The effect of proximity on waste management in the paradoxes of the circular economy in France (chapter nine)

Jean-Baptiste Bahers, Mathieu Durand

THE EFFECT OF PROXIMITY ON WASTE MANAGEMENT IN THE PARADOXES OF THE CIRCULAR ECONOMY IN FRANCE (CHAPTER NINE)

JEAN-BAPTISTE BAHERS AND MATHIEU DURAND

Introduction: The spatial dimension of the circular economy

The paradigm of the circular economy, which is very much a trend these days, is assumed to provide a new vision of waste management, according to its concept promoters (Ellen MacArthur Foundation). It intends to be the antithesis of the linear economy, which is structured in terms of the unlimited extraction of resources and preponderant waste. It has become a reference framework in the issue of waste and supplies, among all stakeholders. Reusing and recycling waste is one the key pillars of the political programme of the circular economy, along with other strategies such as eco-design, industrial symbiosis, and extended product life. Regarding French law, the concept was introduced by Dominique Bourg. His PhD student worked on this subject in China (Fan, Bourg, and Erkman 2006). The first mention of it was during the Grenelle de l'Environnement workshop (2007), followed by the Conférence Environnementale (2013). The French Institute of Circular Economy (described as a think-tank) was created in 2013 to promote the concept. The first regulatory definition was in 2015, enshrined within the legal framework of Transition énergétique (Law no. 2015-992, August 17, 2015).

There is a blooming body of literature within the field, which aims to define the concept, including reviews articles (Ghisellini, Cialani, and Ulgiati 2016, Kirchherr, Reike, and Hekkert 2017, Urbinati, Chiaroni, and Chiesa 2017, Korhonen, Honkasalo, and Seppälä 2018, Homrich et al. 2018). However, the circular economy is not free of criticism: It could be a way of justifying the neoliberal economy by reducing the negative effects of economic growth without resorting to political appropriation (Desvaux 2017, Arnsperger and Bourg 2016, Gregson et al. 2015, Hobson 2016, Mathews 2011, Stål and Corvellec 2018). This growing interest in the circular economy leads us into a growing need to understand its spatial dimension, which is absent, in relative terms, from scientific articles. Interrogating the territorial dimension of the circular economy is useful when it comes to understanding its implementation. How can we think about circular waste management, taking into account the spatial issues of the industrial society? One of the fundamental concepts of waste regulation of the spatial dimension is the principle of proximity. Hence, the role of proximity in waste management is affected by the new vision of the circular economy. This article seeks to understand how the circular economy relates to the principle of proximity laid down in French regulations adapted from the European Waste Directive (EWD). How will consideration for proximity be modified by the circular economy? This research explains the theoretical framework of the proximity in order

to show its full meaning and its methodology (1). Subsequently, it develops an analysis of the interpretation by all types of stakeholders in waste management (2) in order to build different typologies of proximity in waste regulations, which are supposed to be renewed by the circular economy (3). We conclude with the paradoxes of circular economy.

The principle of proximity in waste regulation

The role of the principle of proximity in European and French regulations regarding waste management is quite important, but not well defined. In the European Waste Directive (91/156/CEE), there are three complementary visions of the principle of proximity in legislation:

The first one focuses on the restriction of waste transportation. This requirement helps to prevent large volumes of waste being exported through regions or abroad. The "waste tourism" issue, whereby companies export their waste to the countries with the most lenient legal regulations, is addressed in this vision. However, the international trade in hazardous waste continues today.

The second approach is based on the localization of waste treatment infrastructures, stating that waste should be treated or disposed of as close as possible to where the waste is generated. However, there is no preciseness as regards either the distances or the geographical scales intended to be implemented.

The third vision entails the decentralization of waste management rather than centralized responsibility. This version of the principle of proximity is similar to the principle of subsidiarity. In France, household and hazardous waste is supposed to be managed on the regional level, with effect from 2015. This means that the regional governments have a huge responsibility and are supposed to implement self-sufficiency in waste disposal. However, some regions are still lacking an adequate infrastructure.

If the principle of proximity is one of obligations in waste management, its implementation is quite complex and affected by "variable geometry". The political aim of its implementation is often related to health and environmental issues: i.e. avoiding the export of pollution and reducing the risks of waste transportation. However, other ways of implementing this concept exist, e.g. territorial self-sufficiency in raw materials and waste-treatment infrastructures. Over the last few decades, these approaches have moved towards the technical and economic management of waste treatment.

