

CIRCULARITY AND BUSINESS MODELS

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INTRODUCTION

The purpose of this project is to identify best practices of forerunners among real estate and construction companies who have engaged in developing new business models incorporating circularity principles. The report examines how they develop these solutions. Our aim is to give an insight of how they build their solutions and what are the conditions which enable the emergence of these business models (BM). The concept of circular BM is used to describe, organise and analyse the content of these new solutions. The overall goal of the project is to be able to identify best practices that can be shared within the building sector.

CONTEXT

The message from the last "International Planet Protection Convention" report is clear: The need to mitigate climate change is more urgent than ever. The European Commission has launched successive initiatives - Circular Economy Action Plan, Sustainable Financing (the "taxonomy"), European Green Deal - to encourage and control the construction industry to achieve climate neutrality. Social and political focus on Circular Economy (CE) is pressing the building industry to move from a linear model of consumption to a circular one. Circularity economy requires to "redefine growth, focusing on positive society-wide benefits" by "gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system" (EMF 2015). The incorporation of the CE therefore involves a maximisation of the use of materials through the creation of a closed-loop economy promoting circular principles throughout the lifecycle of buildings.

The strategy includes:

- enabling reselling of building materials by updating the construction product regulation to the introduction of recycled content requirements;
- promoting circular design initiatives focusing on improving durability and adaptability of buildings;
- integrating life cycle assessment in public procurement, and a revision of the material recovery targets (EC, 2020, 2022);
- The sharing and leasing of already existing assets.

To improve the circularity of building materials, models are developed to facilitate and encourage the choice of sustainable solutions, as well as to optimise the supply chain and logistic processes. To promote sustainable investments, EU is continuously strengthening the regulation of the finance sector in a sustainable direction. Shifting focus from material and technical flows to the creation of a new market, the new



policy identifies businesses and consumers as central actors to drive this transition process. Moreover, it suggests that the supplementary cost generated for new constructions, renovations and acquisitions should be supported by the mechanism of this newly created market. Sweden has since 2016 developed a circular policy in accordance with the EU actively engaged in promoting circularity. However, if the country has been a precursor in engaging in sustainability and has consistently performed very well in global sustainability rankings, the country's circular material use stood at 6,6 % in 2021 which is significantly lower than the EU's average of 11,7 %. Although new business opportunities related to circularity have been promoted by many consultants and academics, in practice, it seems so far difficult to transform this potential into business income related activities for the construction sector.

Many researchers have documented the numerous barriers the sector is facing when trying to embrace the principle of circularity. The review of the existing literature reveals that past research has almost entirely focused on technical aspects and technological advancement. But according to the recent literature the challenges faced in building CEs are not technical – if they ever were – but rather economic and institutional. Information and accountability frameworks, normative and legal tools, and collaboration networks have

been built to suit linear models. Institutional and cultural inertia hampers change and preserve business as usual or may lead to uncoordinated, and fragmented initiatives. Besides as externalities are not factored into the pricing of material resource, this inevitably leads to the maintenance of linear preferences.

In Sweden, if most of the large Architecture, Engineering and Construction (AEC) companies have by now demonstrated the technical feasibility of circular building with one or two show-cases largely mediated, they are still struggling to apply and scale up circular principles to their business services and products. But, in order to achieve the zero net, it is vital that the implementation of circular principles is extended beyond pilot projects and local initiatives.

Merely reacting to potential customers demand in the future will not be a sufficient strategy to achieve circularity and the building sector will not embrace circular practices unless there are tangible economic benefits to be gained from such investments. One way to map the economic and organisational feasibility of circular initiatives is the use of Business Models (BM).

WHAT IS A BUSINESS MODEL?

A business model describes how an organisation creates, delivers, and captures value in economic, social, cultural or other contexts.

The concept of BMs assumes that enterprises can manage and control their own business practice, and in doing so are able to create and capture value. It comes in many versions, but they all describe the manner an enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit. Circular BM's should help companies to redefine their value, creating activities whilst adhering to the principles of circular economy. They should focus on slowing, closing and narrowing the loops of material flow to maintain as long as possible their embedded economic value; besides they should reduce environmental impacts but still deliver

customer value. This can be done by designing buildings for longevity, providing solutions preserving material integrity or recycling them. The development of CBM often brings organisational changes for a company and often request the inclusion of a larger group of actors such as company's partners, key stakeholders, and shareholders. This is specifically the case for circularity which request a redistribution of roles in designing and producing building. In the AEC sector, circular BM are expected to be driven by a collaboration between public and private clients, architects, consultants, contractors' companies and suppliers.

