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POWER AND RESPONSIBILITY IN TRANSITION TO SUSTAINABLE FOOD PACKAGING

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Introduction

Plastics have played an instrumental role in the development of modern society. Due to their superior material properties and affordability, polymers are widely used in different economic sectors from packaging and construction to electronics and agriculture. At the same time, the negative environmental impacts of plastics cause increasing global concern. From the viewpoint of circular economy, the challenge is twofold: how to improve the circularity of these materials in the economy to increase resource efficiency, and/or how to replace plastics with materials which circularity is higher than that of plastics. For meeting both challenges, technological solutions are, obviously, of crucial importance, as are the actions of policy-makers, businesses and packaging industry. Yet, it also requires action and adaptation of individual consumers and consumer groups before new solutions can become mainstream tools to promote circular economy. It is important, however, to note that these actions and solutions are not always available for all the consumers or communities and that the power to act is not always evenly distributed.

In 2010, 5-13 million tons of plastic waste were estimated to have entered the oceans (Jambeck et al. 2015). One of the main reasons for the growing amount of plastic waste is disposable food packaging, the demand for which is likely to increase. In 2018, over 340 million metric tons of plastic waste was generated globally. Packaging accounted for 46 percent of plastic waste generation (Statista 2020). In addition to plastic, cardboard and paper, metal and glass are also used. Waste collection and recycling systems are often inadequate, as is responsible human behavior. At the same time, packaging is necessary for protecting food during transportation, retail and storage. As food waste often has a greater burden on the environment than food packaging has (Silvenius et al. 2013), getting rid of all packaging or even plastic packaging is not a solution.

A food package is usually used only once. After this, it is either recycled, incinerated, landfilled or lost in the environment. Some initiatives for reusable package solutions have emerged, but policy and industry initiatives have mainly been aimed at improving the recyclability of packages. Some materials, such as glass and metals, are technically easy to recycle. Plastic packages, however, often consist of different layers or materials that are difficult to recycle. Food eaten on-the-go is packaged in small packages, which are

particularly easily discarded into nature. Recently, the European Union has banned some plastic applications, such as drinking straws, and has set increasingly strict recycling targets. New policies and strategies recently introduced to address the problem in Europe include the EU Plastic Strategy (2018), Single Use Plastic Directive (2021), EU Circular Economy Action Plan (2020), European Strategy for Plastics in a Circular Economy (2018), and at the private sector Ellen MacArthur initiatives. Furthermore, researchers and the packaging material value chain actors develop new materials and package types; food industry and retail sector search for and take to use solutions that e.g., reduce plastic use or increase the recyclability of packages; consumers pay increased attention to packaging and recycling and media and non-governmental organizations (NGOs) increase the public awareness.

One essential factor in increasing the sustainability of packaging is consumer demand and individual consumer behavior, which, in turn, is dependent on the ways societies are built and formed. Developing sustainable food packaging must be done in a balance between ecological and economic aspects, and at the same time acknowledging consumer demands for price, performance, practicality and perceptions of environmental impact (Nordin and Selke 2010). Consumer demand, on the other hand, is also connected to inclusivity in term of affordability and access to different solutions. These demands are not always in line with those from the scientific Life Cycle Assessments (Steenis et al. 2017; Dilkes-Hoffman et al. 2019). The consumer role in the sustainable consumption of food packaging is particularly relevant because the circular economy of food packaging is connected to recycling, where the consumer is a key factor, given that the infrastructure for recycling is available. Yet, in the context of sustainable transition, the consumers' perspective is often ignored.

The Oslo symposium of 1994 defined sustainable consumption as the “use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or products so as not to jeopardise the needs of future generations” (IISD 1995). In the context of food packaging, sustainable consumption thus covers products which minimise the use of energy and fossil fuels and other raw materials (e.g. water), as well as reducing waste and emission. The circular economy of food packaging is not only about sustainable consumption, but also more generally about societal and cultural values which guide environmental behavior, such as proper disposal and recycling habits. However, the other aspects of societal, cultural and economic factors have often been ignored. Previous research has mainly seen the role of human agents in social change and transition as attempts by individuals to change their consumption behavior and, consequently, their lifestyle choices by following the instructions that NGO's and governments are providing (Spaargaren and Oosterveer 2010). This approach, according to social scientist Gert Spaargaren, has proven to have many shortcomings, especially with the rapidly increasing globalization of consumption (Spaargaren 2003). The entire notion that sustainable consumption is mainly a question of individual environmental responsibility has faced criticism and is blamed for scapegoating, and the responsabilization of consumers, consequently downplaying the role of other actors (Eden 1993; Paço and Rodrigues 2016; Akenji 2014).