Regarding the spatial dimension, as enshrined within French law, of the circular economy (Law no. 2015-992, August 17, 2015), the regional dimension is mentioned in this definition because it is supposed to facilitate economic collaboration between stakeholders. Firstly, this means that waste management should go beyond administrative boundaries and, secondly, that it should also take into account all material flows (resources and waste) and stakeholder roles. Finally, the circular economy is supposed to be implemented 'in respect of the principle of proximity' (Law no. 2015-992). For the European Union, the territorial dimension disappears completely in deference to efficiency in the use of resources in order to maximize European economic growth (7) (8). What does it mean and on which scale is it implemented? Does it include the globalization of recycled materials and is it relevant to application on the local scale? The principle of proximity suggests that waste should be

managed close to where it is generated; however, there is no statement as regards on which geographical scale it is supposed to be respected in European and French regulations.

The theoretical issues concerning proximity

Questions concerning proximity have generated a lot of debate in French research (Colletis et al. 1999, Gilly and Torre 2000, Pecqueur and Zimmermann 2004, Bouba-Olga and Grossetti 2010, Carrincazeaux, Lung, and Vicente 2008, Torre and Wallet 2014). Thus, many forms of proximity (e.g. geographical, organizational and institutional), which are included in this article, originate from the debates arising within this scientific network. Geographical proximity, firstly, refers to a separation in space, while organizational proximity is based on interactions between actors. Finally, institutional proximity concerns the common spaces of representation and the rules governing action. The concept of proximity has also been studied with regard to economic and environmental dimensions. Torre and Zuindeau (Torre and Zuindeau 2009, 1-3) investigated the role of the spatial dimension in environmental issues, e.g. waste production, and the infrastructures close to inhabited areas. They looked at the problems connected with short distances between stakeholders and land-use conflicts. Use of the theoretical concepts of geographical proximity and organized proximity (Torre and Wallet 2014, 4-5) is very powerful when it comes to analyzing the management of environmental problems.

Some research has been done in order to show the role of proximity in the field of industrial symbiosis, which is one of the pillars of the circular economy. Indeed, industrial symbiosis, i.e. waste from one company being reused as a raw material by another (Jacobsen 2006, 239), has been studied in terms of the geographic factor. This research highlights the fact that the short distances between companies at an industrial harbour (Schiller et al. 2014, 792), or in a region (Jensen et al. 2011, 703), facilitate waste exchange. French researchers have also gained relevant insights into the role of social proximity in industrial symbiosis. They conclude that geographical proximity between companies leads to social proximity facilitating exchanges of co-products and solutions in waste recovery (Beaurain and Brullot 2011, 340, Buclet 2011, 159). Organizational relations between closed stakeholders is a major factor in reusing by-products and energy. Geographical proximity methods can ‘help to identify opportunities for industrial symbiosis by identifying niches of wasted resources’ (Schiller, Penn, and Basson 2014, 4). On the other hand, Gregson et al. (Gregson et al. 2015) use the variable of spatial proximity to criticize these initiatives of industrial symbiosis, which are unable to reuse all the waste on a local scale. The emerging circular economy, according to them, ‘entails challenges borne of a conjuncture of politically created markets, material properties and morally defined material circuits’ (Gregson et al. 2015, 224).

Methodology

This growing interest in the circular economy leads us into interrogating its territorial dimension. What are the spatial issues connected with this new vision of waste management. How will consideration for proximity be modified by the circular economy? In order to understand the relations between the circular economy and the principle of proximity, 57 semi-structured interviews were carried out between 2013 and 2015 in France. The stakeholders, who were interviewed, were

waste company directors, social companies managers, managers of Extended Producer Responsibility (EPR) organizations, state government engineers, regional government engineers, local government engineers, professional federation representatives, NGO representatives, and experts. This method of data collection did not focus on one type of waste. The objective of the interviews was to collect data on the stakeholders' understanding of proximity. The main themes of the semi-structured interviews were: The spatial representation of the waste recycling chain, The spatial dimension in European and French policies, The inclusion of proximity, Proximity issues along waste recycling chains, The operationalizing of a circular economy of proximity.

We analyzed the data in a qualitative way in order to understand all types of interpretations of proximity. The aim was to compare the discourse of local governments with their political programs and the actions of waste companies. Therefore, different interpretations of proximity have emerged within the circular economy. There are lots of disagreements between stakeholders regarding the role of waste management plans, industrial strategies and stakeholder practices.

