

Developing a transition agenda towards a circular economy: the Dutch case of the province of Overijssel

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Abstract. Over the last years, it has become clear that societies need to increase the adoption rate of circular economy principles. Even though the number of circular products, services and building projects is increasing, innovators obviously experience obstacles in their quest towards a more circular economy. Moreover, relatively many governmental organisations still seem to struggle how to effectively stimulate a circular economy. Governments face the challenge to develop a playground in which a linear economy gradually is replaced by circular practices. This paper presents the case of the Dutch province of Overijssel. The key question Overijssel put forward is what the province can do to stimulate innovative practices specifically in the building sector. After a literature study, a research collective brought together highly successful and less successful local and regional examples of circularity. Document study, website analyses and interviews, provided insights on the drivers and barriers. Our analysis shows what actions the province needs to take to further stimulate or at least to maintain the drivers and what to do about the barriers. Our findings are relevant not only to the province of Overijssel, but also to other regions in Europe.

1. Introduction

The next wave in sustainability is in circular economy. Although the notion of limited stocks of raw material was already noted by the Club of Rome in 1972 by their report Limits to Growth [1], only the last couple of years we see the idea of circular economy getting a foothold. Since our economies are firmly grounded in linear patterns, this implies a major transition. In our study we focused upon the building sector. In the Netherlands this sector is responsible both for around 50% of material use as well as 50% of all waste. Circular building is, therefore, a necessary ingredient of a circular economy. This, however, is a major task. Both in content given the impact of the sector, but also with respect to the structure of the sector: many different actors from architects to scrapyards, mainly SMEs, and with a large time lap between the design and construction of buildings and the possible reuse of the material in them. Business cases of all of these actors are built upon added value in a linear think model.

This is one of the reasons why at the national level a transition agenda for circular building has been developed. Below, in Section 4, we briefly discuss its contents. Given that the building sector holds a strong position in Overijssel, the province of Overijssel decided to translate the national agenda to the regional level. A research consortium was asked to develop this regional transition agenda. The authors were part of the consortium. The regional agenda has been published in last February. Also in Section 4, we describe the contents of this agenda too. Next to identifying current practices, potential obstacles

and needs, we also addressed the role of the province. The question we put forward is: what role of the province is needed to foster circular building?

Our theoretical perspective is found in policy sciences. In this literature a distinction can be found between two models of government action, see for instance De Bruijn [2]. The first, more traditional model is called the hierarchical model. Its steering concept positions the government in a subordinate place. The government issues regulations that guide private actors. The second model is the network model. Policy development is seen as an interactive negotiating process between public and private actors. The government is one of the actors, positioned equally as the other partners. This last model is especially applicable in the case of wicked problems, in which no easy solution is visible that can be captured in regulation. Working in a network model requires governments to reflect upon the question which actors are vital. Policy development takes place in close interaction with these actors. We see the transition towards a circular building sector as a wicked problem. In developing the agenda we, therefore, used the network model as inspiration.

(Policy) Development processes in a network setting follow a different path than hierarchical processes [2]. In the latter the focus is on the substance of the problem, possible solutions, and the implementation of the most optimal alternative. In a network setting the focus shifts to exploring the context of the problem and the actors involved. Below we highlight the main steps in the process.

1. Exploring the substance of the challenge

Although the main focus is on the network, it is wise to start with an exploration of what is at hand. It is difficult for an actor to engage others without some basic understanding.

2. Exploring the actors involved

The network setting is particularly useful, if there is mutual dependency. The second step, therefore, is an exploration of who is involved, in some way. As this is not easily answered often, it is wise not to limit the group of actors to engage.

3. Determining the architecture of the process

An interactive process does not run itself. Rather, it requires careful planning and management.

4. Consultation rounds on the problem definition

The first consultation round should focus on jointly exploring what the perspective of each actor is on the challenge at hand. Of course, in a network setting these perspectives can be rather diverse. Before exploring possible solutions, it is wise to get a clear view on how the challenge is perceived.

5. Consultation rounds on possible routes for meeting the challenge

A logical final step is the exploration of how possible solutions may look like. An important factor for success is the extent in which the various actors recognize their problem definition in the various routes. Also to be discussed is the contribution relevant actors can make to the solution.

In our research setup, that we discuss in the next section, we used this network model as a guidance.