In this chapter, we focus on the views that different actors and stakeholders in Finland in the packaging field have about power and responsibility regarding a transition towards more sustainable food packaging. This transition entails packaging solutions which support circular economy, supporting infrastructure and consumer values and behavior that is in line with the principles of circular economy, including solidarity and inclusivity aspects highlighted in this volume. Finland as a case offers insights of society that already has relatively efficient infrastructure for recycling, high living quality and equality in society in terms of income, education and gender. Finland can thus provide an example where the preconditions for inclusive circular economy are well met, but demonstrates how even with such prerequisites there are several pitfalls that hinder the transition to circular economy. Some of these pitfalls, as we have identified, are connected to the questions of power and responsibility. We examine how the actors perceive their own roles and responsibilities vis-a-vis others' roles and responsibilities. With the framework of power and responsibility in mind, we interviewed the actors whose roles in food packaging were recognized to be of significance during our operation environment analysis, in order to map their views on relative power and responsibility.

Responsibility and power in sustainability transition

The concept of environmental responsibility suggests that all the people are obliged to enact solutions to emerging and existing environmental issues (Hobson 2010). The grounds for such an obligation can be thought of in terms of solidarity: responsibility is grounded in solidarity, which generates actions that can be described as the taking of responsibility for others, humans or non-humans; ultimately, the planet. One is capable of taking on the responsibility because the one in need of help is “one of us” (Principe 2000).

Individual environmental responsibility, on the other hand, here refers to the notion that an individual consumer has agency, capacity and causal responsibility for addressing environmental problems (Eden 1993). This notion has long been utilized both by business and societal institutions through promoting, for example, green consumerism and recycling. Placing the burden of sustainable consumption – a term that has also been widely criticized as being an oxymoron (Bălan 2020) – on to the shoulders of the consumer raises the question whether people fulfil their perceived individual environmental responsibility through consuming, instead of practicing their political agency by voting or engaging in environmental activism (Eden 1993; Lorenzen 2014). In addition to this set of criticisms, social scientists of consumption have often interpreted individual environmental responsibility as consumer sovereignty. Consumer sovereignty assumes that consumers hold the ultimate power – and with that, also responsibility – to make the system more sustainable (Eden 1993). Scholars have criticized businesses and even governments, in advocating the notion of consumer sovereignty, as a means for scapegoating consumers and creating the general notion that environmental responsibility is a consumer issue, rather than something businesses should take responsibility for (Eden 1993; Akenji 2014; Evans, Welch, and Swaffield 2017; Pekkanen 2020).

Emphasis on sustainable consumption consequently directs the focus away from recognizing and addressing the roles of institutions, infrastructures, and cultures as the source of routines habits and beliefs. In reality, these factors guide the processes of consumption and at the same time, have power in advocating more sustainable development (Akenji 2014; Evans, Welch, and Swaffield 2017; Pekkanen 2020). Scapegoating individual consumer while downplaying the role of other stakeholders, can also diminish the sense of solidarity among the consumers. Critical voices also point that the ability or capability of individuals to affect global markets is largely overestimated, especially when it comes to those whose socio-economic status is low (Massey 2004) – many are excluded from having a chance to “vote” with their consumption choices merely due to their economic status. However, even with this criticism in mind, it is important to be cautious to claim that consumers have no power – and thus no responsibility – as that is not the case. The role of consumers should not be excluded, but instead of focusing on the central role of human agency alone, equal focus should be targeted towards social structures (Spaargaren 2003).

