The sustainability paradox of the sharing economy

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1. Abstract

The positive effects of new 'sustainable' business models, e.g. the sharing economy business model, are well-documented and widely acclaimed. However, these sustainable models also have unintended negative side-effects that are less visible and often ignored. In this article we describe this phenomenon as the sustainability paradox. We will discuss the negative externalities of sharing economy business models by comparing them to the characteristics of a sustainable economic model. Further, we will propose a brief and simple checklist or framework for quick identification of sustainable business models. This framework can facilitate the top-down implementation of legislative measures and the bottom-up prevention of negative externalities of sharing economy initiatives.

Key words: sharing economy, product-to-service economy, externalities, rebound effect, sustainable business models, prevention of externalities, sustainability paradox

2. Introduction

2.1 Context

The increase in the scope of individual responsibility for the impact of business processes has been an important field of study in Business Ethics over the last decades. We observed the shift of a narrow profit-oriented view to triple-bottom-line thinking. Technological evolutions have helped to speed the shift towards more sustainable business models. Sustainable business models are presented as an alternative to old-fashioned "unsustainable" forms of capitalism. Claims are made that sustainable models do not externalize or ignore environmental and social costs and that they take into account the interest of a wide variety of stakeholders instead of focusing solely on short-term interests of stockholders. By focusing on efficiency and renewable resources some of these models can offer an answer to the depletion of (natural) resources and the increasing impact of waste. (SDSN, 2015; Hart & Milstein, 2003, Schaltegger, Lüdeke-Freund & Hansen, 2012; SustainAbility, 2014).

However, some novel "sustainable" models, also pose a risk of creating unexpected externalities that are contradictory to the very goals of the sustainable economy as stated by Jackson (2009) and Bocken et al. (2014) (see paragraph 3.1). This contradiction is what we consider to be the "sustainability paradox". Authors like Brown (2014) and Pater (2015) have described the "sustainability paradox", or the "paradox of sustainable development" as the societal and economic need for a rise in consumption that is paradoxical to the environmental need for a decrease in consumption due to pressure on eco-systems. We

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will differ from this point of view by linking the sustainability paradox specifically to externalities. Therefore, the sustainability paradox will be defined by us as:

"The contradiction between the obvious positive effects of a sustainable business model and the often less visible or ignored negative externalities, including the rebound-effect, both on behavioral as on systemic level, associated with the transition."

2.2 Research objective

The central research question which we aim to answer will be: "What are the externalities associated with sharing economy business models and how could different stakeholders reduce the negative impact thereof?"

We will demonstrate the sustainability paradox for a popular sustainable business model i.e. the sharing economy business model. This model is part of the product-to-service economy. This specific type was chosen because consumers play a large role in the model and this model is the most wide-spread of all new sustainable business models.

In paragraph 3 we will describe a model for sustainable business models with 7 features. Further we will thoroughly discuss the notion of externalities, with specific attention to the rebound effect. Further we will discuss the characteristics of the sharing economy model and the negative externalities in theory, backed by an analysis of 10 companies or sharing models in Belgium. This will allow us to pinpoint the externalities on the framework for sustainable business models an prove the notion of the sustainability paradox.

Finally we will offer a framework to reduce the impact of the sustainability paradox focusing on the impact of public authorities, business and consumers. We will formulate 10 features that can be used in the design phase of a model or when judging existing models for their sustainability.

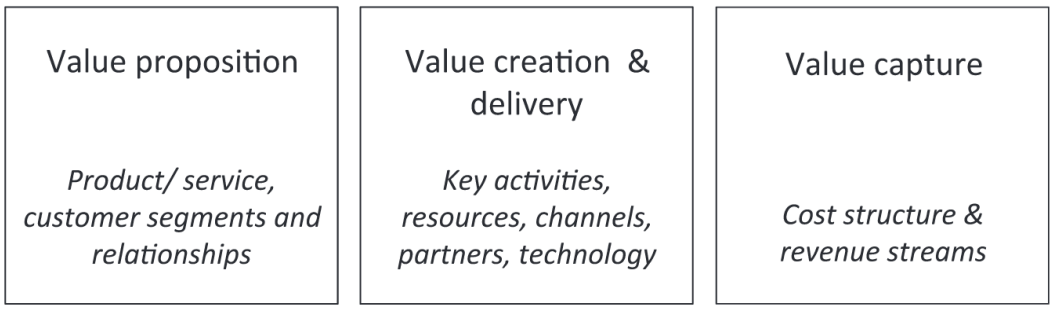
The added value of this model lies in the exemplification of the widely ignored externalities and its practical usability for different stakeholders: e.g. public authorities when deciding whether or not to subsidize innovative so-called "sustainable start-ups" in the sharing economy or for consumers to base their purchase decisions on. But the biggest value add would be when companies start changing models to prevent specific externalities.

