# Contribution of Facilities Management to Value creation

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**Abstract**

R&D project "OSCAR- Value for users and owners of buildings" has now reached a point in its period from 2014 – 2017 where results starts to come. This study is based on a national survey among Norwegian owners and users of real estate, private as well as in public sector. There has been to identify which elements in real estate and facilities management that creates value for owners and users. Through SPSS descriptive statistics and one-way ANOVA data are analysed. Data from the survey confirm there are a number of common items and their relative importance for private enterprises, public administrations and hybrid organizations. Ranking of the items gave interesting results. Many owners and users of buildings seem to overlook recent research concerning value creation. The methodology and tools, including questionnaire, so far is a result of research and development projects including bachelor -, master - and PhD studies in Norway and Slovenia.

**Keywords**: Facilities Management, value creation, owner, user

## Introduction

A discussion about value creation in the FM and RE field is often associated with the concept of value (Hjelmbrekke & Klakegg 2013, Temeljotov 2005), added value (Jensen & Voordt 2015, Finch 2012, Lindholm 2008); benefits on customer value (Menon et al. 2005); and value network of relationships (Coenen et.al 2012). Hjelmbrekke & Klakegg (2013) state that value creation is the result of human activity, which is the only source of new value. They stressed that not all value that is created is captured, and not necessarily by the same actors that create the value. From the user perspective, the value elements are connected with better living condition, like sustainability, adaptability, reliability, flexibility, perceived value for benefits (Sarasoja & Aaltonen, 2012, Haynes, 2008, Menon et.al 2005, Thompson 1990, Zeithaml 1988). For the business, the focus is in the harmonization of the resources and provisions (Coenen et.al 2012, Jensen et.al 2012, Huovila & Hyarinen 2012). The concept of value creation or added value changes the perspectives cost reduction orientation of FM (Jensen et.al 2015, Coenen et.al 2012, Sarasoja & Aaltonen 2012, Boge 2012). A change from FM as a mean for cost reductions to FM as a mean for value creation may increase outsourcing of FM, thus it can facilitate innovation and increase value creation.

Seen from a sustainable point of view we agree with the statement that 'sustainability has become the strategic imperative of the new millennium' (Galpin et.al, 2015). Sustainable solutions includes long lifetime orientation for the buildings in public and private sector. From many conferences in the area of life cycle (LC) planning and economics during the years 1995-2015 (CIB W70, EFMC, IALCC, ICCREM, CEN, ISO, IFM), it is seen that the knowledge is emerging within academia, but is still largely absent in practice.

A huge backlog is seen in Norway (Bjørberg & Temeljotov 2012), due to improper design looking from the future operation and maintenance of buildings and neglected proper management, operation and maintenance (MOM), both resulted in decreasing quality level of the buildings and accumulated need for maintenance. All decisions made in the early design phase have a consequence in the user phase, such as LCC (Life Cycle Costs). In addition to the technical condition, it is worth to mention how buildings affect the core business effectiveness over time. It is seen that changes and new needs in the core business lead to new performance requirements, so buildings are a deciding factor for continuous efficient operation of the core business (Valen et.al 2014). Experience from last decades also shows changes in core business itself due to new ways of working, new ways of organizing, and new technology, which cause low building performance and core business economy and higher the

costs for enhancement. From a life cycle perspective, it is crucial to minimize enhancement costs (Bjørberg & Verweij 2009).

In Norway LCC was put on the agenda in 1978, (Bjørberg et.al 2005), and the first Norwegian standard on LCC came in 1988 (Norwegian Standardization Body 1988). The classification of LCC was supported in Nordic countries (Bjørberg et. al 2005), on European level (Langdon 2007) and within ISO (I5868, part 5 'Whole Life Costing'). All mentioned levels include LCC approach for new buildings and existing ones. The increased focus on LCC in Norway started after the public procurement law was revised (Listerud et.al 2012), in which the net present value (NPV) calculations of the consequences of the investments over a defined period is required. From the perspective to make better decisions, client can calculate different alternatives of investments. A good built environmental orientation is included in Norwegian Government´s White Paper Stm 28 (2011-2012) 'Good buildings for a better society – A future looking policy'. It is mentioned that sustainable building should satisfy core business demands over time and that building should be adaptable for the future changes.