In this chapter, we analyze the dimensions of power in the transition to more sustainable food packaging systems with the framework of four dimensions of power. We see these dimensions to be power *over*, power *to*, power *with* and power *within*. The first dimension of power, *power over*, constitutes of A’s domination over B, by making B do something which B would not otherwise have done, as it was defined by Robert A. Dahl (1957). Power over view is usually interpreted normatively as domination. We use this notion of power over, however, with a little less dominative way – there is no imperative that B would act unwillingly, it is merely a question of acting in response to another actor’s action (Lukes 2005). The *power to* has a dimension of agency within it – a person has capacity to act upon something. *Power with*, on the other hand, refers to power that arises from synergies between partners or from collaboration, from the community and solidarity among stakeholders, whereas *power within* holds the notion of empowerment and inclusivity – as John Gaventa (2006) formulated it, it is not only about having agency, but about self-identity, awareness and confidence to act (for further development of discussions regarding the dimensions of power see e.g., VeneKlasen and Miller (2002) and Haugaard (2012)).

With power comes individual responsibility. It has been shown that individual environmental responsibility is strongest when, similarly, the individual feels that pro-environmental behavior is effective, thus creating a sense of agency. This prerequisites the feelings of inclusivity and solidarity, either towards other people or towards the planet, or both. The sense of moral obligations of responsible behavior grows even larger if the individual perceives this agency to be more essential than those of others (Eden 1993). Similarly, Kollmus and Agyeman (2002) point out that there are several other theories regarding the importance of sense of responsibility in environmental behaviour; in 1987 Hines, Hungerford and Tomera argued that people’s environmental behaviour is affected, among other things, by their locus of control. Locus of control is a term referring to an individual's perception of their agency, ability and capability to advocate change through their own behavioral choices. With the same tone, James Blake (1999) argued that there is a set of three barriers, individuality, responsibility and practicality that constitute the gap between environmental

concern and action. Blakes' second barrier stated that people sense when not having influence on a situation, and hence feel they should not have responsibility for it either. Lack of trust in institutions is also a factor in the lack of sense of responsibility, as it also undermines the efforts of collective solidarity – or power with.

Methodology

A point of departure for our empirical data gathering was a set of workshops organized in the framework of our research project on sustainable food packaging in 2020 in Finland. During these workshops (see Table 1. and the following section for further information on the workshop participants etc.), we were mapping the stakeholders' perceptions on the power structures among the different actors in transition towards more sustainable food packaging. During these two workshops, 37 participants participated in the Power triangle exercise. Power triangles (Kohl et al. 2018) is a simple tool for mapping views about stakeholders. It uses a triangle, where a tip is facing up (Fig.1). Workshop participants place different stakeholders on the triangle, so that the stakeholders who have more power to affect a topic are higher (near the tip) and stakeholders with less power are nearer the bottom. It is also possible to place stakeholders outside the triangle, if they are not considered to have a role in changing the issue at hand. We utilized these power triangles formulated by the participants as data in this study, but in addition to figures alone, we took notes of the discussions between stakeholders, which were also analyzed for this paper.

Adding to the power triangle workshops, we conducted 44 stakeholder interviews within different stakeholder groups. Table 1. presents more detailed information of the data. Among the interviewees were representatives from packaging industry, food industry, different ministries (Ministry of the Environment, Ministry of Forestry and Agriculture and Ministry of Economic Affairs and Employment), and non-governmental organizations. We analyzed the interviews with the framework focusing on aspects of responsibility and power.

In addition to stakeholder interviews, we asked 22 consumers how, in their view, can they influence the transition towards more sustainable food packaging (including efficient circulation of materials) and what kind of responsibilities they see each actor having. The consumer panel was gathered via open invitation on our project website, distributed via email lists and social media. The Panel holds 44 active participants of which 22 answered our questions regarding responsibility and power to influence.

Data		Number of participants
Power triangle - workshops	Two workshops: 1) for NGOs and 2) Businesses	7 & 30

Ministry interviews	Ministry of the Environment, Ministry of Economic Affairs and Employment, Ministry of Forestry and Agriculture	6
Business	Food industry, Packaging industry and Material industry	20
NGOs	NGOs whose interests involve environmental issues and consumers - citizens involvement	3
Consumers	Consumer panel which gathers online and are asked to voice their views and opinions on certain topics	22
Associations		15

Table 1. Data and the stakeholders presented in this study

Stakeholder views on power and responsibility

Power triangles

The first workshop was for six non-governmental organizations who focus on environmental and consumer issues. The second one was for business representatives from different sectors (food industry, packaging industry and retail). Although the results are indicative rather than conclusive, they do paint an interesting picture of the power to influence the food packaging system.