3. Concepts and definitions

3.1 Framework for sustainable business models.

A business model is a conceptual tool, the total of a firm's "products and processes, its interactions with stakeholders, what and how it measures and the transactions it requires" (SustainAbility, 2014). Business models are a set of activities and their underlying structures; in order to propose, create, deliver and capture value for different stakeholders (figure 1). They enable companies to analyze, compare and improve, to perform better than competitors and influence societal and environmental impacts. (Bocken et al., 2014; Magretta, 2002)

Figure 1: Conceptual business model framework.



Source: Richardson, 2008; Osterwalder & Peigneur, 2005, adapted by Bocken et al., 2014.

Business model innovation is essential to exploit opportunities and to stay competitive. It requires a change in the underlying value structure of the model, taking into consideration long term goals. Sharing economy, product-oriented product-to-service system (PSS), circular economy, base of pyramid solutions and crowd sourcing are just some of the novel business models claimed to be sustainable. (Prahalad & Hart, 2002, Bocken et al., 2014; SustainAbility, 2014)

In order to be sustainable, a business model needs to create superior customer value and take into consideration the requirements of all stakeholders, while contributing to "a sustainable development of the company and society" (Bocken et al., 2014) by improving the standard of living.

In order to value business models for their sustainability effects we use the features of a sustainable economy as listed by Jackson (2009) and Bocken et al. (2014) as a framework:

1. Minimizing consumption, imposing personal and institutional caps or quotas on energy, goods, water, etc.;
2. Maximizing societal and environmental benefits, rather than prioritizing economic growth;
3. Closed-loop where nothing is allowed to be wasted or discarded into the environment;
4. Emphasizing delivery of functionality and experience, rather than product ownership;
5. Fulfilling, rewarding work experiences for all, that enhance human creativity/skills;
6. Collaboration and sharing, rather than aggressive competition.

Source: Jackson (2009) and Bocken et al. (2014).

This framework will be the reference point to test the sharing economy model on its sustainability. In order to meet Elkington's triple bottom line completely, one additional feature could be added to the list:

7. Viability of the model after 3 years, without external financing (e.g. subsidies, sponsoring etc.). (Deckmyn et al., 2014)

The above refers to economic sustainability. Although important to mention in order to have a complete overview, this feature won't be tested because of its context dependence.

3.2 Business model externalities

Externalities are positive or negative side-effects which are not calculated in the price of the service or the product, because during decision making not all requirements of stakeholders were understood or considered fully. Externalities are indirect costs that may result in inefficiencies or failures of market outcomes. They impact other people, the environment or society as a whole. (Helbling, 2010; Caplan, 2008; Cornes & Sandler, 1986; Kondoh et al., 2014)

Positive externalities arise when the gains for the individual or the company are smaller than the advantages for the society. The concept of positive externalities is often used in relation to public goods. The notion of positive externalities can be linked to Shared Value Creation. Shared Value is created when organizations invest in long-term projects that create value for the organization as well as for the society or the environment. The concepts differ however by their initial intention: Shared Value Creation is an intended effect, whereas positive externalities are unintended value-delivering side-effects. (Econation, 2015; Pinkhasov, 2014; Helbling, 2010; Caplan, 2008; Cornes & Sandler, 1986; Kondoh et al., 2014)

Negative externalities arise when societal and environmental disadvantages are larger than the costs of individuals or companies. When the costs of certain decisions are not internalized in product or service price, society will still have to pay for them through taxes, loss in environmental capital or health and social payments. The rebound effect is an important negative externality which we will deal with separately. (Econation, 2015; Pinkhasov, 2014; Helbling, 2010; Caplan, 2008; Cornes & Sandler, 1986; Kondoh et al., 2014)

Positive and negative externalities can neutralize each other. In that case a correction of the market inefficiency is not necessary. In other cases, corrections can occur among others through the addition of taxes and awareness raising. The prevention and correction of negative externalities will be discussed in more detail in section 5 of this paper. (Helbling, 2010; Caplan, 2008; Cornes & Sandler, 1986; Kondoh et al., 2014)

3.3 The rebound effect

3.3.1 Definition

The rebound effect is a specific type of externality discussed extensively in literature, especially in relationship to certain domains like e.g. energy services and transport. Maxwell et al. (2011) define the rebound effect as “an increase in consumption which may occur as an unintended side-effect of the introduction of policy, market and/or technology interventions aimed at environmental efficiency improvements.”

