

CHALLENGES FOR IMPLEMENTING THE SUSTAINABLE DEVELOPMENT GOALS IN THE DANISH CONSTRUCTION INDUSTRY: BUILDING OWNERS' PERSPECTIVE

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The construction sector holds great potential and responsibility in achieving the United Nation's 17 Sustainable Development Goals (SDGs). The aim of this study is to investigate how the SDGs can be implemented in construction projects in a Danish context, and which challenges building owners face working with the SDGs. A focus group workshop was held with 22 professional building owners to investigate which challenges they encounter and what is needed to support successful implementation, along with a survey focusing on their current implementation of the SDGs. The results showed that the five SDGs with the highest prioritization among the building owners were Goal 7 (affordable and clean energy), Goal 11 (sustainable cities and communities), Goal 13 (climate action), Goal 8 (decent work and economic growth), and Goal 12 (responsible consumption and production). 94% of the building owners had implemented, or wished to implement, the SDGs in various degrees. The main challenges experienced by the building owners were a lack of local indicators, tools and methods to support the implementation of the SDGs in construction, knowledge regarding the SDGs among the building owners, and extra costs related to the implementation of the SDGs. The main solutions suggested to overcome the challenges were the development of new tools and methods supporting the practical application of the SDGs in construction, e.g., dialogue tools for goal setting and prioritisation and for measuring performance regarding the SDG in construction, along with practical examples and knowledge aimed towards the actors within the construction industry. This study provides valuable insights of the challenges experienced by professional building owners regarding the implementation of the SDGs, as a point of departure for future research and developing practical solutions to support the implementation of the SDGs.

Keywords: sustainability, SDGs, prioritisation, barriers, Agenda 2030

INTRODUCTION

In 2015, the 193 United Nations member states agreed on the 2030 Agenda for sustainable development, marking a global milestone in the field of sustainability and sustainable development (United Nations, 2015). The 2030 Agenda included 17 goals

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for sustainable development (SDGs), supported by 169 targets and 231 global indicators, dedicating equal attention to the environmental, social and economic dimensions of sustainability (Diaz-Sarachaga *et al.*, 2018; United Nations, 2015). The construction industry holds a great potential and responsibility for contributing to the realisation of the 2030 Agenda. About 40% of energy use and one third of greenhouse gas emissions world-wide is related to the built environment, which entails increasing attention on sustainable development within the construction industry (Nielsen *et al.*, 2016). While the environmental focus is urgent, a holistic approach to sustainable development is necessary to ensure healthy, high quality buildings, without compromising the environmental and economic aspects (Kamari *et al.*, 2017). To establish a common ground for sustainable development within the building industry, the global and stable definition of sustainability provided by the 2030 Agenda can be valuable (Goubran and Cucuzzella, 2019).

As stated in the 2030 Agenda, the SDGs should be translated to the local and project-specific levels to become operational (Caiado *et al.*, 2018; Ike *et al.*, 2019; United Nations, 2015). In Denmark, an action plan towards 2030 has been developed and presented by the government in 2017 (The Danish Government, 2017), and currently local SDG indicators are being developed to establish a baseline for the Danish implementation of the SDGs (expected in 2020). Meanwhile, to ensure successful adaption and implementation of the SDGs in construction, the professional building owners plays an important part in setting goals for sustainability in construction projects, to push the ambitions towards the 2030 Agenda. Therefore, new methods and tools are needed to support the building owners in operationalising and implementing the SDGs. To focus this task, exploring the challenges/barriers experienced by the professional building owners is an important first step to further develop solutions towards overcoming these challenges. This paper therefore presents the results of an explorative study investigating the challenges/barriers of implementing the SDGs for professional Danish building owners, both on a strategic level and in individual construction projects. Along with the challenges, possible solutions are proposed.

LITTERATURE REVIEW

While sustainable building design has gained increasing attention in recent years, the academic literature investigating how the construction industry can contribute to the 2030 Agenda is still limited, partially due to the recency of the SDGs. A literature review from 2019, Goubran and Cucuzzella (2019) provide a state-of-the-art overview on how the 2030 Agenda and the SDGs have been utilized in sustainable building design. Furthermore, they propose two analytical mapping tools which can be applied to track the integration of SDGs in building projects (Goubran and Cucuzzella, 2019). Thuesen and Opoku (2018) suggested a research agenda for addressing the SDGs in construction, specifying four research areas to include; (1) an understanding of the relationships between the goals, (2) developing measures for evaluating progress, (3) addressing the target with specific projects and (4) the facilitation of knowledge transfer. Opoku (2016) investigated the built environment's role in achieving the SDGs, and highlights that the sustainable built environment in particular can contribute to socio-economic development and well-being of society. Additionally, Goubran (2019) identified SDG targets that depend directly or indirectly on construction activities, concluding that 17% of the SDG targets depend directly on the construction sector's activities, and 27% of the targets depend indirectly. A number of frameworks to support achieving the SDGs exist (e.g. the SDG compass (GRI *et al.*,