2. Research setup

What makes an agenda effective? Especially in the case of wicked problems, the agenda in our viewpoint should reflect the perception of the sector itself. As explained above, with wicked problems governments have too little information and knowledge to simply regulate by themselves. The knowledge of the private partners, their innovation capacity and other resources are necessary ingredients. Therefore, the research setup is as follows.

We started with a literature review to get a good grip on what circular building is. Academic as well as professional publications have been reviewed. Special attention was paid to identifying possible

obstacles towards circular economy and circular building. The results were used to feed the rest of the process. Some of the results of the literature review is presented in the next section.

Next we started exploring who should be involved in the development process of the transition agenda. More than six workshops in diverse settings and with partly different participants were organized. The participants were representatives of the building industry, but included also people working in education and research. All in all more than one hundred people were involved over a period of six months. Next to the workshops individual interviews were held with opinion leaders and innovators.

Through the workshops and interviews we learned what perspectives the different actors have on circular building. We explored current practices, innovative projects, partnerships, and last, but not least, obstacles. The second part of the workshops were used to explore possible routes for a transition towards circular building. All information was brought together in the draft agenda. This draft was presented and discussed with the province. The project ended with a presentation of the agenda to the network.

3. Theoretical framework

This section elaborates on our theoretical framework. Circular economy is a concept that many scholars try to define and try to make more tangible. It probably comes as no surprise that the Ellen MacArthur Foundation [3] seems to be regarded as an authority in the quest of scholars, as well as practitioners, i.e. entrepreneurs, to grasp the principles of circular economy and to come to actions.

3.1. Defining circular economy, its principles and actions needed

According to Kirchherr et al. [4] 114 different definitions of circular economy can be found. Considering that that paper was written in 2017, the number of definitions probably even increased in the meantime. Although it is by no means our intention to set out all definitions of circular economy that are available in literature, we would like to reflect on some to illustrate some of the different interpretations that seem to exist. The Ellen MacArthur Foundation defines a circular economy as follows [3]: *a circular economy is one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles*. When narrowing our search for literature on circular economy down to the construction industry, Mahpour addresses the definition for circular economy of the Ellen MacArthur Foundation as follows [5]: *“an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts toward the use of renewable energy, eliminates the use of toxic chemicals impairing reuse, and aims at eliminating waste through the superior design of materials, products, systems, and business models.”*

Korhonen et al. [6] define circular economy as follows: *“an economy constructed from societal production-consumption systems that maximizes the service produced from the linear nature-society-nature material and energy throughput flow. This is done by using cyclical materials flows, renewable energy sources and cascading-type energy flows.*

It becomes clear that internationally different points of view led to many definitions. Considering the specific situation of the province of Overijssel, which is located in the Netherlands, the efforts of the Dutch government to define this concept cannot be ignored. According to Reike et al. [7] the Dutch government defined circular economy in 2013 as an *economic system that takes the reusability of products and materials and the conservation of natural resources as starting point. It also strives for value creation for people, nature and the economy in each part of the system”* [8]. In 2018 the national Transition Agenda Circular Building of the Netherlands offered the construction industry the following translated description [9]: circular building means to develop, use and reuse buildings, areas and infrastructure without unnecessary depleting natural sources, without wasting the environment and without affecting ecosystems. It is a way of building that can be justified economically and that contributes to human and animal welfare. Here and there in the present and for the future.

When explaining what a successful circular economy is, Korhonen et al. [6] refer to three aspects, that are very familiar to those involved in sustainable development, namely people, planet and profit.

The people aspect becomes apparent in, like [6] describes it, *the sharing economy, increased employment, participative democratic decision-making and more efficient use of the existing physical material capacity through a cooperative and community user (user groups using the value, service and function) as opposed to a consumer (individuals consuming physical products) culture.*”

The environmental objective of circular economy, or planet aspect, is to reduce the production-consumption system 1a) virgin material and 1b) energy inputs and 2a) waste and 2b) emissions outputs (physical throughput) by application of material cycles and renewables-based energy cascades.”

The economic objective of circular economy is to reduce the economic production-consumption system's raw material and energy costs, waste management and emissions control costs, risks from (environmental) legislation/taxation and public image as well as to innovate new product designs and market opportunities for businesses.”