Different perceptions of proximity

In addition to the spatial dimension of the proximity principle, it also appears that there are different perceptions of proximity, in accordance with the stakeholders, the situation and the priority. Therefore, we can define the typology of proximity on the basis of the types of waste, the roles of the stakeholders, and the socioeconomic conditions. However, the regulations do not take these different perceptions of proximity into account. This is why it is important to structure and clarify this typology in a better way in order to reveal the different perceptions, not just the spatial one. These perceptions vary from stakeholder to stakeholder, and with each situation and issue.

Some French researchers have already thought about the issue of proximity in waste management, but in field studies of conflicts (Cirelli, Maccaglia, and Melé 2017). These scholars have established a typology of proximity regarding the activism of residents who are close to waste treatment infrastructure or who decide to create reuse activities. This article does not focus on the inhabitants' actions, but on the regulatory implementation and on the role of the professional stakeholder. Six types of proximities have been identified.

Spatial proximity: measuring the distance

Spatial proximity can be measured on the basis of geographic issues. The aim here is to identify why waste travels and measure the distance between production and treatment sites. It is thus possible to define the exact number of kilometres travelled in order to study both the route and the distance. The spatial proximity of waste treatment is dependent on these distances between production and processing sites. It also redefines the distance between a territory and its waste (Corvellec et al. 2018). This idea could lead to an geographical implementation of circular economy in order to build a 'metabolism of the urban ecosystem' (Newell and Cousins 2015, 721).

Interpersonal proximity: the importance of human relationships

Interpersonal proximity corresponds to human interrelations. Although it does not have a formal place in public procurement and waste management tenders (to avoid any risk of corruption or embezzlement), it still has a certain place in waste management. Mutual knowledge is a key factor in choosing partnerships, and thus in the localization of waste treatment sites. These interpersonal relationships are not always dependent on a local environment and spatial proximity but sometimes also on career paths. They are thus at times a constraint to the implementation of spatial proximity. For example, relationships and partnerships are finally facilitated by employees who leave companies for other jobs: *I worked for 11 years at company X before becoming a manager at company Y. My main customer is now company X and the other customers of company X have now become my new customers at company Y (Manager of waste recycling company, 2015).*

This proximity between employees from different companies helps to share both best practices and services such as transportation, facilities and marketing. It helps companies to exchange waste, water, energy or by-products. In the long-term, such initiatives, based on interpersonal trust, facilitate the creation of innovative activities (e.g. industrial symbiosis, the process of reusing water in a building, territorial methanization, and heat networks between companies). This trust link is often a driver for the collaboration between companies. In addition, managers also think that the trust factor is more important than being competitive. Hence, these networks in industrial symbiosis offer '*the opportunity for new ecological business, based on trust rather than cost'* (Manager of waste treatment company, 2015). *That is why 'we need to build and maintain relationships along the supply chain'* (Manager of waste treatment company, 2014). Even if public markets are controlled by regulatory frameworks, interpersonal relationships are significant in creating collaboration. In open and strong competition, the waste operators know each other on the regional level: '*with few competing companies, we are complementary, and we work in partnership'* (Manager of waste recycling company, 2015). Some of the waste companies that we studied are also involved in industrial symbiosis or a business club of industrial ecology. These organizations are an important factor of greater understanding and closeness between companies. The better organization of industrial symbiosis networks is enabled by the proximity of professional relationships: '*we get to know each other within this network*' (Manager of waste treatment company, 2015).

<u>Organizational proximity: giving priority to technical issues and economies of scale</u>

Organizational proximity can be understood in two ways. Firstly, the organization of industrial companies: In France, most waste companies are grouped into four consortia (e.g. subsidiary corporations or strategic partnerships). These consortia manage all the steps of waste management, from collection until final treatment. The sorting sites of big industrial companies will favour networking with their existing partners, i.e. the industrial sites within the respective consortia. This is driven by an economic logic. Organizational proximity is based more on existing consortia, even if it entails long distances between two industrial sites. Thus, partnership is givern priority over spatial proximity.

In addition, the long distances involved in trading are not necessarily more expensive. Companies find strategies that reduce these costs, e.g. the 'reverse supply chain which manages the reverse logistics flow of waste' (Manager of waste recycling company, 2014).

