NON-STATE PARTICIPATION IN SUSTAINABLE MATERIALS MANAGEMENT:

The Case of Fairphone

SuMMa Research Paper n° 19

Sarah Van Eynde and Kris Bachus

30 June 2016

The Policy Research Centre for Sustainable Materials Management brings together six renowned knowledge institutes: KU Leuven, Universiteit Antwerpen, Universiteit Gent, Universiteit Hasselt, HUBrussel and VITO.

Please refer to this publication as follows:
Van Eynde, Sarah and Bachus, Kris (2016). Non-state Actors in Sustainable Materials Management: The case of Fairphone, research paper 19, Policy Research Centre on Sustainable Materials Management.

For more information: kris.bachus@kuleuven.be

This publication was sponsored by the Flemish Government, under the 2012-2015 Policy Research Centre Programme.

Contents

Executive summary

This paper provides an analysis of non-state actor involvement in that transition by studying the case of Fairphone. It is argued that a more systematic understanding of NGO efforts at the international level could lead to recommendations on an enhanced cooperation between NGOs, governments and other actors. The paper offers an overview of how our case study Fairphone alters consumption and production processes and engages both business actors and consumers in that transition.

For altering production processes, Fairphone uses two different mechanisms:

Production of a Fairphone: engaging business actors across the value chain of a Fairphone with whom Fairphone partners in the production process.

Transparency: engaging business actors in the sector of smartphones or more generally consumer electronics. Other business actors are not regarded as competitors by Fairphone but rather as a target group.

For altering consumption process, Fairphone adopts three mechanisms:

Transparency: engaging owners and community members by offering rich and detailed information and knowledge about the value chain of a Fairphone. The Fairphone serves as a story-telling device that explains and demonstrates where products and materials come from and how they are made.

Crowdfunding: building a direct dialogue with owners and community members.

Modular design: empowering owners of a Fairphone and turn them into real owners by prolonging the lifespan of phones and providing open-source repair tutorials to support self-repair.

After the analysis on the different mechanisms adopted by Fairphone to alter consumption and production processes, we explain what role the Dutch government has played to support Fairphone. In the case of Fairphone, the Dutch government played an important role as a broker. By setting-up the Conflict-Free Tin Initiative (CFTI), the Dutch government organized a multi-stakeholder platform that enabled learning and network processes. The paper ends with a discussion on the different roles for the government in the transition to sustainable materials management identified by the literature and exemplified by the case of Fairphone. The conclusion presents a reflection upon the various roles for the government and the broader collaboration between governments, non-state actors and other actors in the transition to sustainable materials management.

1. Introduction

This paper is part of a project of the Policy Research Centre on Sustainable Materials Management (2012-2015), a multidisciplinary consortium funded by the Flemish Government. The project looks at the global and European context of the transition towards sustainable materials management (SMM), a policy priority of Flanders coordinated by the Flemish Public Waste Agency (OVAM). The project understands SMM as shifting society's behaviour toward meeting its material needs, without destabilizing the natural system nor mortgaging its future. In other words: to preserve the natural capital and reduce the environmental impacts of the materials life cycle (SuMMa 2011). Like any transformation of socio-technical systems, a transition towards SMM is strongly embedded in international dynamics. Materials are particularly rooted within global patterns of production and consumption, and linked to various international rule systems.

In this paper we turn to the efforts of non-state actors in sustainable materials management, motivated by the observation that there is little systematic knowledge about the significance of civil society efforts in the global transition towards SMM (Happaerts & Van Eynde 2014). A variety of transnational non-state actors play a role in the transition towards SMM. Those actors are not only related to formal governance processes, but they can also be associated with informal norms and rule systems and they can include private and civil society actors. The significance of those actors' activities is largely unknown. A more profound knowledge of their various efforts can help policy-makers, who are pushed to take the non-governmental sphere into account in a context of the transition towards SMM, but have little insights into what exactly is happening there. That is why it is pertinent to make an assessment of the role of non-state actors in making materials management more sustainable.

In our previous paper we conducted an initial screening and a horizontal analysis of 20 international NGO initiatives. We reviewed what phases of the life cycle, target groups and activites are addressed by those 20 initiatives. The paper concluded by formulating two promising roles that NGOs could fulfill in a global transition towards SMM. On the one hand, they have the potential to introduce SMM into the **daily life of consumers**, by means of specific products and materials, and therefore to influence the practices of socio-technical systems. On the other hand, they can induce **changes in production processes**, by addressing producers through non-regulatory means. The latter relates to the frequently expressed goals of influencing more sustainable production and consumption by tailering consumer choices and forging new business models. In this paper we will focus on the specific mechanisms, adopted by Fairphone to induce more sustainable consumer choices and business models. We will explore the interaction between governments, producers and consumers and reflect on the successes and obstacles Fairphone is encountering, which will enable us to identify how public policies could support, encourage or emulate experiments such as Fairphone.

The case of Fairphone has been selected out of the 20 identified non-state initiatives[1] (Happaerts & Van Eynde 2014. The case of Fairphone illustrates our previously stated observation that non-state

[1] In this paper we use the term 'non-state actors' instead of 'NGO' because Fairphone, while started as a campaign in 2010, turned into a social enterprise in 2013.