2016), SDG Capture (Niras, 2019) and the SDG impact assessment tool (Ramboll, 2018)). Also, Grainger-Brown *et al.* (2019) reviewed existing tools and frameworks for strategic implementation in organisations. However, the existing tools and frameworks are mainly conceptual and not adapted to the specific needs related to construction and building projects (Caiado *et al.*, 2018; Goubran and Cucuzzella, 2019). While the SDGs suggest a global framework for sustainable development, assessment frameworks for sustainable construction exist and have been adapted to local contexts. Therefore, these frameworks can potentially support the operationalization of the SDGs in construction. The link between the SDGs and existing sustainability assessment frameworks in construction has been explored in several studies.

Alawneh *et al.* (2018) explored the link between a number of LEED credits and the SDGs, followed by an investigation of a broader contribution of six rating system (LEED, BREEAM, CASBEE, Green Star, Green Mark and GBI) to the SDGs (Alawneh *et al.*, 2019). The link between CASBEE and the SDGs has been elaborated by Miyazaki *et al.* (2019), and the Danish Green Building Council (2018) mapped how the DGNB-DK criteria contribute to the SDGs. The barriers/challenges of operationalising and monitoring the implementation of the SDGs in general have been investigated e.g., in a literature review by Caiado *et al.* (2018) along with proposals of frameworks for strategic implementation of the SDGs (Allen *et al.*, 2019; GRI *et al.*, 2016). Also, Stafford-Smith *et al.* (2017) provided suggestions to how the SDGs can be implemented in an integrated way, and Jaiyesimi (2016) investigated the challenge of implementing the SDGs in Africa. However, there is a gap in the academic literature on the barriers and challenges for implementing the SDGs within the construction industry, including perspectives from the building owner. Several studies have explored the barriers and challenges of sustainable building design, e.g., (Häkkinen and Belloni, 2011; Opoku *et al.*, 2019; Tokbolat *et al.*, 2019), and while these results can provide valuable knowledge regarding the barriers for designing sustainable buildings, there is a need for research focusing explicitly on the implementation of the SDGs in construction projects, the authors argue.

METHODS

This explorative study seeks to investigate the barriers/challenges of professional Danish building owners in implementing the SDGs, and to suggest possible solutions to move forward. A focus group workshop was held with 22 building professionals representing both public and private building owner organisations, including four building owner advisors. The focus group method was chosen to ensure interactive discussions at this explorative stage of the study, and at the same time to enable knowledge sharing among the participants. The workshop participants were purposefully selected based on their interest in implementing the SDGs in construction projects. Prior to the workshop an online survey was sent to the participants, to investigate to which extent they were implementing the SDGs on both a strategic and a project specific level, and which SDGs and targets they had implemented. The survey consisted of close and open-ended questions, and the response rate was 91% of the workshop participants. The focus group workshop was facilitated by four academics and was divided in two main parts; a session focusing on barriers and a session focusing on possible solutions. The participants were organised in four groups and placed at four round tables. In the first session, the groups were given the task of discussing the challenges and barriers they encountered in relation to implementing the SDGs in their organisations and in individual construction projects.

After the discussion, each group agreed on the three biggest challenges representing the group discussions and presented them to the other groups. In the second workshop session, the same process was repeated with the focus on possible solutions to the challenges. Qualitative data was collected through audio recordings at each of the four tables and the written outputs of the workshop sessions in the form of post-it and notes. The data was analysed by first transcribing the audio recordings and post-it notes, followed by identifying and coding the themes emerging from the data (Brinkmann, 2014).

RESULTS

In this section, the results of the survey and focus group workshop are presented and discussed. The results are structured based on the themes which emerged from the data and includes a presentation of the main challenges experienced by the building owners and possible solutions to overcome these challenges.