The second type of organizational proximity is determined by the category of waste. Some waste needs to be treated at a specific dismantling centre and then at a specific recycling site, e.g. electronic or chemical waste is treated in a specific chain. There are only a few of these specific sites in France, because the level of technology and investment is very high. In addition, these sites also have to manage large flows of waste in order to be cost-effective. Hence, waste travels long distances to be treated properly at these industrial sites. This organizational proximity is in contrast to spatial proximity since specific infrastructures are essential and sometimes these are far away.

Even though there are economic and environmental constraints to waste transportation, companies overcome these when dealing with mass waste of high added value. The companies know the following paradox well: '*Proximity is essential! But when waste is well-sorted, that's less important'* (Manager of waste treatment company, 2014). Waste is not a homogeneous material. Depending on its composition, and the separating it has undergone, it will require different treatment infrastructures, to which it will have to go. This proximity is linked to the technical nature of the waste.

The concentration of companies (through mergers and acquisitions) allows consortia to process larger volumes of waste. In addition, this also increases their investment capacity. Small companies struggle in this type of economic context. However, some large companies do not always respect the principle of proximity stipulated in the regulations on waste treatment, especially those with their own specific infrastructures throughout France and Europe: '*The principle of proximity impedes the free movement of goods in Europe'* (director of a professional federation), 2014). According to him, weakening the principle of proximity would benefit the companies by creating a large market in waste. The free market regains its rights when as regards economic profitability and the purchase price of recycled materials.

Environmental proximity: how to measure the environmental footprint

First of all, proximity is seen, by the waste companies from an environmental point of view, as the short-haul transportation of waste. Environmental proximity thus corresponds to reductions in the distances travelled by collection trucks and the optimization of logistics: '*Proximity is an asset by common sense, by conviction, to reduce transport cost and for the carbon footprint. That's marketing!'* (Manager of waste treatment company, 2015). Environmental proximity is also based on a local level and positive relationships with neighbours. Companies recognize that it is important to communicate and to promote this valuable aspect: *Our marketing storytelling is based on about the image of the local company, closed to the local market and careful to our carbon footprint. The environmental proximity is very important for us* (Waste company director, 2015).

Contrary to what stakeholders might think, environmental assessment (e.g. carbon footprint or lifecycle analysis), by type of waste , does not demonstrate any systematic link between environmental and spatial proximity (Durand, Bahers, and Beraud 2016, Song, Wang, and Li 2013, Erses Yay 2015). From an environmental assessment point of view, it is beneficial for some types of waste (e.g. electronic waste or metals) to travel long distances in order to be recycled using technology that reduces its environmental footprint. This is also because of the environmental database, which calculates an important positive impact of recycling. On the other hand, for other

types of waste (e.g. organic waste, building waste or sludge), environmental proximity converges with spatial proximity. Treatment must occur very close to the production site to reduce the environmental footprint. To sum up, the environmental footprint of the logistics and treatment method used can really vary with the type of waste. Some environmental assessments demonstrate that there is an environmental benefit to treating waste away from its production site.

Politico-administrative proximity: regulatory requirements

This type of proximity concerns the role of public actors: How do these handle issues regarding economic development and citizens' interests? These public actors have to define local policies of waste management. Indeed, local authorities have to choose their industrial partners for household waste collection, recycling and treatment. Therefore, regulatory and participatory mechanisms have been created by local and state governement, in order to improve the social acceptability of the infrastructure. However, meetings are not always positive:

The proximity is 150 metres away from neighbouring residents. As soon as there is a bad smell, you can be sure that they will be at the door, or worse still, at the city hall. We have set up an "*olfactory jury"*, which convenes every three months, in order to improve relations (Manager of waste treatment company, 2015).

Regional authorities manage the strategic plan for industrial and household waste management. However, the waste plan is paradoxically experienced as not having a very strong impact on waste management:

Their hypothesis is generally wrong in calculating waste flows due to a lack of methodology and due to authorities not communicating with each other (Waste company director, 2015).

Thus, the plans '*do not prevent the movement of waste'* (Manager of waste treatment company, 2015).