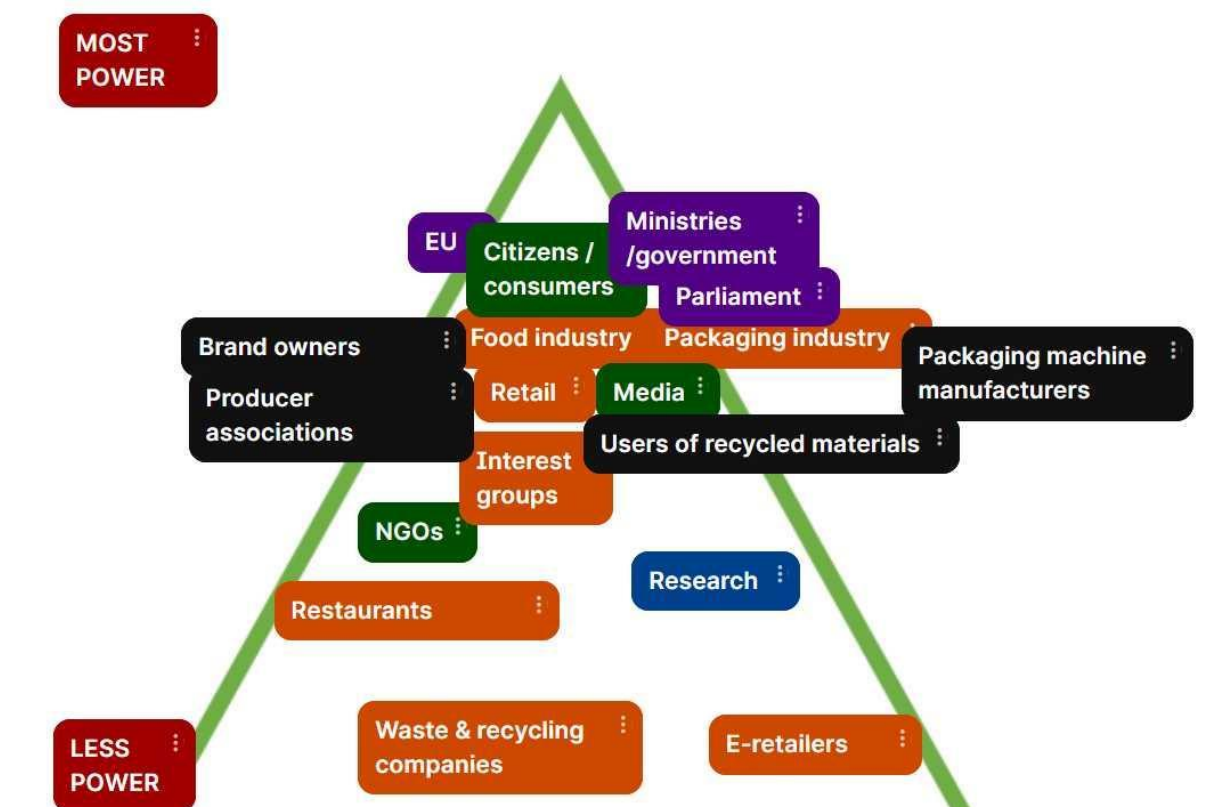


Figure 1. An example of a power triangle created by business representatives in a workshop.

First, the images are all rather different from one another. Second, the respondents seem to consider someone else than the group they themselves represent as being dominant. For example, the NGO representatives placed the NGOs close to the bottom of the triangle. These results indicate that many different actors do have some influence, and none obviously dominate.

Most respondents placed the European Union higher than the national parliament or government, one group considered them to have equal power. In all cases, the governance was seen to have a lot of influence. Most groups place media in the middle of the triangle but one group placed it to the top, in the most influential position. They reasoned that the media determines which topics are discussed publicly and influences policy making and consumer choices.

Food industry and packaging industry were considered to have a lot of influence in all workshop groups. Perhaps surprisingly, waste management and recycling companies were mostly seen to have a fairly small role. The production associations, i.e. the associations that manage the collection of recyclable material on the behalf of the producers, were specifically mentioned by one group and given a higher role in the transition.

The role of consumers differs in the power triangles. Some respondents (particularly the industry representatives) give consumers more power than the industry, others see them as being much less powerful. One workshop group discussed the role of consumers and noted that while a single consumer has very little power, as a group the consumers and their perceived requirements influence the decisions made in industry. This dualism between a single actor within a group and the group as a whole may explain more widely the differences in views. Each actor, such as a company, may see their own position as dependent on others, but as a group, each segment, such as a business sector, is influential.

