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FROM CONCEPT TO PRACTICE: IMPLEMENTATION OF CIRCULAR BUILDING AS A PROCESS OF TRANSLATION

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The concept of circular building (CB) proposes to transform the current mode of production in the construction sector to mitigate climate changes and reduce fossil consumption. The concept has gained momentum among politicians and academics; however, it is only slowly penetrating the sector. In the paper, we aim at developing our understanding of how this concept is translated into specific organisational settings. Rather than focusing on the actions to support or prevent its dissemination, we focus on how the concept is brought into life as an organisational practice and through which processes and mechanism. Drawing on qualitative data from primarily interviews, we present a case study of two large Scandinavian contractors' efforts to implement CB. The results point at a diversity of positions and choices in translating CB within a specific organisational context. The concept of translation helps us to analyse the shaping of such processes and may consequently contribute to the development of the CB concept by directing attention to how circular ideas and concepts are translated across different contexts.

Keywords: circular building; management concepts; translations

INTRODUCTION

The built environment is a major contributor to environmental degradation due to its consumption of non-renewable resources. Approaches to reducing, reusing, recycling and rethinking waste and resources in the entire value chain, and to embed the notion of circular economy into all phases of the construction process, play a key role in the green transformation of the industry. In the Circular Economy Action Plan, the European Commission (2020) has drawn up guidelines to promote recycling and reuse of materials. The potential for this is great, as only half of the waste is recycled at EU level. Even in countries that recycle the majority of their waste there is a potential for further developments, as recycling takes place largely through disposal rather than direct reuse. There are several reasons for the scant reuse of materials in the design, production and renovation of buildings. Barriers include uncertainty about the quality

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of reused materials as well as to how to identify, collect and reuse waste. In addition, goal and incentive conflicts among actors discourage pursuit of green targets, and a lack of market standards (Nußholz *et al.*, 2019) for reused material create barriers for turning the concept of circular economy into practice (Ghaffar *et al.*, 2020).

While circularity has gained impetus at societal level as a new normativity endorsed by e.g., political institutions and corporations (Hofmann, 2019), the question, however remains whether companies adopt circularity for greenwashing (Joensuu *et al.*, 2020) or as part of an eco-business logic used not only as marketing also as a business driver (Valenzuela and Böhm, 2017). This directs attention to two interrelated issues of how circularity as a concept is translated and become embedded at an organisational level, and what organisational as well as institutional factors shape this process. In the paper, we thus analyse how circularity is translated into organisational practice in two large contracting companies in Sweden and Denmark. Drawing on translation theory, we discuss differences in the processes and mechanisms through which circularity is shaped and attains status of a particular environmental concept. Drawing on cases in two different countries allows us to account for contextual differences and go beyond understanding circular construction as a singular concept to instead conceive it as a plurality of practices and ideas shaped by local processes and influences.

In the next section, we introduce the concept of Circular Economy (CE) and Circular Building (CB) in Denmark and Sweden. We then explain the theoretical framework used in the analysis, drawing on selected concepts of translation theory. This is well suited for the purpose of understanding how ideas are adapted to local contexts as they diffuse. Next, we present the empirical data and methodological considerations, before proceeding to the parallel analysis and findings of Danish and Swedish experiences. In end, we point to the diversity of positions in the process of translating circularity, and the implications hereof for the diffusion and adaption of circular building as a concept.

From Circularity to Circular Building: Translations of a Concept

Originating from Industrial Ecology, the concept of Circular Economy focuses on optimising industrial systems to develop a new economic model of production and consumption (Leising *et al.*, 2018). Recently, the concept regained attention due to a series of reports promoting the opportunities of CE 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” (Ellen MacArthur Foundation, 2015). CE involves a paradigmatic shift from a linear model of consumption to a circular one, maximising the use of materials through the creation of a closed-loop economy (Gallego-Schmid *et al.*, 2020). CE has been mobilised by the EU in its circular economy action plan with specific focus areas for promoting circular principles throughout the lifecycle of buildings. This include (1) enabling reselling of materials by updating the construction product regulation, (2) introducing recycled content requirements, (3) promoting circular design initiative focusing on improving durability and adaptability of buildings, (4) integrating LCA in public procurement, and (5) revising the EU material recovery targets and initiatives to increase sustainable and circular use of excavated soils. In the last taxonomy report, four targets to prioritise economic investments were identified, including new buildings, renovation, individual measures and professional services, and acquisition and ownerships. To do so, the EU policy-framework place businesses and consumers as key actors to drive the transition process and at the same time warn that: "Meeting

eligibility criteria for new constructions, renovations and acquisitions may result in additional costs in comparison to business-as-usual practices" (RICS, 2021).