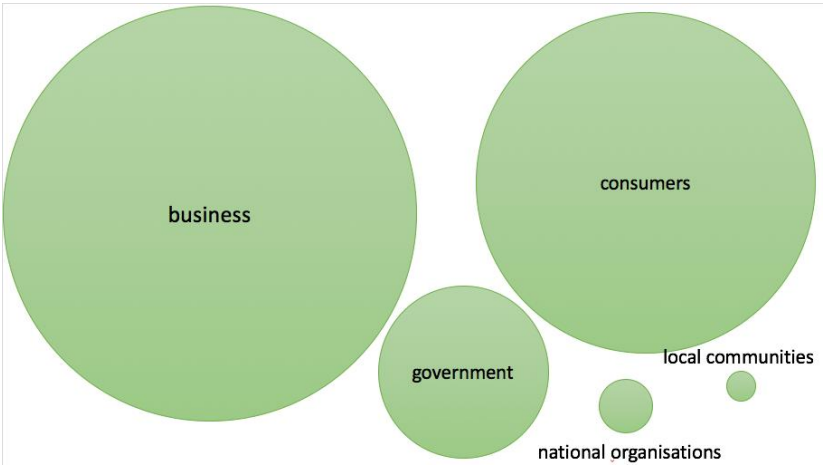
actor initiatives for SMM mainly address consumption and production processes. Fairphone fulfills both the promising role of influencing the practices of socio-technical systems (i.e. the *consumption side*) and the promising role of inducing changes in *production* processes. Another reason for selecting Fairphone as a case is that it goes beyond the traditional role of non-governmental organization in global governance that relates to 'civil regulation' by introducing a new product. Besides a document review of the numerous documents that are made publicly available on the website of Fairphone, an interview was held in September 2015.

The next section gives a brief overview of where to situate initiatives like Fairphone in the transition towards SMM and the results of the previous research paper that provided the foundations for the case-study analysis in this research paper.

2. Fairphone: a niche in the transition towards sustainable materials management

The preceding screening of 20 initiatives resulted in the identification of, among other aspects, the key target groups and activities of non-state actor initiatives in SMM. In the figure below we present a visualization of the different target groups addressed by the initiatives. The size of the circle stands for the number of initiatives addressing that particular target group. The case of Fairphone targets the two dominant groups of business and consumers.

Figure 1. Target groups of the 20 screened initiatives



Source: Compiled by the authors, based on the data gathered in Happaerts and Van Eynde (2014)

Fairphone started in 2010 as an awareness raising and research campaign about conflict minerals in consumer electronics initiated by three Dutch organizations: Waag Society, Action Aid - the

Netherlands and Schrijf-Schrijf. In 2013, Bas van Abel, former creative director of Waag Society, founded Fairphone as a social enterprise[2] that aims to build a movement for fairer smartphones in both environmental and social terms. As will become clear in the remainder of this paper, Fairphone can be regarded as a niche in the transition towards SMM. Niches is defined as "platforms for interaction" (Kemp et al.1998) or as "protective spaces for path-breaking innovations" (Smith and Raven 2012). Crucial to understand the dynamics of a niche in the transition towards SMM is its fundamental idea of being different than the dominant regime because the current dominant regime obstructs the transition towards SMM. Different in the sense that through interaction and through experimentation, a niche can offer a different way to nurture the transition. Fairphone can be regarded as an 'active' niche, implying that it is the result of deliberative and strategic creation (Geels & Schot 2007). To date, a certain level of success can be observed: between 2013 and 2015, 60.000 Fairphone 1's have been sold; in May 2016, already 40.000 Fairphone 2's have been delivered, resulting in 100.000 items sold in total.[3] The community of Fairphone owners is still growing, with 150.000 followers on the social media. Despite the fact that the community is definitely growing, compared to the total market size of smartphones, about 1.3 billon in 2015, the niche of Fairphone is still very small (0,07%).

The current regime of consumer electronics is characterized by a number of unsustainable practices despite a growing awareness of their hazardous environmental and social impact. During the past two decades, digital transformation characterized by increasingly growing consumer demands and rapid innovation came with a compound footprint across consumer electronics devices' life cycle: mined minerals that finance rebel groups neglect community development and environmental protection (Geenen et al. 2013), manufacturing processes are very energy intensive (Malmodin et al.2010), using electronic devices consumes electricity (Caroll and Heiser 2010), and e-waste management poses various challenges with regard to hazardous waste and toxics (Nnorom and Osibanjo 2008). Those practices conflict with the type of solutions asked for by a number of pressing landscape elements. Examples of pressing landscape elements are so-called megatrends, already visible long-term change processes that have fundamental repercussions on both society and the environment such as resources and material depletion and climate change (European Environmental Agency 2015). As a path-breaking innovation, Fairhone responds to several of those pressing landscape elements by altering production and consumption processes in the value chain of consumer electronics and thus offers concrete steps forward to make societal systems more sustainable, resilient and future proof. The next section sheds light on what mechanisms Fairphone uses to alter production and consumption processes.

[2] The evolution from an NGO campaign to a (social) enterprise is a nice illustration of a growing trend, which shows that NGOs, business and government are often intertwined and can evolve from one category to another.

[3] https://www.fairphone.com/2016/05/26/100000-fairphone-owners/

3. Altering production and consumption processes

By altering production and consumption processes, Fairphone fulfills two important roles in sustainable materials management as formulated by the European Resource Efficiency Platform (EREP): as "enabling consumers to make more sustainable choices" and "promoting new, resource efficient business models" EREP 2014). In this section we look at *how* Fairphone induces changes in production and consumption processes.