Building owners' current implementation of the SDGs in construction

The results of the survey showed that 39% of the respondents currently work strategically with the SDGs within their organisation to some extent, 28% to a large extent, 22% to a minor extent, while only 6% respectively to a very large extent or not at all. This means that 94% of the respondents do work strategically with the SDGs to a varying degree. A majority, 78%, of the respondents answer that they have a strategy for sustainability within their organisation as a point of departure for implementing the SDGs, where 22% do not. Furthermore, the respondents were asked to which extent their organisations currently implement the SDGs in individual construction projects. To this question 50% answered to some extent, 28% to a minor extent, 17% not at all and 6% to a very great extent. Additionally, the respondents were asked to specify what their greatest motivation for working with the SDGs were. The answers varied from wanting to improve the built environment and the surroundings, contribute to sustainable development and be responsible for future generations, improve the climate and execute global responsibility. Other motivations were to improve the workplace and branding of the organisation.

SDG prioritisation

Should all the 17 goals be implemented in individual construction projects to contribute to the SDGs? On one hand, the SDGs should be viewed as a whole, in order to ensure the holistic approach to sustainable development (United Nations, 2015; Weitz *et al.*, 2018). The goals are intimately interconnected, and a failure to appreciate this will perpetuate an approach which is non-aligned at best, and highly ineffective at worst, according to Morton *et al.* (2017). On the other hand, some of the 17 goals are more relevant for the built environment than others (Opoku, 2016; Thuesen and Opoku, 2018). There has been some critique of the approach of focusing only on a few SDGs, with the risk of forgetting the interlinked nature of the SDGs (Morton *et al.*, 2017). According to Morton *et al.* (2017), addressing the SDGs, and thereby all three dimensions of sustainability, collaboratively, will yield greatest benefits, while the alternative - addressing them separately and in competitive isolation will deliver much less and induce greater risks. There is a danger that individual goals may be prioritized without an understanding of the potential positive interactions between the goals (Morton *et al.*, 2017). But should the built environment focus on e.g., stopping hunger and poverty (Goal 1 and 2 respectively), or should the emphasis be on contributing to the goals which are directly linked to the built environment? In the survey sent to the workshop participants, the answers surprisingly

showed that the participants had (or wish to) applied all 17 goals in building project - some more often than others (see Figure 1). A majority, 82%, of the respondents specify that they implement Goal 7 (affordable and clean energy), followed by Goal 11 (sustainable cities and communities) with 76%, and, third, Goal 13 (climate action) which 65% of the respondents have implemented. 59% have implemented Goal 8 (decent work and economic growth), Goal 12 (responsible consumption and production), and Goal 17 (partnerships for the goals). Goal 3 (good health and well-being) is the 7th highest prioritized goal, implemented by 53% of the respondents. 12% were unsure of which goals they have or will implement in future projects.

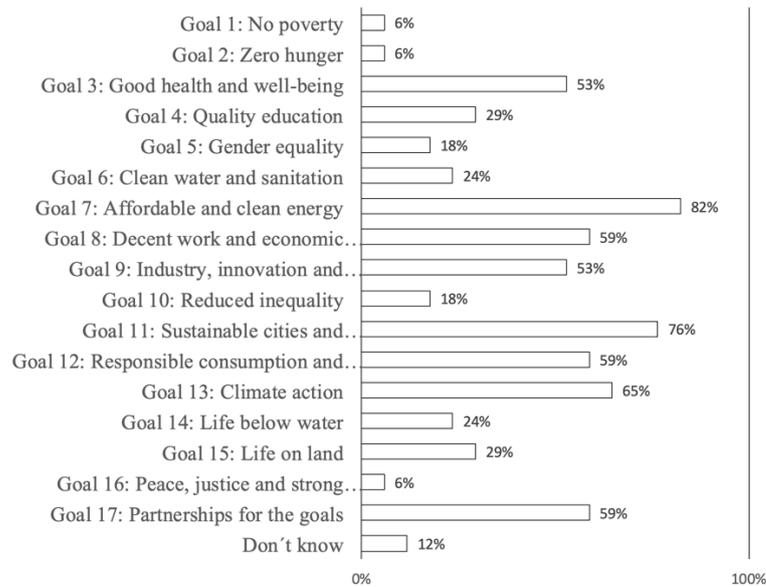


Figure 1: SDGs implemented in construction projects by the building owners

In the study by Opoku (2016), Goal 3 (good health and well-being), Goal 6 (clean water and sanitation), Goal 7 (affordable and clean energy), Goal 9 (innovation and infrastructure) and Goal 11 (sustainable cities and communities) were rated as highly impacted by the (sustainable) built environment. This aligns to some extent with the prioritisations of the professional building owners, with exception of Goal 6 which was only implemented by 24% of the respondents. Also, the building owners indicated that Goal 12 (responsible consumption and production), Goal 13 (Climate action), and Goal 17 (Partnerships for the goals) were prioritised, differing from the results from Opoku (2016)). Also, the prioritisation of the building owners aligns broadly with the suggestion on how buildings can contribute to the SDGs according to the World Green Building Council (2017).

