

# **Lessons From A Transition To Circular Use Of Wood In Utrecht**

## **An in-depth study of two circular business models**

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### **Abstract**

In our in-depth case study on two circular business models we found important roles for material scouts and networks. These key partners are essential for establishing circular business models and circular flow of materials. Besides, we diagnose that companies are having difficulties to develop viable value propositions and circular strategies.

### **Keywords**

circular business models, circular wood, waste management

## Introduction

For a transition to a more sustainable economy it is essential to make loops in what currently are mostly linear value chains. Both politicians and academics call for a transition to this circular economy, because it leads to a better use of materials and via new businesses to new jobs (EC, 2015; Mazzucato, 2018). For instance, in the Netherlands, the size of the circular economy is still only 4 to 5 percent of total employment (PBL, 2019). This might be more than some expect, but is not sufficient for the challenges ahead, such as: zero pollution, toxic free, resource efficiency and clean economy (EC, 2019).

We choose to study circular business models in the wood sector, because there are many possibilities to make better use of this material: reusing, remanufacturing or recycling instead of burning. We expect that studying a sector based on material that is suitable for a circular economy, leads to useful insights for other companies that wish to build a circular business model, especially in the building and construction sector. What is more, many companies are part of what we defined as the Dutch wood sector. In the Netherlands the manufacturing of wood and of products of wood (NACE 16) and the manufacturing of furniture (NACE 31; which is more than just woodwork) consists of nearly 12,000 companies, representing over seventeen percent of the companies in the Dutch manufacturing industry (CBS, 2020).

In the wood sector, as in other building and construction industries, there is a clear cause for action for the transition to a circular economy, because it is a major consumer of virgin materials. But, in order to progress to a circular economy, companies in the building and construction industry need learnings about actual practice and about viable circular business plans. To many companies these insights are not available, and that is why we address the following research question: How do business models in the transition to circular use of wood function? This research question should help to answer questions such as: What can businesses and organizations in the wood sector do to make this transition happen? And what lessons can be learned from the circular business models we studied? Lessons that are useful for a wider uptake and that will help other companies to set up circular businesses or to transfer existing business models.

## Method

In order to explain circular business models in the wood sector we set up an explorative case study of two small companies (<10 FTE) who are active in the transition towards circular wood use in the Dutch region Utrecht. This enabled a local and sectoral focus, which was the basis for an analysis, to study in-depth the characteristics of the two specific business models we investigated.

In our case study on circular business models we took a three step approach. First, we explored the context of businesses in transition towards circularity in the wood sector. We discussed the peculiarities of circular business models in the wood sector in a focus-group session, including the companies we studied and external experts. The aim of the focus-group sessions was twofold: a) to get an understanding of the context and b) to get insight in driver and barriers.

Second, we held expert interviews with the partners responsible for general management and finance of the two companies, and with context experts for the specific regional situation. We analysed the interviews using the Smart Business Modeler (SBM, 2020), an interactive online tool based on the Business Model Canvas (Osterwalder & Peigneur, 2010), and business model patterns (Remane et al., 2017; Lüdeke-Freund et al., 2018; Lüdeke-Freund, Gold & Bocken, 2019), that enabled us to easily identify possible circular economy business model patterns. In their study on sustainable business models, Lüdeke-Freund et al. (2018) define a pattern as an illustration of “an ecological, social, and/or economic problem that arises when an organisation aims to create value, and it describes the core of a solution to this problem that can be repeatedly applied in a multitude of ways, situations, contexts, and domains.” In addition, “a sustainable business model pattern also describes the design principles, value-creating activities, and their arrangements that are required to provide a useful problem–solution combination (Lüdeke-Freund et al., 2018).” The Smart Business Modeler tool we used aids in looking for patterns based on the following seven major circular economy categories: repair & maintenance, reuse & distribution, refurbishment & remanufacturing, recycling, cascading & repurposing, organic feedstock, and other. A breakdown similar to that of Lüdeke-Freund et al. (2019), with an ‘other’ category that contains additional patterns from literature.