In Denmark, the notion of CE has been an emerging part of the political agenda recent years. Approaches to reducing, reusing, recycling and rethinking business models (Advisory Board for Cirkulær Økonomi, 2016) have been a driver for the political ambitions to further the green agenda. The recent national strategy for sustainable construction (Regeringen, 2021) only contains one mention of circular economy when highlighting the ambition of reducing the construction sector's carbon emissions with 0.8 million tons by 2030. To achieve this, the strategy highlights the following means: (1) gradual phasing in of limit values for climate footprints from buildings, (2) further development of LCA and LCC, (3) promoting fossil-free construction sites, (4) safe and healthy recycling in construction to promote climate-friendly building materials, (5) reduction of on-site waste, and (6) targeted energy efficiency efforts. These means include both existing and new initiatives with which there are no prior experiences.

Also in Sweden, the concept of CE has been part of the political agenda for the last decennia. The government defines circular economy as a tool to reduce resource use in society and the environmental impacts that follow from it. In relation to CB, more resource-efficient use of the materials in each cycle should increase their lifespan and economic value, while reducing both the extraction of new raw materials and landfill waste (SEPA, 2018). The strategy for the transition to CE focuses on developing CB through (1) sustainable production and product design; (2) sustainable ways of consuming and using materials, products and services; and (3) non-toxic and circular material cycles as driving force for the business sector and other actors with measures to promote innovation and circular business models (Ministry of Environment, 2020).

Theoretical Frame

Translation can be defined as 'the process in which ideas and models are adapted to local contexts as they travel across time and space' (Lamb and Currie, 2012) through a combination of institutional pressures and stakeholder initiatives (Hultin *et al.*, 2020). The concept is mobilised to explain how ideas travel and shift from abstract ideas to objectified or enacted practices in a given context. This shift includes the processes of dis- and re-embedding (Czarniawska and Sevón, 2011).

Disembedding describes how an idea, concept or model is moved from its institutional surroundings, and translated into an object such as a text or a picture that is able to travel in time and space (Czarniawska, 2008). As the idea enters a new organisation, it has to be modified to fit its new context and in doing so, it acquires a new meaning. This re-embedding process (Wæraas and Nielsen 2016) allows actors to make sense of a new idea in their own settings. During this process, some aspects of the idea may be kept, while others may be reshaped to align the idea with existing conditions (Sahlin and Wedlin, 2008, Hultin *et al.*, 2020). The attention is then on why and how actors choose particular ideas among the numerous options available (Czarniawska, 2008).

The role of modifying is often the tasks of managers, but their different contexts may give rise to interpretations (Spring and Unterhitzenberger, 2020). Sahlin and Wedlin (2008) furthermore distinguish between what they call programmatic and technical elements of a certain practice. The programmatic elements refer to the ideas, aims and objectives of a certain practice, whereas the technical elements refer to concrete tasks, routines, tools and techniques. They underline that the exclusive adoption of certain

tools may serve as a Trojan horse as a focus on implementation may hide programmatic aspects of the practice yet can transform the organisation radically.

We use this framework to focus on how different elements of CB are translated into organisational practice. Our focus is on the role of different actors, and the processes of re-embedding they take part in. We will accordingly not focus on disembedding, however, in the discussion we will mobilise the distinction between programmatic or normative elements to highlight the status of the measures taken in the two companies.

METHODS AND DATA

The paper builds on data from two ongoing, individual research projects in Denmark (2021-23) and Sweden (2018-23) that analyse relations between waste management practices and the wider transformation, which the industry is expected to undertake in implementing circular principles. Both projects draw on interpretivist approaches and combine qualitative methods including interviews, site visits, meeting observations, and document analysis (Bell and Bryman 2018).