The risk for a rebound effect is especially large when business model changes lead to price reductions. Some definitions of the rebound effect stress the rise in use or consumption of products and services because they are more reasonably priced (Bocken et al., 2014) or a gain in purchasing power occurs, resulting from sharing, leading to an increase in consumption (Demailly & Novel, 2014). Sanne (2000) describes the rebound effect as an

inefficiency of efficiency and product or service improvements where consumers start to consume more when accessible, because they believe in the concept of more is better.

Synonyms for the rebound effect include take-back effect, feedback effect, bounce-back effect, income effect etc. When the rebound effect is larger than 100%, it is called backfire. (Maxwell et al., 2011; Sanne, 2000; Santarius, 2015; Jenkins, Nordhaus & Shellenberger, 2011) The rebound effect can be described positively in terms of economic and social impacts (more consumption and provision of more goods/services) or negatively in terms of environmental impact and higher resource use (Demailly & Novel, 2014; van den Bergh, 2011). We will approach it as a negative externality.

For our purpose we understand the rebound effect as: "An unintended side-effect that occurs when efficiency is improved, leading to a price decline and an increase in purchasing power. In turn, this results in a higher resource use or consumption."

An efficiency increase and the resulting price drop are not the only causes of rebound effects. Maxwell et al. (2011) and Sorrell, Dimitropoulos & Sommerville (2009) distinguish 3 other influencing variables:

- time: changes lead to more or less consumption of time, resulting in an altered consumption pattern;
- space: improvements result in more or less space which influences the consumption;
- technology: better accessibility of technology (resources) results in a different consumption pattern.

To better understand the impact of the rebound effect one can also distinguish between the economic level it occurs on. The **micro-economic rebound effect** is the most investigated level. It is defined as the level of consumers, including individuals and households (Jenkins, Nordhaus & Shellenberger, 2011). The **meso-economic rebound effect** is the rebound effect that includes effects on company level and market/sector level. Most authors however, only distinguish between the micro- and the macro-economic level. They include the firm at the micro-economic level and the market at the macro-economic level (Santarius, 2015). The **macro-economic rebound effect** takes place at the level of the total (national or global) economy. (Jenkins, Nordhaus & Shellenberger, 2011; Santarius, 2015).

Further distinction need to be made between the effects of the rebound effect. The **direct rebound effect** occurs when efficiency improvements and the associated decrease of costs will result in increased consumption or demand of the same product/service (Maxwell et al., 2011; Santarius, 2015; Sanne, 2000). Jenkins, Nordhaus & Shellenberger (2011) and Sorrell (2012) break the direct rebound effect into two main effects: income/output effects and substitution effects. The magnitude of the effect is, among other factors, dependent of the elasticity of demand and the ability to substitute (Sorrell, 2012; Maxwell et al., 2011; Sorrell, Dimitropoulos & Sommerville, 2009). The **indirect rebound effect** occurs when efficiency improvements lead to higher consumption of other products/services, requiring the provision of more resources (Maxwell et al., 2011; Santarius, 2015; Sanne, 2000). The indirect rebound effect can be partly offset by the investments necessary to make the

initial improvements (Jenkins, Nordhaus & Shellenberger, 2011). The effect occurs in many different shapes and is therefore more complex to investigate.

Generally, literature states that it is hard to recognize or measure the magnitude and the significance of rebound effects due to the number of influencing variables (e.g. socio-economic background), methodological biases, the long term impacts and the many different occurrences of the rebound effect (Maxwell et al., 2011; Sorrell, Dimitropoulos & Sommerville, 2009; van den Bergh, 2011).

3.3.2 The rebound effect and sustainable business models

For the purpose of this article we will use our own definition of the rebound effect, based on the general definitions we found and determine the scope in function of the models we will analyze. We will limit our scope to rebound effects caused by efficiency improvements resulting in a decrease of consumer prices. Furthermore we will limit the rebound effect to short term, direct as well as indirect, implications of an increase in purchasing power thanks to a more efficient business model. The effects of the rebound effect will be investigated mainly at micro-economic level.

Attempts to investigate the existence or magnitude of the rebound effect for sustainable business models are scarce. The existence of the rebound effect for this type of models is mainly proven by case examples. We believe that the lack of structured proof for the rebound effect can be attributed to wide span of areas that could be impacted by new, sustainable business models including, among others, transportation and product life span. Examples for the rebound effect given in literature include:

- the necessity for resource intensive infrastructures (e.g. telecommunications) for product service systems;
- increased environmental impact of supply chains due to a shift to service based economies;
- the increased transportation demand in sharing systems.