3.1 Altering production processes

A first mechanism used by Fairphone to induce changes in the production process of a smartphone is by ***producing a smartphone*** that is 'smarter' than other smartphones (see figure 2). In the production process of a Fairphone, a number of other business actors that partner with Fairphone are dragged into the transition towards sustainable materials management. Mainstream smartphones are 'not that smart', according to Fairphone, because of a number of reasons: lack of traceability of the different materials and minerals used in the production, violation of regulations concerning labour conditions in manufacturing companies, limited possibilities to open and repair a broken smartphone, the problem that phones last no longer than the next few update cycles leading to discarding.

Different from many other NGO initiatives that use the technique of 'naming, blaming and shaming' to pinpoint those issues, Fairphone, which calls itself a community of practitioners, produces a smarter phone that opens up the supply chain and expands the market for electronics that put ethics before profits: the Fairphone. The Fairphone can be regarded as a product innovation that differs from regular smartphones mainly in terms of sustainability. Interestingly, Fairphone drags along a number of business actors in the transition towards sustainable materials management. At different stages of the value chain, Fairphone cooperates with other business actors and to a certain extent it compels those actors to step into a so-called 'race to the top' of environmental and social regulation. A 'race to the top' refers to "a global convergence of (environmental) policy regulatory patterns at a relatively high protective level" (Kern et al. 2001). It implies a rise in regulatory standards of one party that induces other parties to follow. Other parties follow by raising their standards too due to competition reasons (logic of consequences) in order to be able to sell their products on the market, or due to normative reasons (logic of appropriateness).

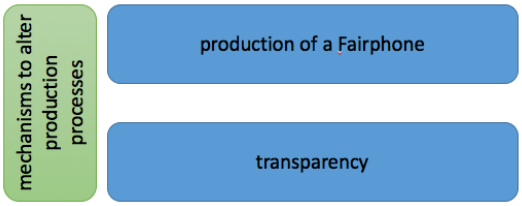


Figure 2. Mechanisms used by Fairphone to alter production processes

Source: compiled by the authors

Other actors in the Fairphone production chain such as mining companies and manufacturing companies are compelled to take up more ambitious regulation concerning environmental and social standards such as modularity, labour standards and representation of employees. Otherwise Fairphone does not partner with them in the production process. Two examples of a race to the top initiated by Fairphone in the production process of a Fairphone are discused in the boxes below.

Altering the production process at the stage of mining: sourcing conflict-free minerals

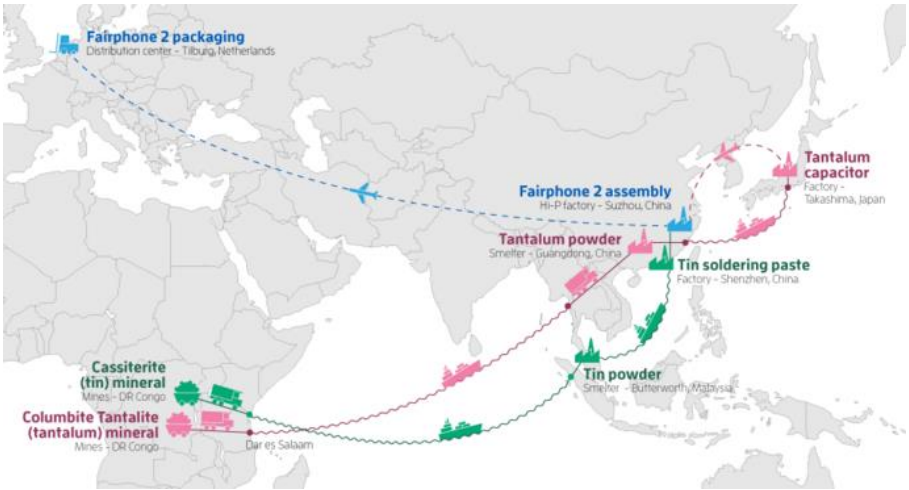
A smartphone contains around 40 different minerals that each perform a different role to make a smartphone work. Examples are tantalum, tungsten, copper, iron, nickel, aluminium, tin, silver, chromium, gold and palladium. Tungsten, for example, is used in smartphones to produce the vibration motor that enables the phone to buzz every time you receive a call, message or other notification. All those minerals enter the supply chain of a smartphone at the stage of sourcing in the mining sector. The mining sector faces quite some challenges when it comes to sustainability: pollution, questionable working conditions, child labour, conflict minerals to name just a few. The issue of conflict minerals entered the international debate, partly due to the Dodd Frak Act, passed in 2010 in the US. Conflict minerals are sourced minerals that fund rebel groups while disregarding pollution, safety and other rights of the workers, thus contributing to political and economic instability. Fairphone focuses on those regions that are confronted with the problem of conflict minerals, such as the Democratic Republic of Congo (DRC) and Rwanda. By partnering with multi-stakeholder initiatives like Conflict-Free Tin Initiative and Solutions for Hope, Fairphone continuously makes progress in opening up the supply chain and in tracing minerals directly to the source. At current, not all minerals used to produce a Fairphone are a 100% traceable so there is still room for improvement. For the Fairphone 1, traceable and conflict-free tin and tantalum were used. For the Fairphone 2, ambitions were further pursued to integrate traceable and conflict-free tungsten from the African Great Lakes region. Every step that Fairphone takes in opening up the supply chain can be regarded as steps forward to systemic change in the industry.