The material for the Danish study encompasses six interviews. Three with respondents at top management level and three at project /construction management level. Various observations at projects meetings and strategy talks provide insights in the contractor's long and short-term agendas and strategic approaches from different views. The Swedish project, so far, includes 31 interviews with 41 respondents and 12 visits and observations. For the purpose of this paper, we have focused on one large contractor, where five interviews with 11 respondents and two site visits have been conducted.

All interviews have been analysed according to the themes developed in iteration with the features of circularity and the theory. We followed an abductive approach (Dubois and Gadde, 2002). Initial interviews were general in relation to the topic of waste management, while later interviews focused on collecting detailed data in relation to the theoretical framework to ensure a basis for comparison. The cases differ on many dimensions, and it is difficult to generalise the findings. This has however not been the purpose of the paper, as our interest has been in understanding embedded processes of agency, and factors that shape the diffusion of a new concept.

FINDINGS

The empirical findings are presented in this section focusing on each case company in turn. For each case, we describe 1) how the company communicates its CB efforts, 2) how managers in staff functions work with CB, and 3) how CB is practice at a project level. This will enable us to shed light on three issues from the theoretical framework, namely what meaning is associated with CB in the organisation, what role managers play in modifying CB, and the specific ways in which CB is embedded.

The Danish Case

The Danish case contractor is a large company with approximately 1.000 employers and construction sites all over Denmark. The company is heavily involved in a series of sustainability initiatives in collaboration with different stakeholders, and a few of these are directly relating to the notion of circularity. Most notably is the development of a resource assessment system that can be used to give an overview of CO₂ savings on construction projects. This initiative is part of an industrial R&D project and has only been tested on select case projects. The company has nevertheless used it for marketing purposes. The contractor has also joined forces

with a company that uses recycled wood for secondary building components. This collaboration is used to gain knowledge about reusability, but also for branding of circular construction methods.

In the organisation, CB is described differently, but there is strong acknowledgment of the need for changing traditional linear construction models to circular a thinking even though it is argued that the system is not in place at industry level. CB is linked to existing process optimisation methods and approaches (e.g., lean construction), which are a cornerstone of the corporate DNA, and respondents draw parallels between these and CB. The argument is that lean has contributed to optimising work processes, and therefore it is natural that also CB is understood an optimisation tool. CB is mobilised in the company through collaboration initiatives and is vocalised through information meeting and in the upcoming company strategy. At present, there is not a formalised CB strategy, nor any guidelines for implementing CB into projects. The initiatives are exclusively based on personal motivation among or stem from client demands e.g., to use certification schemes such as DGNB. Management is nevertheless actively trying to diffuse CB ideas into work practice in different ways. New specialisation areas and employee titles have been introduced in the organisation, with a head of sustainability recently appointed, and LCA and LCC tools are used to calculate material and waste streams, and to make assessments of projects. CB is also used as a competitive tool in an narrative fashion to win construction projects. The approach has been part of the contractor's agenda for a long time. In recent years, and in parallel with an increased focus on CB, the variety of tools used for winning the clients' interest and competitive tenders has widened. The toolset still includes time and cost optimisations, but now has an increased focus on specific green initiatives as e.g., CO₂ and waste measuring.

At a project level, CB is finding its way into work processes even though the primary focus is on traditional on-site planning and building methods. According to the construction manager of a large renovation project, CB is rationalised by the specific economic benefits it may give rise to, e.g., in the form of savings from the reuse of floorboards, from demolished parts of the building as patches for floor connections on new balconies. On this project, the use of DGNB is planned. This e.g., requires that all waste is weighted, and fragments monitored. Monitoring has however been lacking in the early stages, meaning that time is spent on collecting reports and documentation to fulfil the DGNB criteria. Besides being a DGNB criterion, waste reports are also used to provide insights into how much and what type of waste is produced. Unsorted waste is expensive to deal with, and the construction manager uses this information as a proof for subcontractors and craftsmen to support proper waste sorting.

The Swedish Case

The case concerns one of the largest contactors in Sweden. Even though the CB term has not yet entered their public communication, they advertise their collaboration to achieve the goals of the Fossil-Free Sweden initiative, their implementation of a roadmap for a fossil-free construction industry, and their support to the UN goals for sustainability. During the last years, several initiatives have been launched, focusing on reducing energy consumption for production and operation of buildings, including transports. They propose several green certifications depending on the types of building with a preference for Miljöbyggnad, a Swedish certification standard. They demand quality declaration and traceability of material from their suppliers as well as,

in some cases, the possibility of returning unused products. They also have reduced their material consumption and amount of waste produced on site.