If the rebound effect – next to other externalities – is not considered in the valuation of the sustainable business model, it is hard to make a case that they differ from traditional business, since the internalization of all effects was exactly one of the main demarcations.

Another concept associated with the rebound effect for sustainable business models is the mental or psychological effect. This is also a rebound effect whereby an increase in the consumption of sustainable or environmentally-friendly marketed products and services makes consumers feel better about buying those products and services, potentially influencing their future demand. (Maxwell et al., 2011)

4. Externalities in sharing economy models

4.1 The sharing economy

The sharing economy results from social, economic, technological and ecological changes over the last years. Central in the sharing economy is the sharing and selling of goods,

services, space and money, usually on an online platform. The commercialization of the sharing activity does not detract from the fact that the access to the good is still shared. (Martin, 2016; Demailly & Novel, 2014; Katz, 2015; Miller, 2016; Owyang, Samuel & Grenville, 2014). Sharing economy is a part of the product-to-service or product service system (PSS) business model. A product-to-service model can be defined as "a business model were the (market) value is at least partially realized by offering a service, linked to a product" (Deckmyn et al., 2014). Plan C (2016) subcategorizes the product service system as illustrated in figure 2. For this article we will use a broad definition of the sharing economy that includes all forms of the use oriented product service system as indicated in figure 2, complemented with mixed forms.

Figure 2: Link between product service systems and sharing business models

product service system		
product oriented	use oriented	result oriented
product related service	product lease	outsourcing
product related advice	product sharing/renting	functional result
	product pooling	
	pay-per-service unit	

Source: Adapted from Deckmyn et al., 2014.

Apart from the categorization in figure 2, a wide variety of differences and subcategorizations exists within the sharing economy business model . Demailly & Novel (2014) distinguish redistribution, mutualization and shared mobility. Further, models can be based on whether they rely on an intermediary or not, who they are targetting (P2P, B2P, B2B) or if they use a technological platform (Demailly & Novel, 2014; Schor, 2014). Other authors (e.g. Stein, 2015; Cohen & Kietzman, 2014; Martin, 2016) subcategorize according to the sector, resulting in sharing business models for mobility, housing, parking, food et cetera. The sharing economy is therefore marked out by its fragmentation of different types of organizations participating in the model, concerning the type of sector they operate in as well as the size of the organizations. (Martin, 2016)

The sharing economy is characterized by rapid growth. Consumers judge it as convenient thanks to lower information and transaction costs (economic and altruistic drivers) and service providers think of it as an easy way to make money with underused goods. In fact, the sharing economy is often a copy of certain services, already provided by non-sharing economy businesses. (Martin, 2016; Demailly & Novel, 2014; Katz, 2015; Campbell Mithun, 2012)

Positive effects of the sharing economy are well-documented in literature (e.g Schaltegger, Lüdeke-Freund & Hansen, 2012; Deckmyn et al., 2014; Demailly & Novel, 2014; etc.). In addition to generally accepted and proved features we try to contribute to this by identifying positive externalities via investigated cases and literature. The positive externalities and features we recognize include among others:

- Increase of purchasing power for consumer;

- Decrease of transaction and information costs;
- Enhanced social interaction and positive feelings because consumer is helping someone;
- Better coordination of market demand and supply;
- Better total product life value;
- Flexibility for users;
- Quality of services in the complete sector improves and image is upgraded;
- Revival of local economy.

(Source: Katz, 2015; Miller, 2016; Demailly & Novel, 2014; own findings).

4.2 Literature review of sharing economy externalities

In the following paragraphs we will discuss a series of externalities associated with sharing economy. We will refer to the six features of sustainable business models based on Jackson (2009) and Bocken et al. (2015) to frame the possible negative externalities. We will not include the rebound effect as a specific externality in the discussion here since we have already covered the concept extensively. The rebound effect is closely connected to the externalities that work against feature 1, i.e. minimization of consumption and also associated with efficiency gains through the lower information and transaction costs of sharing economy.