Altering the production process at the stage of manufacturing: improving working conditions and employee wellbeing

Fairphone cooperates with manufacturing companies that are willing to invest in social and environmental regulation, in addition to complying with Fairphone's technological requirements. In its 'Social Assessment Program', Fairphone works together with manufacturing partners to improve working conditions. For the manufacturing of the Fairphone 2, Fairphone cooperated with Hi-P, a manufacturing company in China. Before the actual manufacturing, Fairphone together with TAOS (Training, Auditing, Organisation and Systems) carried out a social assessment in 2014 of Hi-P's facilities in Suzhou. The assessment offers a baseline and an understanding of social and environmental challenges, based on which an improvement plan was developed listing concrete steps Hi-P can take to improve health and safety conditions of the workers. The assessment process is not only an ad-hoc snapshot but should be best regarded as an ongoing dialogue to continuously provide advice and follow-up on actions taken (e.g. improve workers' conditions such as wages, working hours and health and safety procedures, in accordance with local legal regulation and international standards derived from the International Labor Organisation (ILO)). The Improvement Plan contains a number of quick-wins such as changing emergency signalisation, installing eyewash stations and providing protective masks. Other opportunities for improvement are linked to more systemic problems, such as excessive working hours or the large number of agency workers, that could be mediated through empowerment of the workers themselves, according to Fairphone. That is why Fairphone invests in a Worker Welfare Fund (WWF, also see cost breakdown of the Fairphone 2). The WWF will facilitate worker representation and improve the employees' wellbeing.

A second mechanism adopted by Fairphone to induce changes in the production process of a smartphone is the mechanism of ***transparency***. In figure 3, the journey of tin and tantalum used to produce a Fairphone is presented from sourcing to the stage of packaging.

Figure 3. The journey of Tin and Tantalum from sourcing to production to packaging of a Fairphone 2.



Source: Fairphone website

The transparency approach adopted by Fairphone is not about 'naming, blaming and shaming' but about 'empowering'. Empowering because by demonstrating and explaining the production process in a very transparent manner to the community and owners of a Fairphone (and other interested people), Fairphone indirectly challenges other smartphone suppliers to become more transparent. Other smartphone suppliers are not only competitors of Fairphone but also regarded as a direct target group. The market share of Fairphone is relatively small, which tends to indicate that in the absence of stricter international environmental and social regulation, cost-benefit calculations are not considered by other smartphone suppliers as an incentive to consider the adoption of more ambitious regulation in the production process. Nevertheless, the combination of various pressures such as a growing group of critical consumers and increased sharp media attention to supply chain practices compel other smartphone suppliers to become more transparent and take measures to improve, among others, workers' conditions. Smartphone phrase the rationale behind those measures as being the appropriate course of action[4]. Regardless of what drives smartphone suppliers to take measures to improve their business practices in terms of sustainability, those measures remain marginal compared to social enterprises or hybrid organisations such as Fairphone where the social purpose is actually embedded in the core business of the organization (Doherty et al. 2014). According to Fairphone, a number of smartphone or other consumer electronics suppliers changed their Corporate Social Responsibility (CSR) communication. Examples of recent developments include take-back and recycling programs initiated by for example Apple, and experiments with modularity by for example LG. These examples show that not only discourses have shifted but also action is being taken. But, for consumers it is quite difficult to see the wood for the trees because every product seems to be green and sustainable when looking at the discourse used on company websites or branding strategies. Moreover, many reports are being published containing sustainability rankings or reviews of smartphone brands[5], but most are not independent, and it takes a long and motivated study by a consumer to rearch an overall conclusion for the most sustainable buy.

From the analysis of mechanisms adopted by Fairphone to alter production processes, we can conclude that other smartphone suppliers and production partners in the production process of a Fairphone are not only competitors but also a target group of Fairphone. The mechanisms of transparency and production reach a number of other business actors in the supply chain of electronics and of the Fairphone and have a noteworthy impact on their strategies and practices. The endorsement of ambitious social and environmental regulation by increasingly more business actors in the supply chain of electronics - whether partly, indirectly or directly linked to the production process and transparency mechanisms of Fairphone – indicates a tendency of convergence. Fairphone tends not to have a competitive relationship with the existing regime, but rather a symbiotic relationship, meaning that practices of Fairphone might be adopted by regime players as "competence-enhancing add-ons" to solve problems and improve performance (Geels & Schot 2007).

[4] See for example Apple's CSR stragegy that is elaborated upon on its website.
[5] See, for example, campaigns and reports by Greenpeace, Consumer Reports, and Somo.

3.2 Altering consumption processes

Besides a number of mechanism to alter production processes, Fairphone also uses innovative mechanisms to alter consumption processes. The three mechanisms discussed in the paragraphs below all closely relate to Fairphone's objective to transform the relationship between people and the products they use (see Figure 4).