Making the concept of circular economy again less abstract, the Ellen MacArthur Foundation also provides fundamental characteristics to describe what needs to be done or, preferably, already has been done in a circular economy [3]:

- A. waste is designed out, because in a circular economy waste does not exist;
- B. diversity builds strength, because a circular economy values diversity;
- C. in a circular economy renewable energy sources power the economy;
- D. systems-thinking is applied broadly in a circular economy;
- E. prices or other feedback mechanisms reflect on real costs.

Besides these characteristics, the Ellen MacArthur Foundation also identifies six actions that businesses and governments can take. These are referred to in the so called ReSOLVE framework [3]. This framework encompasses six categories of actions [3]: Regenerate, Share, Optimise, Loop, Virtualise and Exchange.

3.2. Defining drivers and barriers

The Ellen MacArthur Foundation identifies four building blocks that might help to foster a more circular economy ([1], pp. 16-17):

- 1. Circular product design and production;
- 2. New business models;
- 3. Reverse cycle;
- 4. Enablers and favourable system conditions:
 - a. Education;
 - b. Financing;
 - c. Collaborative platforms;
 - d. A new economic framework.

Although, for the reason of conciseness, the complete descriptions of the building blocks are left out here, two things seem inconsistent to the stranger's eye. Firstly, it can be debated if it is wishful to give name to an individual building block “1. Circular product design and production” that addresses directly the overall target, namely that of coming to a circular economy. Secondly, as one can see, the fourth building block consists of four elements, which suggests that these four, a to d, are less important than the first three, 1 to 3.

On the basis of analysing 195 articles from the Web of Science Core Collection and Scopus databases, Galvão et al. [10] identify seven main barriers in literature to come to a circular economy. These barriers are: 1) Technological, 2) Policy and regulatory, 3) Financial and economic, 4) Managerial, 5) Performance indicators, 6) Customer, and 7) Social. However, the authors fall short in defining or describing these categories. Strangely, most examples given are not even related to these seven main barriers, but to other additional categories of barriers.

This again brings us back to Korhonen et al. [6], who do not speak of barriers. However, they do mention six categories of limits and challenges for the circular economy concept, namely 1)

thermodynamic limits, 2) system boundary limits, 3) limits posed by physical scale of the economy, 4) limits posed by path-dependency, 5) lock-in limits of governance and management and 6) limits of social and cultural definitions.

4. Policy context

In this section an overview will be given of existing national and regional policies.

4.1. National policies

The Dutch national government has put down its ambitions and targets on circular economy in a memo called '*Nederland Circulair in 2050*' [9]. By 2030 the use of virgin material should have bisected. In 2050 all material should be used in a sustainable manner, without any harmful emissions and without using any virgin material at all. Products should be designed in such a way that reuse and recycling is possible without a loss of quality.

Following the memo on circular economy early in 2018, the national government published its memo on the building sector in this respect (see Figure 1) under the name of '*Transitieagenda Circulaire Bouweconomie*' [11]. This national transition agenda has its main ambition in reaching a completely circular building sector in 2050. At the same time, due to existing shortages in the Dutch residential real estate market and due to demographic developments, one million new houses need to be built. The agenda notes that reaching these goals will be far from easy. The agenda holds four priorities, namely:

- market development by, amongst others, creating 'early adopters' through stimulating 'launching customers', by developing passports for materials in buildings and by stimulating Design, Build, Finance & Maintain tenders;
- measuring and monitoring: developing an uniform method for determining levels of circularity;
- policies and regulation: creating space for experimentation in current rules;
- knowledge and awareness: the transition process requires (new) knowledge of all parties involved through research and education, educational programs and communication.



Figure 1. Cover of the national transition agenda for circular building economics.



Figure 2. Cover of the regional transition agenda for circular building sector.

4.2. Regional policies

The national ambition for a circular economy was a stimulus for the province of Overijssel to issue its own regional agendas, for six different sectors of our economy, namely the construction industry, infrastructure, manufacturing industry, plastics, biomass and food, and consumer goods. Figure 2 shows the cover of the regional transition agenda for a circular building sector [12]. As the construction industry is prominent in Overijssel, it is one of selected sectors. The resulting regional transition agenda recognizes that the transition will not only be technological. Rather, new business models and social innovation are necessary ingredients. It also recognizes that the road towards a circular building sector must be explored step by step. Along the way the actors involved will discover what roles they can play and how their practices should change and what is needed for that. That is why developing experimentation platforms are an important element on the agenda.