We did not find proof in literature for externalities that would contradict feature 3 (closed-loop) and 4 (focus on functionality and experience, rather than product ownership)

Feature 1: Minimization of consumption

Consumers sometimes perceive the goods and services they can afford within the sharing economy rather an additional form of consumption than a replacement of normal consumption. Certain forms of sharing business models even facilitate consumption, e.g. by offering a service contract which includes regular replacement of the product. This can cause rebound effects and may even lead to hyper consumption. Consumers are attracted to sharing economy models since these lead to lower information costs and transaction costs by standardizing the operation of sharing. (Demailly & Novel, 2014; Miller, 2015; Katz, 2015)

Feature 2: Maximization of societal and environmental benefits, rather than economic growth

Several documented externalities are at contrast with the goal 'maximization of societal and/or environmental benefits, rather than economic growth' such as:

- Increase in transport because goods need to be accessible for consumers at several moments in different places – environmental (Demailly & Novel, 2014);
- Being a provider in the sharing economy is exclusively for people owning goods – societal (Martin, 2016);
- Decrease of tax revenues due to illegality of practices – societal (Miller, 2015);

- Safety and health of providers, users and the direct neighborhood are endangered – societal (Miller, 2015; Katz, 2015);
- Data privacy on online platforms – societal (Katz, 2015);
- Discrimination in rating and review systems of platforms – societal (Katz, 2015).

Sharing economy is big business, thrives on growth and aims at monopolization. This does not necessarily corresponds with feature 6 of the framework. The same can be said of several companies that are trying to avoid legal regulation, as described (feature 5). Companies are in that case clearly searching for economic growth, rather than prioritizing societal or environmental benefits. (Katz, 2015; Miller, 2015; Demailly & Novel, 2014)

Miller (2015) states that "the commodification pressure of the industry means that the various sharing economy businesses are essentially competing on price." This might influence the attention being paid to the environmental or social qualities of products and services in the sharing economy.

Feature 5: Fulfilling, rewarding work experiences

Problems with work licences, unclear employee accountability, the statute of employees with fixed wages, lack of transparency, poor quality of employment and unreported employment are the main problems associated with the sharing business model, even when the sharing platform operates legally. The information asymmetry between the provider of the service using the sharing platform and the platform contributes to these problems. (Miller, 2015; Sherman, 2014; Katz, 2015; Demailly & Novel, 2014)

Feature 6: Collaboration and sharing, rather than aggressive competition

Martin (2016) states that the sharing economy creates "unregulated marketplaces", typified by 4 elements:

- risk transference;
- unfair competition;
- tax avoidance;
- black or grey markets.

Unfair competition, is in contradiction with feature 6 of Jackson (2009) and Bocken et al. (2014). Other authors stress the occurrence of severe competition as a negative externality too. Miller (2015) acknowledges that most sharing economy services and offers are already provided by non-sharing companies, which encourages competition. Furthermore Miller claims that the blue ocean of new sharing economy markets will quickly change into red oceans once legislative adaptations are made. Competition is severe since individuals have now a platform and they can compete against established market participants. Due to network externalities the established platforms form a high barrier for new businesses to enter the market or they create artificial barriers to prevent the market entrance of new competitors. (Miller, 2015; Katz, 2015)

As a result, the sharing economy facilitates cooperation, however not between platforms. The mentioned network externalities can eventually even result in market monopolies and

very aggressive competition. The sharing economy businesses can be disrupting for the own sector or for substitute sectors. (Demailly & Novel, 2014; Miller, 2015)

4.3 Externalities and rebound in sharing economy: cases

In order to make the conclusions of the literature review more concrete, we analyzed ten cases of national and international companies with a sharing economy business model active in the Belgian market. In doing so we can discover how the externalities rise in practice. A brief description of each company's activities is given in table 1.

All examined business models show positive externalities that can contribute to a more sustainable economy. The focus was, however, on discovering and describing negative externalities that arise in the cases that contradict one or more of the 6 features of sustainable economy (see 3.1). We did not find proof in the cases for externalities that would contradict feature 3 (closed-loop) and 4 (focus on functionality and experience, rather than product ownership). The overview presented is not exhaustive nor systematically conducted. It is presented as a mere concretization of the features discussed in the literature review.

Table 1: Overview of investigated sharing economy cases.

Company	Main activity	Description
Airbnb	Room sharing	Airbnb is a worldwide operating online platform for renting rooms. Every individual can offer rooms. For consumers, accommodation is less expensive than a traditional stay in a hotel.
Uber + Uberpool	Car sharing / ride sharing	Uber users can find a ride with an Uber driver by using an app. Uber drivers use their own car. Users pay a variable price, depending on current demand and the length of the ride. Uberpool is an app to find people in order to share a ride with an Uber taxi.
Cambio	Car sharing	Clients of Cambio can rent cars for a short period of time. They pay a subscription fee, a fee for the time period they want to use the car and a fee per kilometer. Fuel, maintenance and insurance are included. Consumers can pick up the car after online reservation.
Zen Car	Car sharing	Clients of Zen Car can rent electric cars for a short period of time. They pay a subscription fee, a monthly fee and a fee per kilometer. Fuel, maintenance and insurance are included. All car types (also 'fun' cars) are permanently accessible.
Vélo	Bike sharing	Vélo consists of a fine-meshed network of bike sheds in Antwerp. Subscribers can use the provided bicycles for short distances. Subscription fees are low and the model is subsidized, resulting in ca. 10000 rides a day.
Thuis-afgehaald	Food sharing	Online platform where home cooks can share leftover meals. The home cook decides on the price and they mostly include only the ingredients. The seller has to give 10% of the price to the company.
Flavr	Food sharing	Online platform that connects home cooks with food lovers. Users can order a meal and the home cook prepares it. The user will pick the meal up at the cooks home. Prices are at the level of take-out food, taking into consideration meals are especially prepared after the client orders.
WijDelen	Tool sharing	WijDelen is the Flemish version of Peerby, a platform where you can ask to share tools. Sharing is free. WijDelen stresses the importance of the social contact in the transaction.