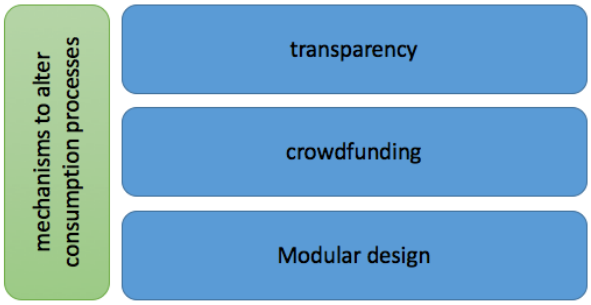


Figure 4. Mechanisms used by Fairphone to alter consumption processes

Source: compiled by the authors

A first mechanism, again, relates to ***transparency***. Fairphone offers consumers rich and detailed information and knowledge about the different steps in the value chain of consumer electronics. The Fairphone can be regarded as a "story-telling device" that explains and demonstrates where products come from and how products are made. It is a starting point to improve the production of smartphones and to build a new kind of relationship between users and products. As a result, consumers are well-informed and are able to make well-considered sustainable choices with regard to purchasing a smartphone.

Building further on the idea of building a well-informed consumer public, Fairphone uses the mechanism of ***crowdfunding*** to build a direct dialogue with consumers. The basic idea of that emerging alternative way of financing is that many consumers - i.e. the crowd – are persuaded to give small donations using an Internet platform without traditional financial intermediaries that, when accumulated, can fund larger projects. Crowdfunding can be regarded as the social media version of fundraising or the financial version of crowdsourcing. Using the alternative financing mechanism of crowdfunding can be regarded as inherently risky but also as a mechanism that mediates risks. Risky in the sense that when a certain threshold is not reached, production cannot be initiated and mediating risks because the crowd offers the upfront investment necessary to start the production of a Fairphone. Besides an important practical tool that enables Fairphone to actually start production, crowdfunding is regarded as an important campaign tool: users have paid upfront for a Fairphone but have to wait a period of time before they actually receive their purchased Fairphone. That period of time is worth its weight in gold, according to Fairphone, because during those couple of months, the near future users of a Fairphone are very approachable. They are not only curious and interested to better understand the roadmap of the Fairphone they purchased, but also talk with peers, colleagues and family about their latest purchase. In other words, those couple of months are very crucial for building the community of Fairphone that exists of both Fairphone owners and non-owners. According to Fairphone, the crowdfunding campaigns also offer important lessons for other industry players in

the supply chain of electronics. Indeed, it is an important signal to the industry and other regime players that there is potential growing market for fair products.

A third mechanism that enables Fairphone to directly step into a dialogue with its consumers is the ***modular design*** of a Fairphone accompanied by open-source repair tutorials and available spare parts for sale. At current, most smartphones are not built to last long and consumers are constantly seeking to upgrade their devices and are already longing to buy the latest available smartphone shortly after purchasing a new one. As a result, "old" or not-longer-wanted smartphones often end up in drawers despite the value of some parts or are shipped to developing countries that often lack decent recycling facilities. The largest environmental impact in terms of metal depletion and human toxicity lies in the phase of themanufacturing of smartphones. With respect to climate change, the largest impact lies at the stage of use. That is why, according to Fairphone, it is of significant importance to prolong the lifespan of phones in order to improve their environmental performance. In order to do that, Fairphones are produced with sustainable components and according to a modular design that enables buyers to repair their phones themselves. Besides supporting Fairphone's environmental and social objectives, this mechanism enables users to obtain real ownership, according to Fairphone. Put differently, "if you can't open it, you don't own it" (Ifixit 2015). The design is therefore again a mechanism adopted by Fairphone to alter how users relate to products. With the design of the Fairphone, in combination with the spare components and open-source tutorials for repair, Fairphone offers the possibility to users to extend the lifespan of their phone, thus giving users more responsibility to become an owner of a longer lasting device. At this stage, it is too early to assess whether Fairphone owners make use of the self-repair service or not. It could be interesting for future research to assess the drivers for, barriers of and impact of the Fairphone owers' self-repair behavior. the 'after sales'-phases, Fairphone cooperates not only with Ifixit to stimulate ownership and repair, but also with Closing The Loop and Umicore to establish a Take Back program and safe recycling programs. Fairphone has the ambition to not only produce a device that is repairable in terms of materials and components used in the production process, but also to produce a device that is future resilient in terms of easily accommodating to future innovations and industry development.

All the mechanisms used to alter consumption patterns are *empowering* mechanisms. The question then rises *who* is being empowered? Who are the owners of a Fairphone and who are the member of the Fairphone community? The objective of Fairphone is to reach conscious consumers and make that group of people bigger. All the communication and adopted mechanisms are developed in a way that it triggers those group of people. Fairphone depends on the group of conscious consumers to make that group bigger themselves. The group of environmentally-aware consumers is divided in five users' types: the Ethical Supporter, the Proud Pioneer, the Thoughtful Critic, the DIY Technic and the No-Nonsense User.[6] The community appears to be a diverse mix. Some community members have a technical background and are mainly interested in the open software and design, while others have no technical background and sometimes have not even purchased a smartphone before. The learning potential and awareness about the complex value chain of consumer electronics has a multidisciplinary nature.

[6] Based on an online survey and research carried out by the University of Amsterdam and TU Delft, Fairphone developed user personas to have a better understanding of the people in the Fairphone community and to better understand how to adress their needs.

