how data should be structured. This is a realistic option but makes it difficult for the clients to have impact on the development. It is unlikely that this option would lead to a standardized solutions that no will be of the benefit of the client and the suppliers.

If one player on the market is able to set the de facto standard, which could lead to monopoly that has historically been shown to develop an inefficient market situation and limited competition and innovation. Public clients in many countries are not allowed to specify specific products and data formats, which means they are forced to look for other solutions. As many buildings and infrastructural elements are owned by public clients, a proprietary solution is – both in general and from society's point of view – a bad solution. From an

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investor's perspective, this may be acceptable solution as it does not have a negative influence on profit.

Benefits

The proposed solution will provide benefits in many different areas. It will:

- Streamline identification of client's requirements in an open format
- Stimulate the market to develop software tools to capture and share client's requirements in relation to buildings, spaces and components
- Stimulate design tools to handle client's requirements as an integrated part of the function to create design and renovate buildings.
- Create the possibility to automate validation of designed and constructed building with the client's requirements.
- Enable better control of changes in the requirements and thereby earlier get an estimate of the impact of cost.
- Avoid costly rework due to mismatch between the requirements and the constructed building.
- Provide the freedom to select the best tool for the job rather than being limited to use tools from few or one vendor.

Disadvantages

It is necessary to harmonize individual client specific requirements to the highest possible level of harmonization in order to enable software tools that can provide information of high quality.

It will only be possible to achieve the expected benefits if the communication based on open standards is supported by information providers that produce information of sufficient quality.

It is expected that an initial disadvantage that it will be necessary to validate and add content to the standard as needed. There will be a time gap until the revised version of the open standard is implemented in software products.

Consequences

In order to achieve the expected benefits it will be necessary to require information delivered according the buildingSMART Data Model and buildingSMART Data Dictionary.

It is necessary to insure sufficient and relevant information are provided as specified, but demanding use of certified software products and data should be validated be they are submitted.

Finance

Identify data elements.

Harmonization of requirements

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Education of staff

Demand digital delivery

Method

The information flow will be based in the use of open standards and mandated from the suppliers.

The overall process should be completed in measure step that provide benefits since significant and large steps have proved to be difficult to manage and be successful.

Work packages

Not specified.

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