In order to get more detailed account of each stakeholders' views on power and responsibility to create circular food packaging system, we analyzed our interviews applying the responsibility and power framework presented above. Below, each stakeholder groups' interviews are described from this perspective.

Policy-makers

The ministry representatives define their responsibilities slightly differently depending on the ministries' core focus areas and their role within the national governance. Following from that there were differences in what was emphasised when defining the meaning of sustainable packaging. Still, all the interviewed ministry informants recognized the role of food packages in protecting food in the food chain, to secure its safety and to avoid food loss, but at the same acknowledged the need to decrease the environmental burden of packaging. In general, the ministry informants emphasised the role of ministries in preparing regulatory frameworks, implementing legislation, setting up policy schemes and innovation funding and facilitating the collaboration between business and RDI actors.

Responsibilities that ministry respondents related to these identified tasks include particularly responsibility over the accuracy of the evidence used as a basis of decision making, responsibility of the health of people (food safety, nutrition) and responsibility of bringing the other actors around the same table (facilitation, orchestration). In general, it can be concluded that the ministry respondents felt responsible for taking care of the evidence-base of policy making while influencing the operational environment of food chain actors and consumers to genuinely advance sustainability and not to cause unanticipated negative outcomes either in terms of environmental or socio-economic impacts. This was regarded as a tricky task due to knowledge uncertainties related to sustainability effects of food packaging. What was common with ministry interviews was the claim that basically, ministries cannot solve the sustainability problems themselves as the innovative solutions and their competitiveness are dependent on the acts taken by business and research actors. There were however some differences between the views of representatives of different ministries which reflect the division of labour within the government system.

Ministry of the Environment in Finland is responsible for the national implementation of many of the EU-level governance measures addressing the reduction plastic food packages and the increase of their recycling both as materials and reusable packages. Following from this position, and due to difficulties in measuring the recycling targets of different materials,

the focus of interviews was very much on the contested facts and responsibility of the ministry to utilise science-based evidence as a basis of policies and their implementation. In addition to underlining the need to take care of environmental impacts of food packaging and regulation, the ministry informants also expressed responsibility over the interests of national industries in the face of EU level regulation. In addition to strong regulatory role, the Ministry of the Environment has taken a responsibility of facilitating the collaborative governance processes and development of shared goals between different societal actors (businesses, industry associations, research, development and Innovation (RDI) to reduce the production of plastic waste and to increase the recycling of plastics as part of creating a national plastic roadmap. Following this, the Ministry of the Environment has taken the role of an orchestrator in the sustainability transition which was very much appreciated by several of our interviews from industry associations and business actors.

All the ministries emphasised that changes in food packaging require innovation and, in this sense, it is at the hands of RDI and business actors. The responsibility of ministries in promoting innovations was however a topic, which put forward contested views and showed clearly how much the existing division of work and boundaries between different ministries define their roles. In terms of innovations, the responsibility was very much put on the Ministry of Economy and Employment, which has in general the role of promoting innovations, employment and growth of the export industry. Nevertheless, despite this general division of task between ministries, all the interviewed ministries deliver RDI funding in their own fields. Also, when talking about innovations, the informants in all the ministries addressed responsibility for food industry and retail actors. Ministries of the Environment, and Agriculture and Forestry, as well as the Ministry of Economy and Employment have all signed from the part of national government the voluntary material efficiency deal initiated by food industry and retail associations and packaging industry association. Our informants emphasised that this kind of promotion of ambitious goal setting for the private actors is one of the ways in which ministries can take responsibility of pushing business forward in sustainability transition.

However, when directly asked about how ministries can support the formation of new market opportunities for novel food packaging innovations which currently suffer from being not competitive in relation to existing packaging solutions, the Ministry of the Environment informants answered that market formation is not their responsibility. Their responsibility is to create new regulatory market conditions and policy goals and to communicate them clearly and after that it is the businesses' which need to take action. The representative of the Ministry of Economy and Employment, however, recognised the role of public sector in the market creation and claimed that public procurement should be more used to share the companies' risks of introducing new products and services for the markets. In this case, the initiative was seen to be at the hands of local and regional public organisations whereas the ministries should provide guidelines for how to impact public procurement.