Challenges for implementing the SDGs

The respondents were asked in the survey if they had experienced one or more barriers regarding the implementation of the SDGs and were given the options of choosing among the following categories; costs, time, collaboration/organisation, lack of knowledge, legislation and other. The categories were adopted from the barriers for sustainable building identified by Häkkinen and Belloni (2011) Figure 2 shows the responses. The two main barriers experienced by the building owners were related to costs and lack of knowledge, both categories selected by 76% of the respondents. A lack of available tools and methods were chosen by 65%, followed by barriers related to time 47%, and cooperation/organisation, 24%. Only 6% indicated that legislation

was a barrier. 12% ticked the "other" category and clarified that a barrier was that the SDGs are not necessarily explicit in the individual construction project.

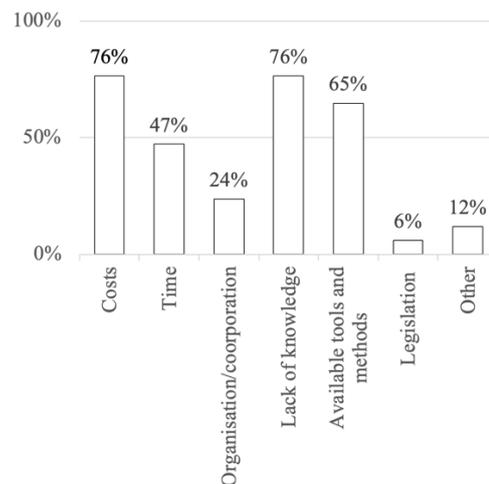


Figure 2: Challenges and barriers for implementing the SDGs

Also, it was elaborated that the SDGs are not tangible enough, and therefore requires specific tools and methods to implement in construction. A majority of the themes of barriers and challenges suggested in the survey were brought up and elaborated by the participants during the workshop discussions, and new themes emerged from the discussions. The main barriers highlighted by the groups during the workshop were "measurability and adaption to local context", "time and costs", "limited knowledge and information", and "process, tools and methods". The emerging themes are discussed in the rest of the section;

Measurability and adaption to local context

As the global indicators have not yet been fully adapted to Danish conditions, obviously this would be perceived as a barrier for implementing the goals in Denmark. The workshop participants expressed that the lack of Danish indicators make it hard to set specific goals and requirements in construction projects explicitly linked to the SDGs. Furthermore, the participants expressed that the global nature of the goals is far from the challenges they experience in a Danish context, and therefore it can be challenging to fully commit to the SDGs. The building owners add that the interpretation of the SDGs can differ a lot within different organisations and that even when the local indicators will be presented, they will still need to be adapted specifically to the construction context. Along these lines, the measurability of the SDGs was also highlighted as a barrier. To be able to set goals regarding the SDGs, the building owners need to be able to measure the performance within individual construction projects. Also, it is easy to say that you adapt the SDGs when there is no baseline and local indicators, and there is a risk of greenwashing, the participants expressed. Along these lines, it was stated that there is a need for a Danish baseline, and, as mentioned in the introduction, a Danish baseline has only been developed for goal 11 (sustainable cities and societies) so far (Dansk Arkitektur Center and Rambøll Management Consulting, 2019).

Solutions to these challenges were suggested by the participants as developing new tools that can support the measurement of the goals and make them tangible. It also suggested that a common ground and language within the industry regarding sustainable building design and the SDGs should be established, including the

prioritisation of the SDGs in construction. As the Danish building industry has already chosen DGNB-DK as a framework for sustainable building design, the SDGs should be integrated or aligned with DGNB-DK to not introduce a new, different framework. The Danish Green Building Council has already integrated the SDGs in a new manual which is currently under development. Also, political initiatives and requirements for implementing the SDGs were suggested to motivate the implementation. New requirements based on the SDGs should be added to the building regulations, the participants suggested. The public building owners added that political prioritisation of the SDGs is a prerequisite for their adaptation and engagement.