A building is seen as a deciding factor for continuous efficient operation of the core business, and adaptability is seen as an important factor from a life cycle perspective in order to maintain the functionality and thereby contribute to a positive value over the LC. The term "adaptability" is defined (Bjørberg et.al 2004), as a function of:

- Flexibility (F): Possibility to change layout (space distribution).
- Generality (G): Possibility to change function (type of core business).
- Elasticity (E): Possibility to change volume (vertical and horizontal addition).

Level of adaptability differs in accordance with building type and 'Service life period' (fig. 1). 'Service life period' (SLP) is a period between the needs for enhancement. If SLP is long, a need for adaptability is lower than the one with short SLP (Bjørberg & Verweij, 2009).

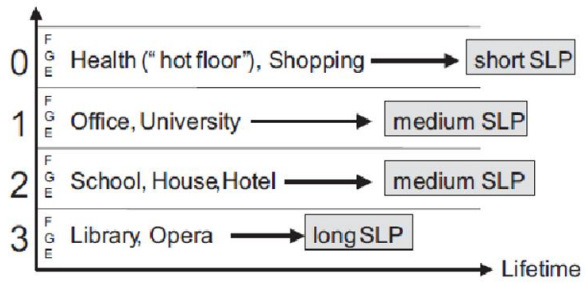


Fig.1: Level of adaptability

From the sustainable point of view, a total life cycle should be as long as possible. We should be aware that a period for early phase planning (with early design phase), detailed design and construction is very short from a life cycle perspective. However, all decisions made in the early phase planning have an important impact for the rest of lifetime, where facility management (FM) plays an important role to obtain value for owners, users and society. Therefore, the important issue is to bring FM, which is according to EN 15221 responsible for "Space & Infrastructure" (hard FM) and "People & Organisation" (soft FM), to the early phase to make an impact on early decisions. The expansion of the stakeholder group by involving FM into a project, with its specific role, tasks interests, values, competences and resources can enrich the future value of the project (Eikeland 2001). All this can influence the value creation throughout design, construction period, and therefore a project total lifetime. As mentioned by Shen et.al (2013) from Value Management perspective it is important to coordinate various actors' values before early planning the project. The project has to look at the needs from the early analysing phase through all phases of building lifecycle.

**Oscar project**

The research project 'OSCAR – Value for User and Owner of Buildings' (Oscar) with the main intention 'to develop competences, methods and analysis tools for optimizing building design in a way to contribute to value creation for owner and end-user throughout its life time' started in 2014. The project takes into consideration a clear connection between the design and operation of the buildings and values for the owners and users. To achieve value creation processes, it is necessary to have competent actors who have good tools for decision and communication through projects and processes. Life Cycle Aspect is essential as an input in Early Design Phase, and the processes through the following phases have to assure its inclusion in a way that value creation is complied with the User Phase.

The research findings in Oscar are a result of cooperation with 20 project partners from three countries from academic, private and public sector, representing all stakeholder groups. In accordance with findings from literature review and purpose of the project, the relevant stakeholder groups for Oscar are owners, users, planners/ designers, consultants, FM providers/ contractors and society. Oscar research the possibility to achieve more sustainable buildings by collaboration of stakeholders from the early beginning with the goal to maximize value for owner and user over building's lifetime. In figure 2 Oscar lifetime phase plan is shown, including refurbishment phase, demolition phase and decision gates.

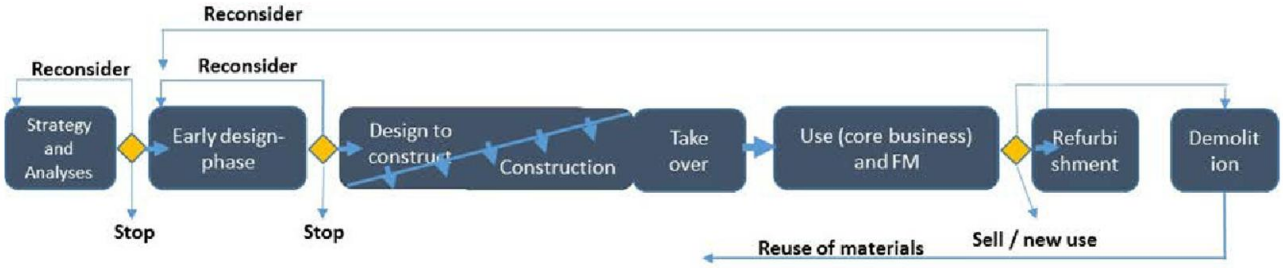


Fig. 2: Oscar phase plan throughout lifetime

To obtain main goal in Oscar project four working packages (WP) are defined, namely:

- WP1 - Early phase planning: to define the knowledge, how to contribute to value in user phase as an input in Early Design Phase (focus on characteristics, which contribute to value creation);
- WP2 - Execution process: to define models which execute contribution to value creation;
- WP3- Methods and tools: to design methods and tools as an interactive guideline (focus on cost benefit evaluation simulation model and information for user phase);
- WP4 - Implementation of results.

To get an overview of all results from Oscar, we structured information in the "Value contribution model" (fig. 3). WP1 have main value dimensions in sustainability: Economy, Social, Environment supplied with Physical Situation. For WP2 the chosen dimensions are Contract, Economic Incentives, Knowledge and Processes for Quality Assurance. Those elements will follow into all phases from Early Phase Planning including Early Design Phase (EPP), Detail Design Phase (D), Construction Phase (C) to Operation Phase (building in use) (O). WP3 shall be the catalyst to bring decided characteristics from EPP into value creation process throughout the life cycle.

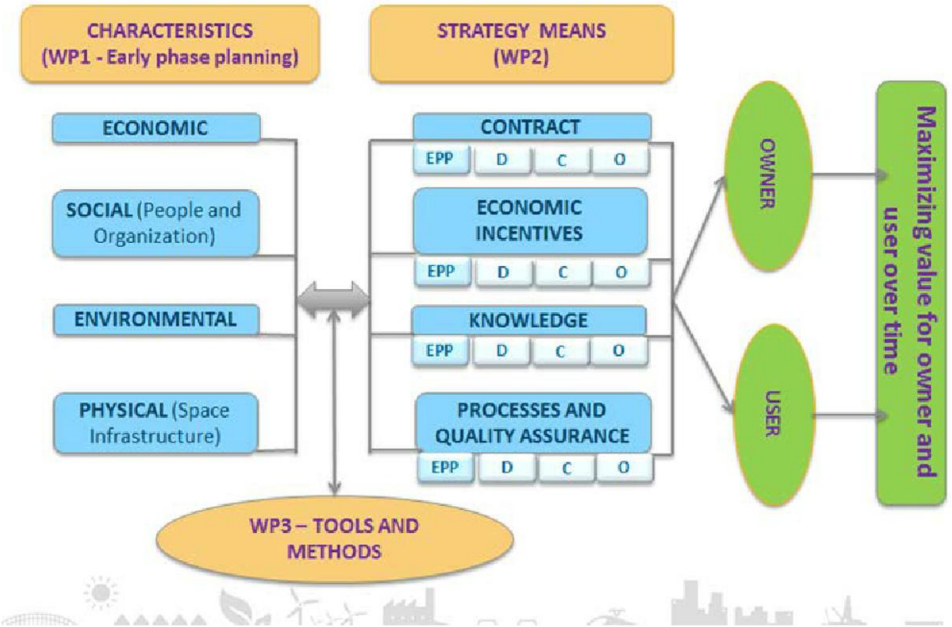


Fig. 3: Value contribution model

Based on the European standard, EN 15221 and the 4 elements in WP1 as a value contribution model, a value contribution mind map was sat up to show the impotence of interaction between building and social aspects to achieve value for user and owner, see figure 4. The research is led by Anne Kathrine Larssen, Multiconsult, Norway.