Businesses

The moving toward sustainable food packaging involves four different industries: the materials industry, the packaging industry, the food industry, and the recycling industry. In the material industry, it is particularly the fiber industry that is seen as a potential for sustainable innovations that could replace plastics, but the chemical industry is also working to develop alternatives in terms of bio-based, more easily recyclable, and biodegradable options. The metal and glass types of packaging provide less opportunities, as they rely on non-renewable raw materials, and create solutions that are heavier and thus cause more transportation costs and emissions, though they are relatively well recyclable.

The packaging industry is involved in innovating ways to use and form the materials into packages which use less material, create less waste, create the barriers needed to protect the food (and prevent food loss), and create less emissions in logistics and storage, while still being attractive. The innovations that this industry can make to impact the environment are multiple. As actor between the materials and the food industries, they try to make what customers want with the materials available. This industry could come up with sustainable packaging solutions, help in making sure that these become more available on the market, and push material producers to innovate. Our interviews, however, indicate that they try to avoid this responsibility, and can do so, as the food industry is made responsible for the packages they put on the market. The packaging industry indicates willingness to test and produce sustainable solutions when requested, but against the higher price it brings.

The food industry also plays an important role. They are making the packaging choices and consider the different pay-offs they can accept. The food industry also makes efforts to influence the material and packaging industries. We have identified five different ways in which the food industry is trying to take responsibility and influence the material and packaging industry to make this move (Bor et al. 2022). First, food companies actively signal their aims to change. They do so by formulating targets and goals in their CSR reports. From the interviews it is clear that these signals are being picked up by the material and packaging industries, and are seen as challenging them to make changes. Second, food companies actively make changes in their packaging designs and make material choices. Over the last years, many of the food companies have reduced their plastics consumption by millions of tons. This change in buying pattern directly affects the material and packaging industry as this means there is much more opportunity for more sustainable material and packaging solutions in the market. Third, the food companies also act as testbed for new innovations from the material and packaging industries. They are willing to support the development of new solutions and thereby may speed up and help in further developing the innovative solutions. Fourth, food companies actively invite both material and packaging companies to participate in the redesign of their packages in their efforts to meet their sustainability goals. They thereby invite the actors from the other industries to put in an effort to find and create solutions and work towards more sustainable options. And finally, for some, particularly large international food companies, the material and packaging industries are not moving fast enough and they were frustrated with the dependence on these other industries. To overcome this dependence, they decided to move into the material and packaging industries by developing their own innovation centers for food packaging (Bor et al. 2022).

Besides the influence on the material and packaging industries, the interviews we undertook also highlight that the food industry is seeing an important role for itself in being able to influence consumers. In particular, the guidance on how to recycle packages has increased. Company informants described their realization of their responsibility for providing the necessary information to consumers. One of the companies for example discussed the closing mechanisms for bread and sweets bags, the metal structure with plastic coating. As it looks like plastic, most people tend to put it to the plastics recycling, however, it is best recycled with metal. The company realized that the consumer does not know what the package is made of and where it best is recycled and thus food companies have a responsibility to communicate this to the consumers.

Finally, the recycling industry is playing an important role via the development of sorting and recycling technologies, but they also play a key role in providing information to packaging and food companies about the current and future recyclability of materials.

Thus far, the transition towards sustainable food packaging has not resulted in much solidarity among the business actors, this is, however, understandable as transitions cause changes which provide benefits to some, while others are losing. While different actors do work together on projects, many of the companies interviewed highlighted their fear of breaking competition laws when working with competitors to find solutions, creating a further barrier to solidarity and collective action.

Non-Governmental Organizations (NGOs)

NGOs recognized their environmental power being mainly about educating consumers about good environmental choices based on objective scientific facts and/or regulations and directions provided by governmental institutions. The NGO representatives' interviews did, however, have different views on ideological education, as some NGOs were more ideologically based than others. Related to educating people, influencing schoolchildren in the form of school visits etc. was seen as a rather efficient way to promote sustainable behaviour. NGOs did note that their audience is most often people who are already somewhat aware and educated, or at least open to learn, so NGOs' lack of power lies in the fact that their ability to reach and influence all people is very limited.