Fablab	Tool sharing (larger sense)	Fablab provides several workshops with tools and machinery. Use of the provided machinery is free; however the design and creations need to be shared on a website in order to be open source. Users can buy materials at purchase cost. Fablab is subsidized by the government.
Listminut	Task sharing	Listminut is an online platform were individuals can offer their services or ask for other people, preferably living in the neighborhood, who can do small tasks for them, e.g. cleaning, mowing etc. Listminut asks for a fee for each service executed.

(source: own composition)

Feature 1: Minimization of consumption

The investigated sharing economy business models are more convenient for users than traditional models and they facilitate easy use and more usage. Often, also a larger share of the market is served, e.g. Uber or Airbnb, and as a consequence the use rate of the product or service will increase. Also in the case of Listminut we suspect that users tend to put out more tasks since they have easy and quick access to individuals who want to do their tasks. For several types of products and services, use is not just higher, but overconsumption or unnecessary consumption occurs, e.g. individuals using Vélo bicycles while they could actually walk the short distance. This is the basis notion that supply potentially creates demand.

Feature 2: Maximization of societal and environmental benefits, rather than economic growth

Sharing economy business models do not always maximize ***societal benefits*** due to negative externalities. These include among others the wrong allocation of subsidies, an increased income disparity and the lack of systematic health and safety controls.

Demand and the degree of substitution for new products and services in a new business model are unpredictable. Therefore it is often hard to allocate subsidies correctly. The wrong allocation of subsidies, resources from the community, diminishes the societal benefits of the model and facilitates economic growth of several subsidized market players. This is illustrated by the cases of Fablab, Vélo and Zen Car for feature 6. In addition to this, social disparity increases because individuals that are already owning goods can earn more by sharing. Furthermore, health and safety problems stay often under the radar. Examples in the investigated cases include food quality and hygiene for Thuisafgehaald.be and fire safety for Airbnb.

Sharing economy business models do not always maximize ***environmental benefits*** due to negative side-effects of the model. This includes for example the increase in transport that originates from individuals picking up the good they are pooling, hiring, leasing or sharing and the reallocation of goods in order to provide the correct amount of goods at each service point. Vélo is a good example of this. Fishman, Washington & Haworth (2014) accounted that for London, the total distance driven by car increased after the introduction of the bike sharing system due to low substitution levels for car use and the use of redistribution vehicles.

Several negative externalities listed under the other features of sustainable business contribute to this characteristic too, e.g. the unregulated legal area impacting employee protection proves the mainly economic concern instead of societal benefits.

Feature 5: Fulfilling, rewarding work experiences

Individuals can easily make money with the services they offer, through sharing economy business models. Consequently a lot of new 'workers' will enter the labor market. An example of this is Flavr, were home cooks offer their services, competing with traditional take-a-ways or even restaurants. The competition of new providers or 'workers' in the market will result in lower job security.

More fulfilling and rewarding work experiences are not necessarily a consequence of the sharing economy since jobs are shifting to an unregulated grey legal area. Service providers or workers can have problems with unemployment compensations, working hours, liability etc. An example of this is Uber drivers that do not need to comply fully with the regulation in the taxi sector (Mishel, 2015). Other companies like Listminut try to limit the maximum amount of working hours, although we can remark that this does not guarantee that clients and workers contact each other, apart from the platform.

Feature 6: Collaboration and sharing, rather than aggressive competition

Collaboration and sharing occurs between providers and consumers on the platform, however not at the level of the platform or sharing economy businesses themselves. Strong competition that contradicts feature 6 originates from three negative externalities, identified in the investigated cases.