Third, we validated the results and analyses with the partners of the companies we studied. We asked the interviewees to react on the interview transcript, and in case of the companies also to reflect on the business model as we had worked them out with the Smart Business Modeler tool. Based on the validation round we slightly adjusted our analysis of the business model.

## **The context: Wood waste**

The wood case is interesting because according to a national bottleneck analysis in the Netherlands, of the approximately 1,600 kilotons that become available through business and consumer waste, up to 75 percent is burnt in power plants (Tauw, 2017). In theory this material stream would be relatively easy to reuse, recycle and remanufacture, because there are no complicated treatment procedures needed for circular use of wood. Circular start-ups manage to make use of wood from the waste stream by looking at the functionality of discarded wood that is available to them. Even though, many wood streams in the Netherlands still seem to be traditionally managed, leading to many resources ending up as fuel in power generating plants.

Currently, there are two important sources for discarded wood in the Netherlands: consumer waste and business waste. The first is the responsibility of municipalities (Ministry of Infrastructure and Water Management, 2019a), and is collected as bulky waste or brought to a recycling centre. Companies and organizations are responsible for their own waste (ibid.), and have contracts with private or municipal garbage-processing organizations. From here on the waste is further processed and mainly sorted according to the type of material. A constraining factor are the current regulations on moving and processing material once it has been designated as waste. According to our interviewees these regulations lead to structural barriers in realising circular flow of material. These regulations had been issued in order to be able to control hazardous materials. For the circular economy, however, they present a major obstacle.

For wood, an important distinction has to be made between A- or B-type wood waste, and C-type wood waste (Ministry of Infrastructure and Water Management, 2019b). C-type wood waste is qualified as hazardous waste and has to be managed under strict regulations, because it has been treated with toxic chemicals. A-type wood is unprocessed and can easily be recycled by woodwork companies. Processed wood that is not hazardous, B-type wood, is a very diverse waste stream. In reality, despite its potential functionality, B-type wood is mostly burned in power plants.

## **Zooming in on two companies in the circular wood sector**

From the two companies we studied in-depths, one is active in trading and using discarded material, with wood as an important product in their portfolio (Company A). The other company makes wooden products for the gardening sector, and develops circular garden fences made from wood (Company B).

Company A enables discarded materials to be reused. The company is both a wholesaler of these materials, matching circular patterns such as redistribution and recycling (Lüdeke-Freund, Gold & Bocken, 2019); and the company facilitates the uptake of discarded materials in specific building projects they manage, matching repurposing (Lüdeke-Freund, Gold & Bocken 2019). The physical location of Company A is both a sales outlet and a wood workshop, that people can rent for woodwork activities or that is alternatively being used for commercial group workshops. The different activities are deliberately being developed together, because the application of materials shows the circular potential and creates more mass for the wholesale business. This multi-sided focus leads to different services that are being offered, also linking to various value propositions for the customer segments.

With their current focus Company A finds it has too little outflow of material streams in their wholesale business. Therefore, they aim to further develop specific projects, such as designing and manufacturing tree and flower tubs, and street furniture for public squares, into bigger assignments, leading to more materials being needed. In realizing these kinds of projects, they need a tight network with different craftsmen. This is essential for two reasons. The specialists surrounding Company A are needed to realize the projects for their skills and expertise on design and construction. Besides, these partner companies create a network for acquisition, also being supported by other networks in which Company A is active.

Company B designs and makes wood-based products for the gardening sector. Circularity is not yet at the core of their business model, the company is currently expanding their product range by adding circular products. However, this new focus must fit their current value proposition: creating living and lively gardens. Although, Company B can be characterized as a sustainable company, their traditionally product portfolio still is linearly organized. They do find that circularity fits their sustainability focus, and have therefore been designing and developing a circular product, a garden fence that is primarily made out of re-claimed and re-usable A-type wood. This product matches the circular patterns reuse and repurpose (Lüdeke-Freund, Gold & Bocken, 2019), and the patterns design for upgradability and design for dis- or reassembly identified by Bocken et al. (2016).