Regarding CB specifically, in 2016 the company introduced an open digital platform for more efficient handling of stone, soil and other secondary fillers at construction sites. Through the service, it was possible to transport material between workplaces instead of ending up in a landfill. After three years of exploitation, the platform was closed down as it was argued that the market was not ready to engage in such initiatives. The company moreover argued to aim at identifying areas where the most effective efforts can be made to reduce the material consumption. They advertise their participation to pilot projects led by research institutes on recycling of selected material such as plastic, pipe, steel, aluminium or gyps in collaboration with other actors of the sector. Regarding renovation, they are involved in a project focusing on the reuse of windows in collaboration with a housing company and a windows maker and take part in a demonstration project aiming at using 80 % recycling product for the renovation of a university facility. The company is involved in inter-sector networks to promote circular economy. To measure the environmental impact of a product, the company advocates for the use of environmental product declarations (EPD), life cycle analyses (LCA) and life cycle costs (LCC). However, according to our interviews with site project managers, the diffusion of these practices is far from generalised, and they struggle to give examples and assess the number of projects, which benefit from these measures. The role of the environmental manager is to focus on informing and implementing the different waves of green demands. She introduces concepts and solutions building on the compilation of various sources such as Swedish and European legislation, Ellen McArthur Foundation, and networks, conference and exchanges with other companies. Our interviewee, as many other of the environmental managers participating in the study, struggles to provide calculations demonstrating the economic advantage of increasing handling, recycling or reuse of material. Without clear economic benefit “it is nearly impossible to convince project managers to engage in new practices”. So, to mobilise project managers, a competition has been launched between departments. Every month, the unit producing the smallest amount of waste receives a prize announced in the whole company. Moreover, the amount of waste produced is also part of the KPI to measure the performance of different departments. Drawing on newsletter and annual meetings, their initiatives, goals, regulations and best practices are shared with the rest of the company.

At the project level, there is no systematic planning of waste management and recycling. According to one production manager, even when the construction aims at being certified, the quantity and management of waste can be down-prioritised without too many consequences. Besides, one of the site managers claims: “we don’t always know what has been promised during the contract, so we are not always informed of such details”. The site project managers tend to focus on what they can decide upon rather than then on the broader aspects of circularity. First, whereas they agree on the importance of reducing amount of material, they see the implementation of circularity principles as a very small aspect of their daily job on site. Second, they do what "the client ask them to and during the production of building, usually there is less rather than more budget". Besides, they also claim that they do not have the power to engage or negotiate with the products suppliers to instigate new cooperation or development towards circularity. The examples they give of their own actions relate to a better consumption of material, the opportunistic possibility to transfer the

surplus of material to other sites, and the increase of waste sorting. They tend to dismiss the storage of recycled products and material for a later use as it is “better [to] discard things now rather than collecting, stocking and discarding them later anyway”.

DISCUSSION

As the two cases have shown, there are both similarities and differences in the how the concept of CB is understood in the two companies, and how it is brought into life as organisational practices. Table 1 summarises the different practices that the companies have undertaken in relation to re-embedding central CE concepts, as presented in the previous section on circularity and circular building, and highlights stated barriers.

Table 1: Dimensions of CB re-embedded in the two cases

Dimensions of CE	Danish case	Swedish case
Redefine growth	Not mentioned	Not mentioned
Decouple economics from finite resource consumption	Not mentioned	Not mentioned
Focus on society-wide benefits	Articulated intent to contribute to a transition	By improving current practices
Design waste out of the system	Select examples for specific products	Rather recycle existing waste, focus on specific material
Promote the concept of circular economy	Changing employer titles Internal dissemination of CE at meetings, etc. By embedding CB in resource assessment tool CB is used narratively as competitive tool	Transforming vocabulary Building legitimacy with external network Branding CE Audit for dismantling buildings and handling materials No changes in goal, value, benefit Projects still assessed under linear economy
Enable resale of materials	Only if there are economic benefits Collaboration with re-sale company Storing waste/materials	Stockage of material to be reused
Promote circular design initiatives	Lifecycle analyses Offers waste sorting Resource assessment	Show case Standardisation Material certification Building certification LCA Dismantling buildings
Revise material recovery target	Not mentioned	Pilot project with suppliers
Barriers mentioned	System not in place at an industry level	No market for reuse No recycling market Sector not ready Unsecure risk investment