Tools for measuring performance in relation to the SDGs and making the SDGs tangible would be an aid in implementing the goals, according to the participants. Along these lines, a common tool to track measures and ranking the effort towards the SDGs in construction was suggested (e.g. inspired by the SDG index (Sustainable Development Solutions Network and Bertelsmann Stiftung, 2019)). A shared platform which connects the different certification systems applicable in a Danish context could also be useful, argued by the participants.

Time and costs

In relation to time and costs, the participants expressed that extra time is spent on getting to know the SDGs, before being able to implement them, and that is an extra cost for the organization. Also, if certification is needed for the SDGs on individual projects in the future, extra time spent on certification would be expected, as the building owners currently experience with creating documentation for DGNB-DK assessment. The participants argue that the occupants need to understand the SDGs and their importance, to be able to prioritise them. This is especially relevant for Danish housing associations, as the occupants are the decision makers regarding major renovation projects. Along these lines, the total costs perspective was also highlighted as important, to show the potential value of sustainable solutions to the decision makers. To overcome the barrier of time and costs it was suggested to clearly communicate the value of the SDGs to create commitment among the building owners, end-users, and other decision makers, such as politicians. Economic incentives were also suggested as a motivational factor.

Limited knowledge and information

The participants expressed that limited knowledge about the SDGs and their application in the Danish construction industry was perceived as a barrier for implementation. The building owners also miss practical examples and solutions of successful SDG implementation for inspiration, and they need the professional and industrial organisations to lead the way and commit to the 2030 Agenda. The building owners suggested that information should be made accessible to the actors within the construction industry, to support the adoption of the SDGs. This indicates that knowledge regarding the implementation of the SDGs in construction is needed on a local level, and that existing information need to be aimed more specifically towards the different actors within the construction industry, including the building owners, to become operational.

Process and the need for new tools

The participants expressed that it is challenging to adapt all 17 goals, and thereby all three dimensions of sustainability equally, and that, in their experience, the SDGs was often used as a retrospective checklist, and not as goals towards 2030. Also, the fact

that the actors change throughout the process of a building project is a challenge, as knowledge and decision rationale might not always be sufficiently transferred between the actors. The participants suggested that increased collaboration across the value chains within the construction industry, e.g., to create new products and business models, could improve collaboration and thereby support the implementation of the SDGs. Furthermore, it was expressed that the SDGs should be a part of the early goal setting in a construction projects, and that the involved actors, such as the architects, should include the SDGs in their proposals. The SDGs should be an explicit part of the agreement and negotiation from the beginning of a project.

The participants expressed that support is needed in prioritizing the goals and targets, as different interests within the organisations entails different prioritisations. Especially tools to support the implementation of the SDGs in the early stages of a construction project for goal setting was expressed as a need. A dialogue tool for building owners and advisors to provide requirements in the individual construction project could be a solution. Also, a dialogue tool to communicate important aspects with politicians regarding the SDGs was suggested (e.g. inspired by the REDIS tool (Gade *et al.*, 2018)). A framework to support planning on how to implement the SDGs in the construction industry and single projects could be beneficial.

CONCLUSION

This study investigated the challenges/barriers for the implementation of the SDGs for Danish building owners, and possible solutions to these challenges, based on a focus group and a survey with 22 professional building owners and advisors. The results showed that the five SDGs with the highest prioritisation among the building owners were Goal 7 (affordable and clean energy), Goal 11 (sustainable cities and communities), Goal 13 (climate action), Goal 8 (decent work and economic growth), and Goal 12 (responsible consumption and production). 94% of the building owners had implemented, or wished to implement, the SDGs in various degrees. However, they experienced multiple challenges; apart from the need for local SDG indicators the main challenges were: 1) lack of tools and methods to support the implementation of the SDGs in construction, 2) lack of knowledge regarding the SDGs among the building owners, 3) extra costs related to the implementation of the SDGs, including time spent on extra documentation. The main solutions suggested by the building owners to overcome the challenges were 1) development of new tools and methods supporting the practical application of the SDGs in construction, e.g., dialogue tools for goal setting and prioritisation and for measuring performance regarding the SDG in construction, 2) existing information should be aimed towards the actors within the construction industry, e.g., the building owners, along with practical examples for inspiration. The results presented in this paper fill a gap in the academic literature by providing valuable insights of the challenges experienced by professional building owners regarding the implementation of the SDGs, as a point of departure for future research and developing practical solutions to support the implementation of the SDGs. However, a limitation to the study is on the research participants which only involve 22 participants. Based on the results, the authors suggest that future research focus on developing tools and frameworks supporting the implementation of the SDGs aimed towards professional building owners.

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