Although individual consumers might have little power to influence other stakeholders, mainly producers and policy-makers, NGOs considered their responsibility to transmit the voice of consumers as a group. Hence, this responsibility is based on a strong sense of solidarity. The NGOs can communicate to policy-makers that people are ready and willing to adopt new policies, and on the other hand, let businesses know the wishes and preferences of "green" consumers and encourage them to take actions towards more sustainable solutions.

In terms of sorting and recycling, the consumers' role was seen as very significant, but at the same time it was acknowledged that sorting and recycling should be made as easy, simple, and inclusive as possible. Consumers cannot act sustainably if there is no sustainable choice or if they do not know how to act. The interviewees emphasized that, for example,

instructions for sorting waste should be simpler by further standardizing labelling in both packaging and disposal containers. This type of infrastructural responsibility was placed on policy-makers (legislation and regulations) or on business stakeholders (volunteer agreements such as green deal).

Consumers

We asked 22 consumers in which way they consider themselves responsible for consuming sustainably, and for advocating effective circulation of food packaging material.

Consumers considered their power in transition towards more sustainable food packaging to lie within their capability to impact as a group. However, as individuals, their power is lacking in terms of having an impact on packaging industry or even policy-makers. Consumers perceive that it is not in their power to influence the packaging choices the producers make. Even though consumers can “vote with their choices”, they can only choose from what is offered, and therefore it is producers’ responsibility to make sure their choices are the best possible ones in terms of sustainability. Many of the consumers thought their channel for influence was consumer feedback, but doubted its efficiency.

All our respondents felt it is in their power to sort and recycle. Consumers felt, rather unanimously, that it is the consumers’ responsibility to sort and recycle their own food packaging waste. However, they thought that it is not their responsibility, nor is it even in their power, to organize an efficient circulation of the material, nor are they responsible for maintaining or cleaning the recycling stations. They see that creating the infrastructure should be up to the manufacturers, food industry or the municipality, who are also responsible in making it as easy as possible for the consumer to recycle efficiently - i.e. recycling bins should be big enough, there should be more of them and closer by, and even the people with no cars should have easy access to them (not only in the supermarket parking lots).

Notably, consumers thought that they do have possibility to promote sustainable packaging industry by purchasing packaging that is easily recycled, but they did not mention this behaviour as their responsibility. This sense of responsibility is also lessened by the notion that for the consumer, assessing the sustainability of food packaging is very difficult, as there are so many mixed signals of sustainability. However, it should be food and packaging industries’ responsibility to manufacture packaging that is easily recycled and made of material that is environmentally friendly, as consumers cannot make decision over which type of packaging the food will be packed.

Discussion

Based on the analysis above, the power of different actors using a framework with four types of power – power over, power to, power with, and power within – can be discussed as follows.

Power over was defined as the ability of one actor to prevail over another actor. Our results indicate and there is no obviously dominating actor within the food packaging system, nor are there any actors with no power at all. Ministries seem to have power over other actors in terms of regulations and legislation, creating the preconditions for sustainable food packaging industry and consumption. However, according to our material, the food industry has power over other actors in creating and promoting a sustainable market, though limited, as they remain dependent on the material and packaging industries for the sustainable innovations needed. Consumers as collective were seen as having power over all actors. On one hand, consumer demand guides the market - what they are buying is guiding to a degree what is put on the market. It is also important to note that being able to vote with one's choice is often not an option for those with low income. On the other hand, consumers are, through active participation in societal discussion, affecting the policies and regulation being made.

All actors have *power to* act, although each has different strengths. Ministries have power to fund innovation, for example, whereas material and packaging industries have power to create innovations. NGOs have power to educate consumers, and have the power to influence policy-makers and, in some cases, the industry as well. Consumers have power to recycle materials, albeit they do not have power to influence the recycling infrastructure. Being able to recycle can thus also be seen as an issue of equal opportunities. Not everyone has equal access to recycling bin due to their location or possibilities and facilities to sort and store the waste in their homes. There is, for example, a great difference whether one lives in a house or in an apartment building, in a city center or remote countryside. Consumers noted that even though as a group they have power to do many things, they are not well organized and therefore do not have the possibility to control or steer their message. Also, consumers do not form a single homogenous group, but are very heterogeneous in regards to their preferences, ideologies, needs etc. As individuals they at large lack *power to*.

