Reflection

The objective of this research was to design the financial section of a business model in which building product providers can operate within the set boundary conditions of the circular economy. The cost and revenue streams of a business model have been designed and assessed by means of a case study. The thesis is largely the result of the author trying to model the circular economy principles in practice. Due to a lack of scientific research or profound reports, there is not a solid ground theory to work with. Therefore the author first (re)defined the definition of a circular economy (together with co-student Robert van den Brink) and defined boundary conditions of this circular economy. With all these formed definitions, a business model is designed. A large part that has been written might be controversial or at least provide fodder for discussion.

Scientific relevance

As already stressed in the problem statement, current literature on the concept of the circular economy tend to remain rather theoretical. It seems that not much thought has been given to the practical implementation of the concept. Furthermore, the circular economy concept as posed by the Ellen MacArthur Foundation (2012) should not be accepted without a critical view (Mentink, 2014; De Grauw, 2015; Mohammadi, Slob & Prins, 2015; Kok et al., 2013). Extensive literature review has revealed a lack of business models ready for circular economy practice. This research aims to design the financial section of a business model by critical reviewing the current literature and reports. With the aforementioned six-step-approach the circular economy principles are mapped, boundary conditions are designed and subsequently projected to conventional business models of suppliers. With the results, a new business model will be designed.

Social relevance

The economy has been dominated by a one-way or linear model of production and consumption. In this model goods are manufactured from raw materials, sold, used and thrown away (EMF, 2012). This has brought society a lot of prosperity and there is still room for this model to grow geographically. However, people more and more realize the need for productivity gains and resource efficiency. According to the Ellen MacArthur Foundation (2012) people are living on a ‘consumption time bomb’. Resources are running out. On the contrary, the global middle class will more than double in size to nearly 5 billion in 15 years which will result in a consumption increase and material intensity (EMF, 2012). By 2050, the population will grow over 9 billion people, most of them enjoying increasing wealth (Godfray et al., 2010). This will lead to an economy demanding three times the amount of resources currently used (Planing, 2014). Other research even concludes that over 99% of the material flow generated in order to produce goods ends up in waste disposal after 6 months (Hawken, Lovins, & Lovins, 2013). It can be questioned if these figures are exact, however the urgency of a fundamental change of our economy should not be denied.

Looking at the construction industry the following figures can be mentioned. The built environment nowadays is responsible for using 40 to 50% of the natural resources, 30% of the primary energy demand in OECD-countries, 40% of the emissions of greenhouse gases and 10 to 30% of the waste flow in the European Union (Uihlein & Eder, 2009) (Schoolderman et al., 2014; OECD, 2008; Uihlein & Eder, 2009; APRICOD, 2006).

Experts

This section will discuss feedback of market parties on this research. Two experts were asked to provide a brief reflection on this thesis. One was director of the NVTB, a Dutch organization that represents the common interests of producers and suppliers of building materials in the construction industry. The second expert is a general manager of Tata Steel Construction Centre NL; part of Tata Steel Group. Tata Steel is one of the biggest steel suppliers in the world. Questions that have been asked were of reflecting nature, asking about their opinions on the outcome and results, the design of the study, the topic itself and the case study.

The respondents acknowledged the importance of research on the topic. Both respondents were already involved in the circular economy. The employee of Tata Steel acknowledged that the company is interested in leasing steel structure components over selling. However for Tata Steel the focus of implementing circular economy principles is not at the construction industry, but at the automobile industry, due to the long term relationships with the industry. Tata Steel furthermore acknowledged the difficult issues on the organizational level. The respondent stresses the complexity of the ownership structure in a building, confirming the findings in chapter two of this thesis. It is unclear what happens if a customer is not able to pay its lease; it is not easy to retrieve structure
components, especially in relation with other building product providers. This issue has been tried to cover by adding ‘complexity risk premiums’ in the designed business model. Next to that, the company finds it difficult to find a lease construction for a product with such a long life span (>100 years). Finally, also Tata Steel sees that the resource prices are dropping, significantly removing the financial advantage of retaining ownership over the product and with that acknowledging one of the important conclusions in the previous chapter.

The respondent was also asked to provide feedback to the list of costs that has been added to the business model. According to the respondent the list is highly relevant and he was not able to identify any overlooked aspects. However, criticized the ease of the conclusions; more conclusions can be drawn if more sensitivities and break points were calculated. The designed business model was found interesting and realistic, whereby the respondent acknowledged the present reuse of beams in the construction industry in the Netherlands.

The director of the NVTB found the topic and the design of the study very interesting. The director thinks that leasing products can be financially interesting, since it provides a business with a continuous revenue stream over a long period of time. Next to income from the products, a company enlarges business activities with the monitoring and management of the product and therefore spreading risks. On the other hand, the director also acknowledge (as the findings in chapter three) the high upfront investments involved with this structure and furthermore states that this step is hard to overcome.

As an interesting note the respondent mentioned that disassembly are rarely causing extra costs if products are well-designed. Next to that, the director found the results interesting and praised the ‘out-of-the-box’ thinking. On the other hand the respondent thinks the case study should have had a different subject. He believed that the case should have raised value if it was more from the client’s point of view. It is believed that the study has become more useful if it has been done about already existing circular economy building product examples, such as a circular façade. Furthermore the respondent criticized the lack of market experts in the report. More involvement of those parties could have given this report more depth. This is also mentioned by the manager from Tata Steel; he claimed that the case study could have been more comprehensive if market parties were involved earlier one.

The whole period of writing was one big learning process, giving new insights on the topic every day. This thesis focusses on the suppliers, and more specifically referring to the supplier of a steel beam in the case study or, within terms of this thesis, the building product provider. This research tried to determine whether or not the implementation of circular economy could be financially viable. In hindsight, more work is required in the field, specifically trying to identify the viability of the designed business model.

In the problem description of this thesis, it has been written that the implementation of the circular economy principles in practice cause financial, legal, social, mental and operational challenges (Kok et al, 2005). This thesis identified several costs that have to be incorporated in the financial section business model. More research is needed on all the other challenges, specified for all the other actors in the construction process as well. Co-student Robert van den Brink already did a part of this research, focussing on the organizational aspect as seen in the previous section.

Case study
The case study specifically focusses on the providers of steel beams. This product is partly chosen because the construction sector is the biggest consumer of steel and is also accountable for the highest carbon footprint. The challenges and opportunities are mapped for this specific product, but more research is needed on other building products. It is unsure if the same conclusions apply to other building products as well. If, for instance, a different structure product is examined such as wood, different payback periods, different resources, and different technical and economic life spans can be identified. Next to that, wood has different characteristics and is highly influenced by building regulations regarding bearing capacities. These issues should all be incorporated in the business model and if it more profound examined, it could result into a completely different conclusions.

Concluding, more research is needed about the legal, social and mental challenges. Next to that, more market parties should have been involved in this thesis. Despite that, the two respondents all think the findings are interesting and realistic. It is hoped that this research, together with the thesis of Robert van den Brink, can contribute to the discussion about circular economy.

Ruud Stigter