Company B is struggling to transform their value proposition to fit a circular product and how this transformation might change their business. In addition to their current product portfolio, Company B is exploring to develop what they call 'special projects'. An example is an urban area development project, where Company B will be co-creating garden fences with residents. Circularity would be a key aspect of this initiative. A secondary aspect is the increased cohesion of the neighbourhood.

## **The importance of key partners**

What we noticed during our analysis is that key partners have a high importance for the circular businesses we studied. These enable supply of materials, much needed networks and expertise that are essential for the companies to function in a circular economy.

Being manufacturing companies, suppliers are key partners of both companies we studied. Four different suppliers can be identified in the circular wood sector: (1) municipalities; (2) waste management companies; (3) building and construction companies, having leftover materials from their construction projects; and (4) material traders. One of the main challenges when it comes to supply of materials, for both company A and B, is estimating the available amounts of re-used wood. With a hard-to-estimate inflow it is occasionally difficult to fulfil agreements with customers. Closer collaboration or structural partnerships with these suppliers and within the supply chain could alleviate this problem.

Furthermore, close collaboration in networks is very important for both case companies. Company A is part of a vast range of different networks, and also acknowledges that this is needed both at the supply and demand side of their business model. For example, they are part of the Circular Craft Center network, and often collaborate on projects with these craftsmen and designers. For the transition Company B is aiming at, it seems that for realizing a viable circular product they need to be part of different networks as well, and need different key partners. Consequently, the number and type of suppliers might change as they must be able to provide a circular inflow of materials. Moreover, they will have to change their processes for manufacturing and quality assurance, which will influence the manufacturing site where they outsource their production to.

Other important key partners are specialists who are able to search for discarded materials, assess the quality of a material in a waste stream and estimate the possible use and value of that material in new products or buildings. These professionals are often referred to as 'material scout'. A further distinction is sometimes made between the role of material trading, which is similar to the wholesale activities of Company A, and the role of finding useful materials. The first role includes sales skills and functioning as a middleman between companies, and getting a margin out of that. For the latter role a person needs to possess empirical knowledge about materials, negotiation skills, and be able to assess the applicability of a particular material.

## **Discussions and conclusions**

The circular start-ups we studied had not consciously defined or chosen a specific circular economy strategy. In contrast, they use re-used materials as a starting point, and are

experimenting with different value propositions, products and services. Company A has activities that match patterns such as redistribution, recycling and repurposing. Company B's search for a circular product could match patterns such as reuse, repurpose, and design for upgradability and dis- or reassembly (e.g. Bocken et al., 2014; Bocken et al., 2016; Lüdeke-Freund et al., 2019); at the same time Company B is concerned about finding an appropriate inflow of materials, whatever the circular pattern.

The patterns and typologies from circular economy literature are practical for understanding circular business models. What is more, the research tool we used supported linking our analysis to circular patterns. Though, we did not find distinct patterns that could help advising circular start-ups on their strategies. This implies that in (our) further research a more detailed approach and analysis is needed in order to be able to find circular business model patterns that are relevant to companies in the wood sector and other building and construction industries.

Although we were not able to typify the companies we studied based on circular economy patterns, our study does provide insights that are useful to both academics and business. In general, how to optimally use discarded wood and how to deal with existing waste management regulation is a key and unresolved issue in both the wood and the waste sector. Traditionally municipalities and waste management companies focus on what is available from (bulky) waste and recycling centres. Alternatively, the companies with a circular approach we studied work from a customer and market opportunities point of view, and look at the functionality of materials available.

Concerning the business model, based on our case study, we conclude that key partners are essential in making the transition to a circular business model. These key partners first of all include suppliers that are needed to stabilize the inflow of used wood material. It seems to be necessary to have a good relation within the supply chain, in order to reduce the problem of instable inflow of material. Secondly, circular companies are in need of, and therefore have to establish, a network with different experts such as craftsmen, designers and 'material scouts'. This also enables the companies we studied to pursue different strategies and business models, including both services and products.

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