Power with follows from synergies between partners or from collaboration. There are many examples of potentially fruitful synergies in terms of sustainable food packaging. For example, ministries funding innovations and material and packaging industries using these funds to innovate; consumers collaborating with NGOs to make their voice heard and voluntary agreements within the industry, to name but a few. These synergies create potential for solidarity. The fourth dimension of power, *power within*, is connected to empowerment and agency, awareness and capability, which is, as established previously, closely connected to (individual) environmental responsibility and the underlying sense of solidarity and inclusivity. Those stakeholders who are aware of ways they can act, have capability of acting and feel their agency is equal, or even more important than that of others, indicating a strong solidarity aspect, also have greater sense of environmental responsibility.

The actors examined in this chapter had different takes on responsibility. Ministries' responsibility, as defined by the representatives of different ministries, was to facilitate transformation and produce accurate knowledge of sustainability. Food industry respondents also brought up the question of them having a responsibility to educate and inform the consumers of their products, namely the proper ways of sorting and recycling them. NGOs

responsibility was seen predominantly as educating consumers, but also as communicating consumers' preferences to other actors i.e., acting as a mediator of some sorts. The third responsibility the NGOs were seen as having was securing the interests of the consumers in the transition processes, by demanding better recycling instructions and actions against greenwashing, for example. Consumers had a tendency to think that individually they have no power over other actors, nor any significant power to act upon to transition towards more sustainable food packaging, and so they perceive the lack of environmental responsibility. A clear exception was consumers' attitude towards recycling, which they felt they have both power and responsibility to do. However, from the consumers' point of view, it was other actors' responsibility (policy-makers, producers) to build an accessible and efficient infrastructure so that consumers have no excuse not to recycle. Interestingly, among all actors, it was perceived that consumers have power over other actors, as well as power to act, yet according to our material, they have no responsibilities as a group. This could be due to the lack of forum or channel which would, on the other hand, execute the power they have, and with that, prompt the sense of responsibility.

Conclusions

In discussions with different food packaging stakeholders, it has become clear that one of the main challenges in behaving responsibly is the uncertainty of what is sustainable. For the industry, the lack of information on overall sustainability – especially since the sustainability of certain packaging solutions is highly dependent on the product the packaging is supposed to cover – is clearly a barrier for product development and innovation. For policy-makers the lack of clear sustainability assessments is a barrier for making best possible policies and, finally, for the consumers the lack of knowledge clearly constrains their sustainable behaviour as it is very hard for them to assess the sustainability of each packaging. The lack of knowledge, information and education can decrease the sense of responsibility as well as the underlying solidarity in all stakeholders, as it has an impact on the attributes – such as awareness and capability – having power within. In our data, researchers were often mentioned as a group that would need to produce such information. It can be said that the research community has an important responsibility in providing science-based evaluations of different materials and solutions. The difficulty often lies in the life-cycle of packages: the sustainability depends much on the recycling and reuse possibilities of each location.

From our material we find that in terms of power and responsibility in transition towards more sustainable good packaging solutions there is no stakeholder that has clearly more power or more responsibility than the others. However, there were indicators to suggest that different stakeholder groups are dependent on each other - i.e., industry is dependent on the regulatory frames policy-makers create, and on the funding they provide. At the same time, policy-makers cannot create markets for the more sustainable products, namely those supporting a circular economy. Consumers, albeit they have power to recycle, are dependent on the recycling infrastructure provided. Similarly, although collectively consumers can 'vote' with their consuming choices, individual consumers are dependent on the choices the industry and policy-makers make available to them, in terms of packaging selections in

stores, for example. The sense of responsibility or solidarity does not directly help, if the infrastructure is lacking and/or there is no possibility to choose. Indirectly, the sense of responsibility and solidarity can, naturally, help to put pressure on industry and policy-makers, particularly if consumers are acting as a group.

Since there is a clear distinction between the sense of power and responsibility of the consumer, whether consumers are seen as individual agents or as a group, there is an evident niche for an institutional organization which would represent consumers as a group but would also act *with* consumers, thus creating power *within* and consequently, increase the sense of environmental responsibility and solidarity. For power and responsibility to be distributed equally and efficiently in food packaging sector, there is an eminent need for evidence-based sustainability recommendations for all stakeholder and more efficient co-operation, where an assigned representative body would be in charge of representing consumers – and also in developing ways to channel the concerns and initiatives of individual consumers.

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