As previously stated, re-embedding entails a modification of an idea that allows actors to make sense of it in their own settings. As can be seen, the translation of CB is quite diffuse. Both companies struggle to translate what circularity entails in a specific contracting practice, and the specific tools and methods that are employed are related to established industry standards in both countries most notably in the form of LCA methodologies and certification schemes. In addition, the majority of the efforts can be considered quite piecemeal. Small and incremental changes are implemented. In the absence of CB strategies, the project levels of the two cases opt for practices that fit within existing structures rather than designing new, systemic approaches. In the Swedish case, the modest re-embedding is motivated with reference to a lack of market mechanisms and supporting field structures. This is also the case in Denmark as illustrated by a department director who claims: "It's everyone's responsibility to change the industry [...] we need to push the finish line, so we don't get used to something. The norms need to be pushed."

An interesting finding in relation to the Danish case is that attempts at re-embedding CB in existing tools are made. CB is thus translated in relation to lean construction, which is firmly embedded in the company. This means that CB acquires the status of an optimisation approach instead of a radically new economic logic that entails a redefinition of growth and a decoupling of economic activity from the consumption of finite resources, as proposed in the European Action Plan.

Another interesting finding is that there is an absence of ownership to the translation process. The literature often argues that 'managers' perform re-embedding by adopting a given innovation (e.g., Love and Cebon, 2008). Who the managers are, is often not explicated, but normally it is executive managers who are accorded this status. We show how actors at different levels and functional areas of the organisation contribute to the process. This might account for the limited scope and impact of the translation process so far. The question of who 'owns' the transition to the circular economy is relevant to reflect on. Is the lack of ownership and direction a straitjacket or strength in relation to the diffusion and adaption of CB? This question remains to be answered. Nonetheless it is interesting to observe how differently CB is seen at the different levels of the organisation. Not surprisingly, sustainability managers in the Swedish case refer to the foundations of the concept, Ellen MacArthur publications and the broad discourse on sustainability, whereas CB in the Danish case is seen as a strategy for winning bids, a process optimisation method, and a question of waste handling on-site.

Returning to the issue of programmatic and technical elements of a practice, which we introduced in the theory section, we suggest that our findings illustrate that CB is associated more with implementing specific tasks, routines, tools and techniques than with something that fundamentally changes established ways of working or challenges existing systems. The companies re-embed CB in the form of mandated methods even though they knowingly work within the boundaries of a traditional 'linear' model of consumption and question the relevance and impact of the associated practices on the climate. The programmatic element of CB arguably necessitates more fundamental behavioural and structural changes. As argued by the Head of Sustainability in the Danish cases: "I think they [the craftsmen] are focused on working and less on other stuff. We have to articulate it [CB] as a new culture. We have to address that it is something that we need to get good at [...] Maybe nudging or technical solutions? It is a balance between sticks and carrots. We need to make it [CB] a part of us, and a part of our practice."

CONCLUSIONS

In the paper, we have taken the first steps at analysing how the concept of circular building is translated from abstract idea that permeates policies and industry initiatives at transnational and national levels to specific practice in two contracting companies in Denmark and Sweden. The analysis displays certain similarities but also differences between these translation processes. Common for the cases is that the translation is somewhat hesitant. Many of the local translations take the form of an implementation of specific tools or techniques, rather than of programmatic elements, associated with CB. Whether this may be a Trojan horse for a potential transformation of the organisations remains to be seen.

The analysis here is thus still at its preliminary phases, with more data to be collected and more elaborated analyses to be conducted. The Danish material is particularly under-developed, as this research project is still in its very early phases. Moreover, the analytical approaches remain to be elaborated. Future research will attempt to link the specific translations to questions of contextual differences to account for field-level influences on patterns of diffusion. Another unexplored question concerns the role of multiple translators in processes of re-embedding. Following a more conventional ANT-approach (Callon, 1984) this will focus on how the interests of different actors are translated across levels of functional areas of the case organisation. Nevertheless, we hope that the tentative analysis can generate some interesting early insights into how an increasingly important policy area, circular building, is translated from abstract idea into specific organisational practice.

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