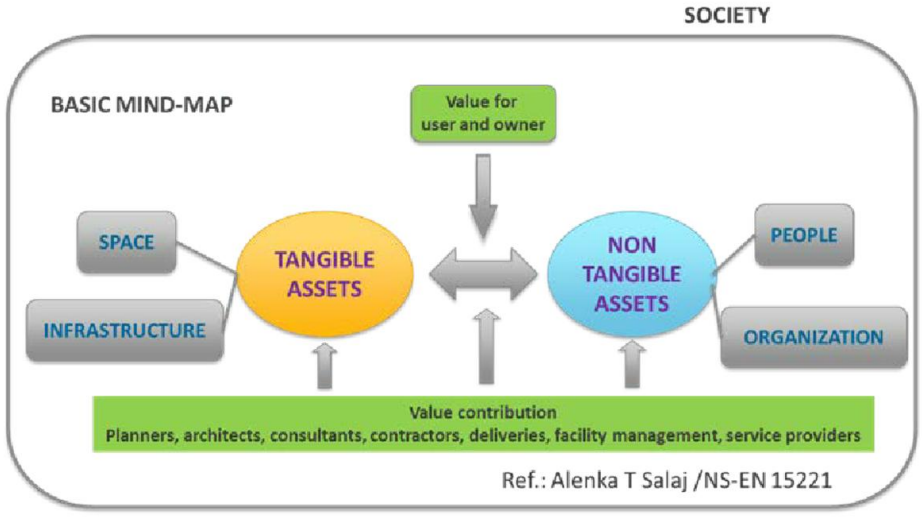


Fig. 4: Value contribution mind map

## Methods

Methodology used in this project is based on both qualitative and quantitative research methods such as literature review, case studies, questionnaire, interviews and workshops. The online questionnaire was developed based on findings in Oscar's literature survey during the fall 2014, several workshops and meetings with the research consortium's partners during the second half of 2014 and early 2015, and even some students' bachelor and master thesis written during the spring 2015. Cohen (1988) recommends use of surveys if the aim is to get a better understanding of commonly held opinions and ratings. Approximately 3000 responded in total who gave their opinion on value creation from owner and user perspectives in several questionnaires. The stakeholder groups represented in the surveys were owners, planners and designers, consultants and contractors, and FM providers. Questionnaires were structured in 3 sustainable elements Economy, Social, Environment, supplied with Physical Situation and Obstacles for not achieving successful projects.

One of the questionnaire was running as a national online survey in Norway from May 2015 until mid-October 2015. The main channels for distributing the invitation to participate in the survey were business sector organizations such as Norwegian Building and Real Estate Association, the Architects' association, and the Consulting Engineer's association. This survey did not address end users of RE and FM, but addressed specifically respondents working with RE and FM on strategic or tactical level in their organizations. The respondents (N = 837) who answered the web survey are not a result of random sampling. It is thus not possible to generalize the results. However, the sample gives a good picture of Norwegian owners' and even users on strategic and tactical level (customer) perspectives on RE and FM in private enterprises, hybrid organizations and public administrations. According to Cohen et al. (2000), questionnaire based surveys may produce more reliable results than interviews, because surveys are anonymous, which may encourage greater honesty from the respondents.

The questionnaire includes the respondent's demographic data, the questions concerning the economic dimension (11 items + open question), the social dimension (11 items + open question), the environmental dimension (9 items + open question), the physical dimension (11 items + open question), and obstacles against value creation (18 items + open question). This paper emphasizes the four value dimensions and obstacles against value creation.

All questions about the respondents' background, except the age question, are nominal level variables, and thus inherently qualitative. The questions in the four value dimensions have a

four item Likert scale on ordinal level, ranging from 'No emphasis' = 1, 'Some emphasis' = 2, 'High emphasis' = 3, to 'Very high emphasis' = 4, and 9 = 'Don't know/'Not relevant', and thus inherently quantitative. The questions about obstacles against value creation have a four item Likert scale on ordinal level ranging from 'No obstacle' = 1, 'A small obstacle = 2, 'An obstacle' = 3, to 'A major obstacle' = 4, and 9 = 'Don't know/'Not relevant', and are also inherently quantitative. The survey data have been analysed with IBM SPSS version 23. The most important analytical methods have been descriptive statistics (frequency, mean, etc.).