5. Exploring circular challenges

In coming to the regional transition agenda circular building of the province of Overijssel, interviews were conducted with six different front runners in educating circularity. Interviews at universities and at an Intermediate Vocational Education institute were taken. In the field were circularity needs to be practiced entrepreneurs were interviewed. Eleven interviews in total were taken to find out how well circularity has landed in company policies and in the daily routines. By studying literature and policy documents on the one hand and by interviewing political, entrepreneurial, research and educational leaders on the other hand, it became clear to us that nine major obstacles still exist hampering circularity becoming mainstream. These obstacles have been formulated as questions which the construction industry might want to ask herself:

1. How can the behaviour within and culture of the construction industry be transformed to a situation in which skilled and unskilled clients and contractors recognize the scarcity of virgin materials and act accordingly, placing circularity upfront?
2. How to ensure that laws and regulation in the construction industry do not obstruct a circular economy, but rather require and support this new economy without lowering quality standards, climate objectives, CO₂ and energy targets?
3. How do we come across all stages in the whole life cycle of buildings to lasting partnerships in which long term common interest and social relevance are united with short term individual financial benefits?
4. How can functionality be valued profitable by a business model that takes into account environmental impact and the circularity of products and materials offering that functionality?
5. How can financial constructions be developed that assess risks by also considering the added value of building and exploiting circularly?
6. How can a solid, comfortable and sustainable building for the user be guaranteed, while at the same time material cycles are closed?
7. How can building components, products and materials be reused offering high quality with the lowest environmental impact possible?
8. How can the construction industry come to a circular supply chain of (circular) components, products and materials for the entire life cycle of a building?
9. How can educational programs prepare future employees in and adjacent to the construction industry for (contributing to) the circular building economy?

As shown by the challenges identified above, it is clear that the transition towards a circular building economy is a major challenge. From what we have learned from the forerunners there is yet much to be experimented and learned. A central element in the agenda, therefore, are the so-called experimentation platforms. At these platforms more knowledge can be gained on how to overcome obstacles. The

experimentation platforms have been spotted by the research team. We further developed them in close collaboration with the (local) partners involved.

6. Discussion

The transition process will need close collaboration between all actors involved: the sector itself, governments, research and educational institutes. A study on the role of the province of Overijssel in the energy transition showed that governments and particularly the province play an important role [13]. It concludes that there is yet not fully functioning market. Without an active role the energy transition will not likely reach its goals timely. We feel this situation is comparable with the transition towards a circular building economy. The question we address in this section is what role there is for the province of Overijssel.

In a recent study by the University of Twente/BMC a couple of action perspectives for provinces is described [14]. They distinguish four categories:

- the outstretched hand: at the start of a process a province act as equal partner, exploring the playground;
- the helping hand: as the actors involved sometimes do not oversee a challenge, a province can intervene by for instance commissioning research or appointing a process manager;
- the guiding hand: guiding all actors into the direction wanted. The role of the province is to provide a vision and to keep all actors aligned and on track;
- the strong hand: as not all actors will move automatically, a province should in the end also use its regulatory power to force change.

Of course there is some sequentiality. At the start of a transition process the outstretched hand is more fitting than the strong hand. Also, in cases where all is clear a province shouldn't be holding back from direct regulation. We feel that all 'hands' will be necessary in the end. For the coming period, however, the emphasis should be on collaborating, gaining knowledge, getting all relevant actors on board. Once there is sufficient mass, and there is more clarity on what circular economy actually means for the building sector, the focus can shift towards guiding and regulating. This development of different strategies stands at the basis of our advice to start with experimentation platforms.

7. Conclusion

Although there is much talk about circular economy, in practice still much has to be learned. Major issues, as the nine challenges we identified, remain open. That is why it is too early for scaling up already. The challenge towards a circular construction sector presents itself as a wicked problem. Not clear yet is what needs to be done, who has to do what and how governments can stimulate action. We, therefore, looked at the challenge from a network perspective. Some conclusions can be drawn: many of the actors in the construction industry know about circularity, but community-building is only in its early stages. That is why we started up our process of research iteratively. For the next round a more firm process architecture should be developed. Through our research we discovered the challenges the sector faces. As a next step projects need to be developed that address these challenges.

As for the role of the government: there are some early adopters, but the majority of the building sector is, at best, only starting up. Further experimentation and learning are necessary. That is why we recommended experimentation platforms. This calls for a government who is supportive and collaborative. When sufficient knowledge has been gained, regulatory action may be a future phase.

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