4. The role of the Dutch government towards Fairphone

In the case of Fairphone the Dutch government played an important role as a **broker**, according to Fairphone. The role of broker can be illustrated by the Conflict Free Thin Initiative (CFTI), initiated by Boubon de Parma, special envoy natural resources for the Ministry of Foreign Affairs in the Netherlands (DMFA), aimed at establishing a conflict-free source of tin from the DRC and ran from September 2012 until August 2014.[7] Due to a de-facto embargo on mining minerals across the DRC provinces of South and North Kivu, local communities were severely impacted in terms of jobs losses and poverty. The CFTI main objective therefore was to demonstrate that sourcing conflict-free minerals from the DRC provinces of Kivu is possible and to foster demand for and willingness of downstream buyers for conflict-free minerals from the Kivus (Jorns and Chishugi 2015). The CFTI thus had two goals: (i) installing a system that can supply conflict-free tin from the Kivus and (ii) creating and maintaining a market demand from downstream buyers. As a broker, the DMFA created a platform where a number of stakeholders along the supply chain were brought together such as Fairphone and Philips[8] and succeeded in finding a common ground and interest in the added value of the CFTI. For Fairphone, other important achievements are that it can partner with other stakeholder across the value chain, implying that it takes other stakeholders along in the objective of reaching transparency and traceability. Indeed, the CFTI increased the understanding of the complexity of the supply chain and the difficulty of making it more transparent among a number of stakeholders along the supply chain (Jorns & Chishugi 2015). Finding a common ground among all participants and considering other ways of collaboration are identified by Fairphone as an important result from this initiative. Fairphone and Philips, for example, found another common ground in jointly organizing audits in two manufacturing companies in China. For both manufacturing companies and Philips and Fairphone, that type of cooperation has reduced the costs and time spent for organizing audits significantly.

5. Advancing niches: which role for government?

5.1 Roles for government identified by the literature and exemplified by the case of Fairphone

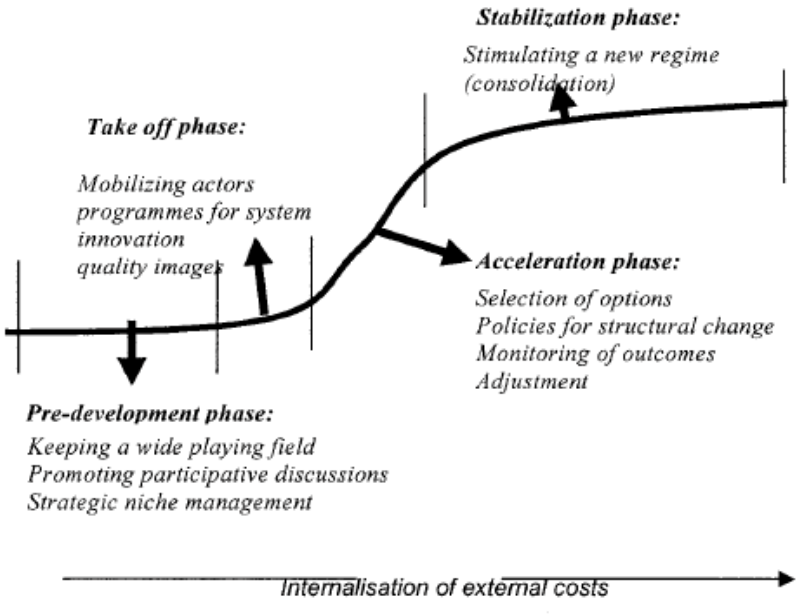
The case of Fairphone confirms that governments can play an important role in the advancement of niches. But of course the role of 'broker' described in the Fairphone case is not the only role a government can play. In this section we reflect on the concept of 'steering' and the role of the government in advancing niches in the transition towards sustainable materials management. It is not

[7] For more information about the CFTI, we refer to the website of Solutions Network.
[8] For a list of all the participating stakeholders see this link.

our intention to give the impression that the government is the only actor in the transition process that can take up a steering role. On the contrary, other actors such as regulatory agencies, local authorities, non-governmental organizations, a citizen group, a private company, an industry organization, a special interest group or an independent individual can take up this task (Kemp et al 1998). In this paper we focus on the link between government and niches only because of the identified role for governments to incorporate the results of multi-stakeholder dialogues in the formulation and implementation of policies. Since civil society initiatives are more likely to appear in areas where government regulation is weak (Gulbrandsen 2012), there is much room for improvement and action to be taken by the government. Recent recommendations made at the European and global level highlight the importance and potential of partnerships with multiple stakeholders to increase the legitimacy of decision-making and the design and impact of SMM policies, of which the results can be incorporated into policy formulation and implementation (European Commission 2011, OECD 2012a, OECD 2012b, UNEP 2012).

The concept of steering is closely related to what is called niche management. Niche management concerns stimulating learning about problems, needs and possibilities of a technology, building actor networks, aligning different interests, altering expectations and fostering institutional adaptation (Kemp et al. 1998). The above mentioned activities illustrate that steering is not about setting up experiments itself but more about taking up a guiding role (Genus and Coles 2008; Kemp and Rotmans 2005; Kemp and Loorbach 2003). Kemp and Rotmans (2005) identified different roles for the government to carry out in the transition process depending on the phase in the transition process (see Figure 5).