## Findings

Since "value" is one of main words in the projects, it was necessary to decide a usable definition for Oscar. From literature review about value aspects we found many different definitions of value, value creation or added value (Jensen & Voordt 2015, Galpin et.al 2015, Hjelmbrekke & Klakkegg 2013, Jensen et.al 2012, Huovila & Hyarinen 2012, Boge 2012, Coenen et.al 2012, Sarasoja & Aaltonen, 2012, Finch 2012, , Haynes, 2008, Lindholm 2008, Temeljotov 2005, Menon et al. 2005, Thompson 1990, Zeithaml 1988).

Based on that, it was concluded within the project partners to use for Oscar next definitions:

- Value: the project value should be a result of owner's strategy for the project.
- Value creation: process needed to achieve value.
- Added value: innovation and possibilities throughout the project process which can increase value outcome.

Value for the owner of the project, the client, will be a part of the strategy and must be communicated to the stakeholders. Hjelmbrekke et al. (2015) concludes that many projects become a motherless child due to three perspectives:

- Client does not manage to translate his strategy into tangible project requirements;
- project teams are torn between loyalties throughout project period; and
- user requirements rarely come to prevail.

Some interesting findings from the bachelor and master thesis are given.

To avoid negative consequences when changing project program it is important to have a system for change management and make a "manoeuvrable area for successful project", Hartmann (2016), established in early design phase as a part of project framework, which is a

balance between dimension (needs, technology), project finance (sustainable economy) and politics (strategy, value, future changes).

Sødal (2014) concluded that there are many advantages and no disadvantages with contractor involvement in early design, but there are some challenges such as conflicting interests, establish trust and mutual respect, and involving subcontractors at the right time. FM can be one of those.

PPP models with good specifications is not necessary synonymous with owner value creation, but an open constructive dialog has a positive effect on value creation, Aamodt et.al (2015). Urdal & Aarseth (2015) have some of the same conclusion for schools operating in PPP contracts and they emphasize special competences on client / owner side. This kind of models are strong incentives regarding time, costs LCC) and quality. Munthe-Kaas (2016), has examined PPP projects that has been in user phase for several years and concludes better maintenance regime with better standard due to good SLA´s (service level agreements) and indoor climate. Result of all this is improved learning environment for students and working environment for teachers.

In campus projects, such as universities and colleges, both Hulbak (2015) and Spiten (2015) emphasize the importance of user involvement in early design. This can improve the daily experience using the campus. Especially ground floors, including areas between buildings, should be a total social zone with all kind of services, meeting – and working spaces. Students work today continuously on computer and there is a lack of outlets in this areas to day. This is a small detail but has big impact for student wellbeing and –working. Hareide (2015), conclude value in hospital campuses is buildings, which make optimum conditions for health treatments. Affecting factors are logistics, functionality, efficient operation of the buildings and infrastructure. To obtain this there are three strategies; i) adaptability, ii) life cycle planning and costs and iii) involvement of FM.

For office buildings, Ravik (2016) concludes high value for users is accessibility to suitable areas for different work, good indoor climate and –comfort. Results from questionnaire underpin literature findings about challenges with balance between privacy and interaction for office concepts.

In table 1 we can see the main results from the survey. Different aspects that are ranked with the highest and lowest importance rank are listed.

| Aspects | Highest importance | Lowest importance |
|---|---|---|
| Economy | • Investment costs<br>• Effect on core business<br>• Energy cost<br>• Cash flow (NPV) incl LCC | • Market value in case of sale<br>• Cost efficient services (soft FM)<br>• Yield<br>• Workplace cost in use |
| Environment | • Energy efficiency<br>• Long life materials / components<br>• Renewable energy resources<br>• Environmental friendly products | • Recycled / recyclable materials<br>• Environmental certification<br>• Greenhouse gas emissions<br>• Orientable (intuitive signs) |
| Social | • Indoor climate / comfort<br>• User involvement<br>• Security and safety<br>• Architectural qualities | • Facilities for physical activities<br>• Individual operation (sun, temp, light)<br>• Promoting pride (org. cultural value)<br>• Orientable (intuitive signs) |
| Physical | • Accessibility and universal design<br>• Area use (logistics, movements)<br>• Suitable materials with life span<br>• Technical condition / flexibility | • Generality (possibility to change function)<br>• Innovation<br>• Life cycle planning<br>• Parking facilities |
| Obstacles | • Adequate / clear project order<br>• Competence on user phase<br>• Multidisciplinary understanding<br>• Sufficient project organization | • Dominant technical professions<br>• Too much emphasis on technic and cost<br>• Insufficient use of digital tools<br>• Dominant role of architect |