Common features of BM encompass the dimensions below:

Dimensions of Business Models

| Major dimensions | Subcategories |
|-------------------|---|
| Value proposition | Products, services |
| Value delivery | Target customers, value delivery process |
| Value creation | Partners and stakeholders, value creation process |
| Value capture | Revenues, cost |

Companies run portfolios of many business models, larger companies typically have diversified exploiting competencies in different manners across multiple customer groups and mirroring organisational units. This results in different divisions capitalizing on common capabilities to sell products or services one way in one market, and in a different way in another market. Lüdeke-Freund et al (2019) estimate to

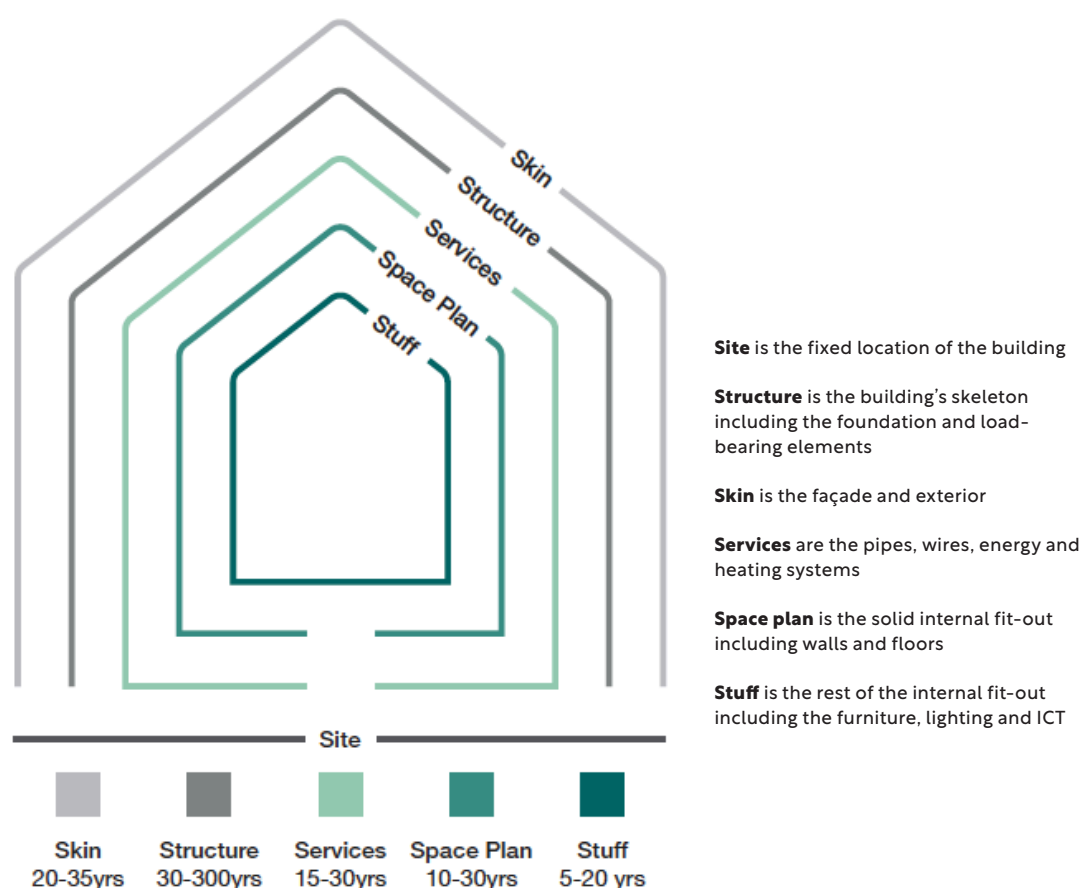
4,445,280 theoretically possible combinations of design options to create circular economy business models. The shared objective of these countless possibilities is nevertheless to offer a strategic tool to companies seeking to integrate sustainability values and goals in their business.