Figure 5. The role of the government in various phases of a transition process



Source: Kemp and Rotmans 2005

Smith and Raven distinghuish three types of niche support that can be considered by the government: ***shielding***, ***nurturing*** and ***empowering*** (Smith and Raven 2012). **Shielding** implies that niches are shielded from mainstream selection pressures (Schot and Geels 2008). The government can, for

example, take a more active role in directly supporting experiments by creating protective spaces such as living labs and test gardens and verify whether they have diffusion or scaling potential. During that process, obstacles that niches face can be identified and solutions can be looked for. If those test contextes are created or supported by government, it is possible to steer the innovations slightly towards the government's sustainability agenda. In a next phase, niches can be **nurtured** in order to be able to grow without suffering from the usual sector pressure. **Empowerment** is implementing measures in the 'real' world to increase the niche's competitiveness in relation to the dominant regime, without changing the system as such. However, according to Smith and Raven (2012), a second possible type of empowerment is to take some features from the protected space, and transfer them to the real-life socio-technical system, which creates an environment that is by definition favourable towards the niche.

The example of the CFTI in the Fairphone case mainly relates to nurturing and empowerment since the program enables Fairphone to grow further and enables learning processes and networking processes. It is also used by Fairphone to mature the niche and to argue for more enduring forms of cooperaton in the form of strategic partnerships. As proof of concept is delivered in the case of Fairphone, the role as broker seems suitable. The Dutch government invited the niche of Fairphone to participate in a multi-stakeholder dialogue that enabled networking and learning processes. While less discussed in the analysis of the case of Fairphone, shielding is also an important aspect in transition management and could be adopted by the government.

5.2 Potential roles for the Flemish government

Based on the two theoretical models described above, and insights from general policy sciences, we see the following concrete potential roles for government to try and advance and – to a certain extent – steer a niche.

First, the government can take up a role of **facilitator** or **broker** (see above) in process terms by inspiring other societal actors and making sure that niche actors are invited around the table. Niche participation is of particular importance to make sure that new players "who are as yet insignificant but who may become important in the future should become involved in the process" at the stage of pre-development phase (Kemp and Rotmans 2005, see figure 5). The government has a role to play in enabling platforms where both niche and regime players can gather and in facilitating the dialogue among those players to find a common ground. The case of Fairphone demonstrates that it can move beyond talking and lead to very tangible results.

Second, an important aspect of the transiton towards a circular economy is ***levelling the playing field*** to relieve the barriers caused by the present socio-technical system, which favours the (unsustainable) regime. One way of doing this, is - as suggested by figure 5 - the use of economic policy instruments, which internalizes external costs. A well designed environmental tax can boost investment in sustainable niche innovations (Bachus and Vanswijgenhoven 2015). Taxes can be linked to incentives regarding transparency, labour conditions, product lifespan, traceability, modularity, repairability, take-back programs and warranty. Possible examples are levying a tax on smartphones that are not modular and could not be or are difficult to repair.

Third, next to taxes, ***regulatory instruments*** can also be used, e.g. to oblige a system of traceability of minerals and other materials used to produce a smartphone, developing a transparent and uniform labelling system and measures that charge planned obsolescence. That way, governments also help consumers to see the wood for the trees.

Fourth, governments may use ***subsidies*** to help niche initiatives to overcome the large barriers compared to the dominant regime. Subsidies are best granted for a predetermined and limited period for a maximum incentive for innovation.

Fifth, government could play an active role in detecting legal ***barriers*** that promising niches are faced with. They could then go into dialogue with the niche player and try to adapt the regulatory situation, or at least advice the niche player on how to deal with that barrier in the short run.

A sixth and final role for the government that we would like to reflect upon is the government as a ***consumer*** to unlock investment in sustainable materials management. A recent example is the government building Virginie Loveling in Ghent where NNOF has developed and re-produced the office facilities based upon the existing facilities. Public procurement that would support niches, such as investments in only sustainable smartphones, could speed-up the tansformation pathway process.

The Flemish government has already played a number of these roles in the past. In the 1990s, there was already a sector of independent, non-profit re-use shops. OVAM has used regulatory instruments, combined with subsidies, networking and removal of legal and other barriers to upscale the fragmented sector to the level of an integrated network of shops covering the 308 municipalities in Flanders. This combination of bottom-up and top-down action can be considered as the upscaling of a niche *avant la lettre*.

A final recommendation for the OVAM we want to make relates to the evolution of *circular economy* as a leading horizontal principle for the Flemish government. On the one hand, the fact that the economic and industry departments of the government are increasingly including the discourse and actions related to circular economy into their policies is a sign of integrated policy, which is a positive evolution. On the other hand, this may create a risk for the environmental objectives to get buried under other perspectives. We therefore recommend the OVAM to keep on playing a constructive but proactive role in the Flemish and international policy processes to come, as it always has done to date.

6. Conclusion

In this paper we investigated the different mechanisms that Fairphone embraces to induce changes in production and consumption processes related to consumer electronics. We identified the mechanisms of *transparency* and *production* to target ***businesses*** at the side of ***production processes.*** *Producing* a Fairphone targets business actors along the supply chain of a Fairphone. *Transparency* affects a broader range of business actors in the sector of consumer electronics. Other business actors are not per se regarded as competitors but rather as a target group by Fairphone. That symbiotic relationship implies that practices of Fairphone might be adopted by regime players as “competence-enhancing add-ons”, as exemplified by the CFTI in the Netherlands. The incentive for Philips to

participate in the CFTI, for example, is said to be motivated by “sustainability, responsible sourcing and CSR concerns, to not contribute to the informal boycott of DRC and have a positive impact on the ground” (Jorns & Chishugi 2015). The adoption of niche practices by regime actors suggests a “transformation path” (Geels & Schott 2007) in which Fairphone acts as a niche frontrunner and regime actors such as Philips use their adaptive capacity to reorient development trajectories. In a transition path, a new regime grows out an old regime. A condition for adapting practices conform with niche players is that the niche demonstrates a viable alternative way that changes the perceptions of regime actors.