Tab. 1: Ranking of aspects with high and low interest

The questionnaire is based on literature reviews in 2014 and 2015, and has been validated through several expert reviews and pilot tested on relevant groups of possible respondents. The data presented in this paper has been collected through a national online survey in Norway. The chosen sampling strategy, a combination of dimensional and purposive sampling gave a fairly representative sample of Norwegian RE and FM professionals on strategic and tactical level, which was the target group. In this study, the vast majority of respondents have high and medium high education.

Ranking of the aspects show the various items' relative importance. The answer to the question, namely 'What in early phase planning of RE projects and FM creates value for owners and user of buildings' is seen from the table. We have to notice that some elements which in the literature (see for instance Jensen et.al 2015, Hjelmbrekke & Klakkegg 2013, Sarasoja & Aaltonen, 2012; Bjørberg 2012; Haynes 2008; Menon et. al 2005) are considered very important for the buildings' long-term value creation, have relative low emphasis in early phase planning according to the present research's findings. The cost orientation is still in the foreground, environmental certification, generality and LCC are evaluated as lowest important.

For the early phase of projects, it is found in accordance to the literature that competences, collaboration and good management have an important role (Heywood and Smith, 2006, Woodhead, 2000). The expressed need is for: adequate and clear project order, better competences from the user phase, increased multidisciplinary understanding and sufficient project organization.

Based on Oscar goals and findings five Oscar principles are defined:

- **O**ffensively - To achieve good buildings for a better society, a precondition is to get satisfied users. Satisfied users make satisfied owners.
- **S**upportive - Buildings should be usable over time and have to meet changing demands from user and owner. Adaptability, life cycle planning and – economy is in front line.
- **C**ompetent - Right composition of competence in early design phase is a prerequisite to see and understand the potential, possibilities and limitations within owner's idea and strategy.
- **A**ddressing - An «OSCAR-bridge» with clarified information flow, decision gates and quality assurance must be executed between early – and user phase. This delivery of competence will secure transfer base for value creation.
- **R**esponding - Access to adequate documentation must be understandable and easy available for all stakeholders in user phase.

## Conclusions

From literature review, it was found that there are many definitions on value, value creation and added value. Because of this, it is concluded to use OSCAR definitions as:

- Value: the project value should be a result of owner's strategy for the project.
- Value creation: process needed to achieve value.
- Added value: innovation and possibilities throughout the project process which can increase value outcome.

Early design phase team should have stronger participation and competences from facility management and core business area (user involvement), in addition to integrated architecture and technology, that user's needs and value creation perspective is secured. The defined value for the project must not suffer because of other stakeholder's value concept.

FM as a competence is the partner with longest contribution to value creation due to the long user phase with changing demands and needs. All experiences from FM must be an active in early design phase with special emphasize coordination of users need. FM should set up premises for adaptability, especially for core businesses with short service life periods between necessary refurbishments, and accessibility for efficient operation and maintenance of building and infrastructure and LCC budget. Throughout the possesses of the project, FM should be a part of quality assurance activities to assure that decided characteristics from early planning phase follows the project.

Furthermore, FM should also look into alternative solutions regarding LCC and core business cost due to materials, systems, components and space distribution. All this put a demand on FM competencies regarding actual type of core business.

Totally, projects has to develop from choosing lowest investments cost to look into life cycle economy where investment together with LCC and core business costs has impact value creation. In this game FM can take a leadership and develop Value Management.

Based on Oscar goals and findings five Oscar principles are defined.

- Designing 'Good construction for a better society.'
- The building should be sustainable over time.

Value competence team in early phase planning.

- Secure value creation from early phase to user phase.
- Activate experience from user phase.

Knowledge about the stakeholder groups' preferences makes it possible to develop strategies for increased value creation during early phase planning of buildings. Further research is necessary to investigate whether this study has identified some general patterns concerning value creation from RE and FM during early phase planning of buildings.

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