Unfair competition arises due to legal gaps or the subsidization of certain early market players: e.g. Zen Car is subsidized by the Government of the Brussels-Capital Region while Cambio had a similar trial project, without subsidies, that failed (Brusselnieuws, 2011). Cannibalization of existing markets destructs value: Vélo competes with local sellers of second-hand bikes and bike repairers. Due to network externalities a lock-in effect of consumers a factual monopoly arises: consumers and providers tend to use Airbnb because it is the largest room sharing platform in Belgium. Over 10 000 Belgians offer a room or other accommodations, whereas 17 000 traditional hotel rooms are available in Belgium. (Trends, 2015)

4.4 Conclusion

The negative externalities, including rebound effects, identified in literature and in cases prove that sharing economy business models are at risk to result in a lesser total value add than perceived. However, it is impossible to quantify them. Furthermore we do not claim that "traditional" models are necessarily better. They share similar and other externalities that might be in the very end unpreventable and just a normal effect of business. We claim that the negative side sustainability paradox for sharing economy can be summarized in four statements:

1. Sharing economy models do not necessarily lead to less consumption. Supply creates demand. There is no proof that the discussed models lead to minimization

of consumption. In many cases, one is tempted to conclude that they even stimulate use and hyper consumption of (other) goods.

2. Sharing economy models are not necessarily “green” or “fair” but also follow a basic economic rationale. It is not always clear how sharing creates less societal and environmental impact than normal business models.

3. Sharing economy models are at risk of harming the rights of workers. Some models threaten better jobs and replace these by unstable, poorly paid and sometimes even exploitive or illegal work relations

4. Sharing economy models are also business as usual and at risk of creating a highly competitive market that poses barriers to potential new players. Collaboration and sharing does not prevent aggressive competition and cannibalization of traditional economy. Especially for the large players, it seems that there is a logical evolution to oligopolistic or even monopolistic constellations. The lock-in effect of consumers strengthens this.

5. Changing the sustainability paradox

The externalities of the new sustainable business models are hard to identify, quantify and attribute in terms of who exactly is impacted. This makes a strategy to tackle these externalities difficult. Demailly & Novel (2014) state that negative externalities can be prevented by taking measures and influencing choices that concern 3 actors:

- public authorities;
- entrepreneurs (business);
- consumers.

We have used this categorization to discuss corrective actions.

5.1 Public authorities

Public authorities can prevent negative externalities by regulatory actions. Literature lists various legal approaches ranging from banning models to small corrective actions. Banning might be considered as a temporary measure in order to give the legislator time to catch up with market transformation, but it is ineffective on the long term because of the control needed and especially because of inexhaustibleness of the sharing market. (Katz, 2015; Miller, 2016) Therefore we will focus on more corrective approaches

Stakeholder participation to coordinate legislation is however essential. In establishing a decent legal framework, the level of coordination (national, local) and the establishment of a place for dialogue, consultation and action-taking are necessary to align stakeholder opinions. (Katz, 2015; Miller, 2016; Demailly & Novel, 2014)

Clear definitions in the legislation are deemed essential to avoid grey areas, e.g. introducing tiered regulatory schemes to distinguish super users of the specific sharing economy model from normal or low intensity users. (Katz, 2015; Miller, 2016) Providing a clear legislative framework and avoiding (illegal) grey areas, will result in the entry of existing companies from the non-sharing economy into the new market segment (Miller, 2016; Katz, 2015).

Other suggestions from literature that can be translated into regulatory frameworks affect the physical environment of the organization, e.g. neighborhood, and the administrative environment, e.g. licenses. The feasibility and effect, however is not documented. They include:

- The limitation of use: in time and geographically;
- Fiscal systems: consumption caps, subsidies, taxes. E.g. the unit owner must pay versus the platform owner must pay for the all the units shared on the platform;
- The enforcement of affirmative duties for the provider, e.g. informing the neighborhood;
- The enforcement of affirmative duties for the platform, e.g. insurance, background check providers, dispute regulation system, provision of legal information for providers etc.;
- The implementation of a simplified registration or licensing system for providers. Providers keep in this case a few records, e.g. user log book;
- Promotion of certain companies and products.