WHAT IS TO CIRCULATE IN THE CONSTRUCTION INDUSTRY?

People often argue that the long lifespan of buildings poses a challenge for applying circular principles in the construction industry. However, by adopting the concept of "building in layers" proposed by Brand, we can identify the various elements of a building and roughly estimate their distinct lifespans. While the structural elements may endure for up to 300 years, other aspects like the building's facades, systems, or interior layout have considerably

shorter life expectancies. Research has revealed that the cumulative impact of multiple interior renovations over a 60-year period can result in embodied carbon emissions that are comparable to those of the structure and envelope. It's worth noting that while structural and envelope components are extensively studied and incorporated into building codes and standards, the embodied carbon of interiors is frequently overlooked or omitted.

Building systems carbon framework – building layers



Source: ARUP 2023



METHOD

This report builds on three complementary projects spanning from 2018 to 2023. As the building sector has evolved over the past five years, our focus has shifted from waste management to circularity. It has also transitioned from primarily addressing on-site waste management to encompass more strategic considerations, including the development of innovative business propositions.

The conceptual framework for this report consists of a selective literature review, primarily drawing from Circular Business Models (CBMs) publications focusing on the challenges met by the construction sector.

The three projects, two in Sweden and one in Denmark adopt interpretivist approaches and employ qualitative research methods such as interviews, site visits, observations of meetings,

workshops, and document analysis. These methods enable us to gain valuable insights into specific contexts, employing quotes, observations, and rich descriptions. In total we have talked to more than 60 practitioners, taken part in 15 workshop focusing on business development and visit.

| Organization | Interviews | Respondents | Positions |
|--------------------------------------|------------|-------------|--|
| Architects | 9 | 9 | Environmental managers |
| Property companies | 8 | 8 | Project managers |
| Consultants | 6 | 6 | Environmental manager |
| Demolitions small-medium contractors | 6 1 | 10 1 | Project-, site-, production manager Environmental manager |
| Large contractor - subsidiary | 1 | 2 | Business development manager |
| Large contractors | 10 3 | 13 3 | Project-, site-, production manager Environmental manager |
| Contractors medium size | 6 | 4 1 | Environmental manager CEO |
| Recycling contractor | 1 | 1 | Business development manager, coordinator |
| Suppliers | 6 | 6 | Sustainability manager |
| Total | 57 | 64 | |



We conducted 57 semi-structured interviews with selected companies contributing to give a fair understanding of the development and challenges of developing circularity within the Architecture, Engineering, and Construction (AEC) sector. However, the main focus of our material for this report is on companies at the forefront of circularity initiatives. So, the focus here is mainly on the results of 24 interviews and for the Danish participants 4 workshops. The list of companies includes 2 large architect companies, 3 contractors, 3 property owners, 3 material suppliers and an international engineering consulting firm.

The length of the interviews varied between 60 to 90 minutes. The interviewees were informed about the goal of the project, how the material will be managed, how it may be published, anonymity as well as the structure of the interview. The interviews took place online via Teams or at the companies' offices and were organized around three primary elements: how circular principles were integrated into their existing business model, the process of developing and integrate CBMs, and finally a discussion around the various elements of CBMs e.g. value proposition, value delivery. The 4 workshops lasted 3 hours and took place at Aalborg University in Copenhagen. All interviews and sessions were recorded, transcribed, and systematically analysed based on recurring themes related to circularity. In addition to interviews, our study

involved an extensive document analysis. This encompassed a wide range of sources, including European and national reports, professional guidelines, certification standards, legal frameworks, company websites, and publications in professional media. Given the exploratory nature of this study, we followed an iterative approach that involved an ongoing interplay between interviews, document analysis, and the existing body of literature. Our objective was to deepen our comprehension of the underlying processes and not to seek broad generalizations from the findings.

When we tried to assess the progress of the companies in term of circularity, we need to acknowledge that the initial impression may not always offer a complete picture. The practices may be differentiated across departments and projects. Talking to different actors within these organizations offer varying accounts and insights into their progress in circularity. This diversity of perspectives calls for a nuanced assessment of the situation for the some of the companies, as it becomes clear that making generalized statements about their progress is challenging. The reason behind this is that the expectations set by external perceptions and public image sometimes differ from the company common practices. Several of the DCPM master's students who seduced by the companies' narrative have expressed disappointment by the scope of their actual realisation.