Even if local authorities are in charge of household waste treatment, they are still constrained by the Public Procurement Code. Hence, they cannot help local companies in accessing markets in order to benefit favour local economic activity. In addition, the regulatory requirements of Extended Producer Responsibility (EPR) are increasing in Europe, covering at least 15 types of waste in France. The EPR organizations are in charge of the design of waste collection and recycling, since local authorities play no part in this. In such cases, public actors cannot support the principle of proximity in spite of their knowledge (Bahers, Capurso, and Gossart 2015, 46). However, regional authorities have had a stronger role in France since 2015 given the French law for a new regional organization (L2015-991) due to having to define the industrial and household waste plan. They are supposed to organize the localization of waste infrastructures in order to optimize regional capacities. However, the regions are quite vast, revealing that waste is increasingly being treated further away. In addition, interviews also show that organizational proximity is a more important factor than regulation, leading companies disregarding the legal principle of proximity.

Socio-economic proximity: developing local activities

The last type of proximity tends to highlight the local socio-economic companies of the waste sector. This image is often linked to the support given to local socio-economic activity: *'We want to provide local recycled waste to local companies and to facilitate our integration into the economic landscape'* (Manager of waste treatment company, 2015). This strategy of proximity is the opposite of the strategy of the large industrial group, which owns several industrial sites. Hence, the limitation of being small in size is balanced by the local level. This is a smart marketing strategy. According to the interviews, the waste management operators sometimes choose to favour partnerships with social companies, which are known as a local stakeholder, instead of as a major company: "*Small markets are also a way of encouraging SMEs to respond to the market ... and to promote, through these small structures, the social and solidarity economy strategy* (Manager of local authority, 2014).

The competition is quite fierce in some markets, e.g. e-waste. Producer responsibility organizations have been approved by the French Environment Ministry but are owned by the electronics manufacturers. These last ones are seeking to regroup e-waste into national infrastructures. On the other hand, social companies, historically operators in e-waste reuse, have lost a lot of markets to producer responsibility organizations, but are still putting forward their local level supported by their old partnerships with local authorities and waste collectors. The local network of the waste sector needs to be considered from this perspective. Thus, socio-economic proximity and organizational proximity are in competition with each other.

Conclusion: the paradoxes of the circular economy

Proximity is one of the most important principles in European waste legislation. Nevertheless, no regulatory requirement defines precisely the territorial scale in which it is supposed to be implemented. This is freely interpreted by each waste operator. The pattern as regards common interpretation and appropriation is indeed unknown. Thus, the proximity principle is not being implemented on the same geographic scale vis-à-vis the type of waste, the geographic and social context, and the stakeholders. The 'diversion and displacement of materials', as referred to by Bulkeley and Gregson (Bulkeley and Gregson 2009, 945), requires the spatial and temporal aspects of waste management to be better taken into account.

Based on a qualitative methodology, these situations are analyzed and regrouped in a typology of six proximities. These proximities are dependent on spatial distance, interpersonal networks, the organization of waste chains and professional partnerships. These types of proximity are sometimes in opposition and do not necessarily lead to a local circular economy. Environmental proximity is based more on the assessment of the environmental footprint, according to transportation and treatment patterns. Correlations between environmental and spatial proximity are not always proven or demonstrated. Any political action taken depends on the local authorities, something which is also quite important. Even if local authorities are really constrained by regulatory requirements, the interests of the citizenry can be supported by their actions. This perspective is also supported by researchers, who talk about "generative spaces" for developing the circular economy

based on citizen engagement (Hobson 2016, 99). Finally, socio-economic proximity advances the local development of economic activity thanks to the reuse of urban secondary materials.

Although the concept of the circular economy is being interpreted and appropriated by all stakeholders (NGOs, local authorities, social companies, and industrial companies, which were all interviewed), its implementation is far from simple. The issue of proximity is very interesting when it comes to revealing the paradoxes and contradictions of the emerging circular economy. Beyond the stakeholders' discourse, most waste is treated locally, entailing high costs borne by society, while the waste being recycled and sold is sent far away from its production site (Durand, Bahers, and Beraud 2016). The secondary materials are not used to develop local activities. How do we connect the world market for secondary materials with local actions? According to the interviewees, it seems that the new vision of the circular economy is influenced more by technical issues and economies of scale than by the development of local partnerships.

The geographical issues are appropriate very differently between local authorities, PROs, waste companies, and social companies. Nevertheless, it seems complicated to implement the proximity principle when national regulations are promoting the economies of scale and industrial and technological specifications. Analysis of the interpretations of proximity show that the actors think they are evoking the same territorial scales of action when this is not the case. Organizational, interpersonal, politico-administrative, and environmental proximities are not necessarily benefiting to the local scale. Opposition to the dominant paradigm of large technical systems remains slight. Therefore, there is more of a hybridization of practices than a real challenge to waste treatment systems.

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