Is there proof of a viable alternative way – proof of concept? At the side of ***consumption processes***, we identified the mechanisms of *modular design*, *transparency* and *crowdfunding*. Via those mechanisms, Fairphone establishes a direct dialogue with its Fairphone owners and broader community. The growing community of Fairphone signals that there is growing consumer demand for sustainable and smarter smartphones, and perhaps more generally for sustainable products in the sector of consumer electronics. The growing community and increasing demand for Fairphones demonstrates proof of concept and signals high potential for further diffusion.

At both processes of consumption and production, the identified mechanisms suggest Fairphone adopts a diverse set of routes to scale. According to Gabriel (2014), scaling is not just about growing organisations, it can also relate to different routes such as influencing and advising, building a delivery network, forming strategic partnerships and growing an organisation to deliver. The analysis presented in this paper suggests Fairphone has mainly chosen the scaling route of the type of strategic partnering: as a small and agile bee Fairphone ‘pollinates’ the ‘trees’ (larger and established organisations with greateer reach and resources) with new ideas (ibid).

Government actors can play different types of roles in supporting niches and helping them to overcome the existing barriers. The role as a facilitator is most often used, but more steering roles can also help niches. Government can use its regulatory powers, e.g. by altering legislation or adopting market-based policy instruments, such as environmental taxation. Finally, public procurement is an important tool government can use to foster not only circular economy in general, but also specific niches more in particular.

7. Bibliography

Bachus, K. and Vanswijgenhoven F. (2015), "Regulatory Taxes as an Instrument to Foster Sustainability Transitions: An Exploratory Analysis", in: Kreiser, L., Andersen M, Egelund, B., Speck S., Milne, J., Ashiabor, H., Critical Issues in Environmental Taxation series: 2015, Volume: XVI, Chapter: 14.

Caroll, A. and Heiser, G. (2010), "An Analysis of Power Consumption in a Smartphone", Paper presented at the USENIX Annual technical conference 2010, available on the Internet at: https://www.usenix.org/legacy/event/usenix10/tech/full_papers/Carroll.pdf, last accessed on 24 November 2015.

Doherty, B., Haugh, H. and Lyon, F. (2014), "Social Enterprises as Hybrid Organisations: A Review and Research Agenda", Journal of Management Review (16), pp. 417-436.

European Commission (2011), Roadmap to a Resource Efficient Europe (COM(2011) 571 final).Brussels: European Commission. Available from http://ec.europa.eu/resource-efficienteurope/.

European Environmental Agency (EEA) (2015), "European Environment's State and Outlook", Copenhagen: EEA.

Geenen, S. and Claessens, K. (2013), Disputed access t the gold sites in Luhwindja, eastern Democratic Republic of Congo, The Journal of Modern African Studies (51:1), 85-108.

Gulbrandsen L. H. (2012), *Transnational environmental governance: the emergence and effects of the certification of forests and fisheries*, Cheltenham: Edward Elgar.

Jorns, A. & Chishugi, A. (2015), *Assessment of Impacts of Closed-Pipe Supply Chains in DRC Public-Private Alliance for Responsible Minerals Trade*, Estelle Levin Td.

Malmodin, J. Moberg, A., Lunden, D., Finnveden, G. and Lovehagen, N. (2010), "Greenhouse gas emissions and operational electricity use in the ICT and entertainment media sectors, *Journal of Industrial Ecology* (14:7), pp. 770-790.

Gabriel, M. (2014), "Making it Big: Strategies for scaling social innovations", Gabriel.

Nnorom, C., Osibanjo, O. (2008), "Electronic e-waste: Material flows and management practices in Nigeria", Waste Management (28), pp 1472-1479.

OECD (2012a), Sustainable Materials Management (Green Growth Policy Brief). Paris: OECD.

——— (2012b), Sustainable materials management. Making better use of resources. OECD Publishing. Available on the Internet at: http://dx.doi.org/10.1787/9789264174269-en, last accessed on 2 December 2015.

Kemp, R., Schot, J. and Hoogma, R. (1998), "Regime Shifts to Sustainability Through Processes of Niche Formation: The Approach of Strategic Niche Management", Technology Analysis & Strategic Management, (10:2), pp. 175- 195)

Kemp R. and Rotmans, J. (2005), "The Management of the Co-Evolution of Technical, Environmental and Social Systems", in Mathias Weber and Jens Hemmelskamp (eds), *Towards Environmental Innovation Systems*, Heidelberg: Springer, pp. 33-57.

Schot, J.W. and Geels, F. W. (2008), “Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy”, Technology Analysis & Strategic Management (20:5), pp. 537-554.

Smith, A. and Raven, R. (2012), “What is protective space? Reconsidering niches in transitions to sustainability”, Research Policy (41), pp. 1025-1036.

United Nations Environment Programme (UNEP) (2012), Global Outlook on Sustainable Consumption and Production Policies. Nairobi: UNEP. Available on the Internet at: http://www.unep.fr/scp/go/, last accessed on 2 December 2015.