CIRCULARITY – A MOVING TARGET

Developing circularity involves navigating in a complex weaving of challenges and opportunities. The structure of the construction industry is slowly changing to accommodate new legal and economic demands that prioritize sustainability and circularity.

However, as these regulatory frameworks are constantly changing, they necessitate continual adjustments and adaptations putting pressure of the various stakeholders - clients, architects, consultants, contractors, suppliers, and public administration. Besides, the involvement and interdependency of these stakeholders in the decision-making process, add layers of complexity which accentuated by the evolving expectations, norms, and standards held by each of one.

The coordination of efforts and alignment of interests across the supply chain become intricate tasks, particularly when these actors have different priorities and incentives. This dynamic environment creates uncertainty and necessitate ongoing adaptations to circularity strategies. In addition, the production of recycled material and the establishment of circular supply chains is a slow process. This delay can be explained by various factors, including technological limitations, resource availability, and market demand.

Moreover, as already mentioned circularity principles may sometimes conflict with sustainable measures aimed at reducing CO2 emissions. Balancing the goals of circularity, which emphasize resource efficiency and waste reduction, with CO2 reduction measures can be a delicate task, requiring careful consideration and trade-offs. All the elements make it difficult for the companies – and the researchers for that matter – to keep update with all the changes taking place and the necessary competences to address them.

STRATEGIES FOR CBM

In our selected companies we identified 3 strategies to develop the CBM tailored to their specific contexts and organizational structures:

→ ***Singular Actor in the Company***

In some organizations, the responsibility for driving circularity falls upon a single individual or department. This “singular actor” takes the lead in championing circular initiatives and ensures their integration within the company’s operations. They play a central role in setting the circularity agenda and working towards its realization. The weakness of this strategy resides in the strong dependency of the company towards the champion.

→ ***Group of Internal Competences***

Other companies adopt a strategy of enabling several groups to develop internal competences. This group consists of individuals who are not only meant but also expected to actively engage with circularity projects. They are equipped with the necessary knowledge and skills and are encouraged to work towards circular goals, even if these initiatives may not bring immediate financial returns. This approach reflects a long-term investment in the future circularity of the organization.

→ ***Top-Down Approach in Large Companies***

Some the very large companies have developed circularity strategies at the top management level and cascade them downwards through the organization. This top-down approach ensures that

circularity becomes an integral part of the company's overarching business strategy. It emphasizes the importance of aligning corporate objectives with circular principles and should involve all levels of the organization in the journey toward circularity. The weakness of this strategy is that it may prevent the development of contextualised solutions by limiting at local level the decision power and the possibility of creating other ad hoc initiatives.

However, curse of the project-based organisation, each of these strategies may face resistance from "small kingdoms". These smaller, independently managed units or departments operate with a degree of autonomy, which can sometimes allow them to avoid full engagement in circularity initiatives. This independence can lead to disparities in the level of commitment and participation in circularity efforts across different parts of the organization.

DEVELOPING CIRCULAR BM

Value proposition describes the specific benefits that customers can expect from the company products and services. The companies we have talked to have developed training and methods for their employees regarding circularity. Some also try to be systematic with its implementation, for example with mandatory circular audit for each new project. These competences are offered as service to their customers.

EXAMPLE OF NEW VALUE PROPOSITION

On a of the property owner has integration of circular principles as a request for all their projects, giving an extra service to their customers. They have also modified their offer to integrate circular material.

So far, recycling has mainly been about interior design for offices focusing on renovation or adaptation to new locals' tenants. The material has then been retrieved from other projects within the company. To increase reuse, certain properties are only equipped with one type of material one type of floor mat. This makes it

easier to repair damages or move and replace items during renovation. They also upgrade the quality opting for classic and durable materials, this should mean that more people can feel at home in the premises than if they have been fitted out in a very special style or colour. Using recycled doors, suspended ceiling tiles, or floor mats does not mean that the premises should be perceived as old or stale. On the contrary, the standard our interviewees claim, must be as good as new. The material recycled or reused encompasses mainly glass, inner door, partition walls, ceilings or ventilation system. The company also develops technics to limit the damages when fitting offices like a new fixing system for the gips panels.

Value delivery defines the audience of the product or service and how the latter is delivered to the customers. For the architects we talked to, relaying on circular material should not challenge the architectural quality of the building. *"We should say this is a great building and by the way it is circular, we want to avoid the patchwork or shabby chic feeling associated with recycling"*. For the property owner, the challenge lies in conveying the advantages of reuse to customers without triggering discussions about potential discounts: *"We property owners have no disclosure obligation to tell the customer that roof tiles are recycled. The important thing is that we can offer good premises where our customers feel comfortable and can perform...If the customer hears that we reuse furnishings and materials, the question of a discount comes up reflexively..."*

Currently, the feasibility of cost-effective reuse is not guaranteed, as it may involve time-consuming searches for materials or the need for extensive refurbishment. In this context, even if circularity is an important aspect of the companies' efforts towards mitigating climate change, it is not a marketing argument contrarily to the attraction that sustainability may have created among customers.

Value creation entails the necessary partners to develop the proposition and the process to produce it. In order to get the companies more interested in buying in recycled material, the habits of the sector need to be challenged. An



example to trigger this change is the creation of a recycling premium for contractors so that the use of material surcharges will not hinder their efforts to reuse materials. The recycling premium is included in the framework agreements between the property owner and their contractors. As no contractor would suggest reuse if they simultaneously lose the mark-ups they usually get in various kickback systems linked to material suppliers. Though advertised by the literature we have not met companies who have formalized agreement with any supplier but many claim that would very much like to have long-term collaborations for current deliveries of recycled material.

The participation to network, research project and showcase is central in these developments, however some of the interviewees deplores the lack of business focus in these partnerships.

Value capture refers to the methods that companies use to generate revenue and capture value from their products or services. It involves identifying and implementing strategies to capture a portion of the value that the company creates for its customers. It is difficult for our companies to assess the tangible benefits produced by their implementation of circular models at least in financial term as by now only a small portion of their ongoing projects is actually integrating these principles. No immediate return on investment does not mean that these CBM are not successful, as they may appear beneficial on the long term. These initiatives however are giving the company a strong position on the market. Which in turn allows at least for one the property owner a very advantageous situation regarding investments and loans.

RECOMMENDATIONS

- In the pursuit of sustainability and circularity in the construction industry, a coalition of actors across various departments within organizations seems to be a key for achieving success. While many initiatives may be developed in isolation, the synergy between departments is where the real progress happens. Notably, the accounting department and the sustainable department should work hand in hand to align financial practices with circular goals. This collaboration ensures that sustainable initiatives are not just well-intentioned ideas but are financially viable and beneficial in the long run.
- However, it's not enough to merely develop these initiatives. They require long-term mobilization efforts, including rigorous follow-up and assessment procedures. They should not be considered a one-time project but an ongoing commitment that necessitates continuous improvement till they become institutionalised.
- Rational models and metrics are still seen as a key factor, allowing organizations to make data-driven decisions and keep key performance indicators (KPIs) aligned with their sustainability objectives. So, risks and costs should be addressed in the new business propositions.
- But circularity would benefit from innovative valuation techniques to assess the long-term contribution of its new practices. These techniques should exceed traditional economic measures and consider the broader societal and environmental benefits of these initiatives.
- The integration of design for disassembly and sustainable data through IT solutions is another essential aspect. Leveraging technology helps streamline processes, manage resources efficiently, and monitor the environmental impact of construction projects.
- Clients also play a crucial role in driving circularity in the construction industry. They need to be knowledgeable about these practices entailed and willing to put forward demands that prioritize environmentally friendly and circular solutions. Clients' preferences and requirements can significantly influence the direction of construction projects.
- Moreover, collaboration among stakeholders should go beyond individual projects, with concepts like early contractor involvement or partnering providing a more stable context to develop these solutions. These enable shared knowledge and resources, fostering innovation and sustainability at a broader scale.
- Attaining a perfect 100% level of circularity may not be necessary for every project. Sometimes, it could be more efficient to search for compromises and adopt a pragmatic approach when defining project outcomes.



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