(Katz, 2015; Miller, 2016; Demailly & Novel, 2014; Maxwell et al., 2011)

To execute these suggestions in an aggregated way, Miller (2016) suggests a regulated system of transferable sharing rights (TSRs), whereby everyone that wants to participate as a provider in the sharing system needs TSRs. Providers need to use their TSR to be allowed to offer a service, goods, a space… on the market. The use of TSRs is limited geographically, in time and per provider in order to limit negative externalities. The use of the right must result in better information provision to the regulator and payment of taxes or fees per TSR. In an ideal market, TSRs can be traded and excess fees can be reinvested to minimize negative externalities of the business model. The regulator should take in mind that a good regulation of the TSR market, a correct number of TSRs and well-founded reinvestments are crucial to the success of this system. (Miller, 2016; Katz, 2015)

5.2 Businesses

Businesses include both new market players in the sharing economy and the established market participants. For entrepreneurs, awareness of environmental impact of their products and business models is sometimes limited, especially with regard to the indirect effects. Maxwell et al. (2011) illustrate this with cases of well-intended, however misguiding ‘green’ product campaigns. It is necessary to raise awareness about the conditions applicable for business models to be sustainable and the fact that sustainability is not inherent to all new business models. (Demailly & Novel, 2014; Maxwell et al., 2011)

Internalizing environmental externalities in the prices of products is a way to prevent or decrease the rebound effect. Because of the complexity of interdependent variables, internalising all externalities is a mere theoretical or academic ambition. Businesses must be incited to ask a higher fee and invest this in societal projects since consumers (providers) will not be able to calculate ‘correct’ prices for the sharing activities (Maxwell et al., 2011; Miller, 2016). An example of this is Thuisafgehaald.be, were providers offer meals often at purchase price.

5.3 Consumers

Consumers include providers using sharing economy platforms and consumers, using the services of providers on the platform. According to Demailly & Novel (2014), the main motivation for consumers to use or to participate in sharing economy is an increase in purchasing power. The second motivator is the specific nature of the business model, taking into account societal and environmental advantages.

Since consumers are partially driven by the specific nature of the business model, it is essential to raise awareness about the negative externalities (and especially indirect rebound effects). Only a strong change in the awareness level, priorities and total lifestyle of consumers will facilitate the prevention of most externalities and rebound effects. A common strategy to raise awareness at the level of the individual is by informing consumers better about their use, e.g. by using smart metering or billing. (Maxwell et al., 2011; Demailly & Novel, 2014)

5.4. Framework for sustainable sharing economy

Based on these findings we propose a framework that can be used to make a sharing economy business truly sustainable. The framework focuses on the prevention of negative externalities, including the rebound effect. This framework is a shared responsibility. It is important for legislators to approach businesses and consumers together to avoid externalities. They must share both risk as compensation of sharing economy practices to be incentivised to take initiatives for externality prevention. (Miller, 2016)

Figure 3: framework to check sustainability of sharing economy model

Sustainability paradox statement (from section 4.4)	Solution	Link with feature of the model for sustainable economy
Improved supply creates demand	a. Limitation of number of uses or time per user or geographically	1
	b. Clear and simplified use registration system	1
Economic rationale excels fair practices	c. Registration of use numbers, profit and damage for tax collection with simplified system	2, 5
	d. Internalization of negative externalities in prices, taxes or both	1, 2
	e. Investment of profits coming from extra charges in neighborhood or societal projects, linked to the business or in affirmative action for the platform and providers	2
	f. Communication improvement and awareness building for consumers	1, 2
	g. Introduction of a user rating system	2
	h. Sharing of risk and benefit between users and providers	2, 5
Sharing models create unstable working conditions	Registration of use numbers	
	i. Informing users of the platform (providers and consumers) about the (il)legality of the platform, its transactions and the legal duties of the users	2, 5
Highly competitive market creates barriers	j. Introduction of correct pricing models	1, 6
	k. Use of clear definitions with tiered regulatory schemes	1, 6

(source: own composition)

The framework (figure 3) links the statements that compose the sustainability paradox with possible solutions for the paradox. These solutions can in turn be linked to the features of sustainable economy, which they support. The list with solutions can be used as a checklist for the testing of the sustainability of sharing economy models or as inspiration for areas were regulatory action can be taken. The activities in the checklist can be summarized into 4 main domains of action:

1. Minimizing consumption

The business model should limit the use of the service or the sharing of goods (solution a). Limitation can be applied to the number of uses or the time of use per

consumer or geographically. This requires a clear registration system (b). The platform should facilitate data registration. Providers should be able to register use numbers, profit, and damage easily. As a result the government and the platform could calculate fair taxes and prices ((c +) d). The creation of awareness among consumers can facilitate less consumption too (f).

2. Partial internalization of externalities and reinvestment in social projects

Negative externalities should be internalized in prices, taxes or both (d). Internalization should be regulated top down, since consumers are not able to estimate correct prices. Profit coming from the extra charges should be invested in the neighborhood or societal projects, linked to the business to neutralize the externalities (e).
Better communication and awareness building is necessary to prevent psychological rebound effects (f).

3. Employee (provider) and user protection

The government and the sharing economy business platform should take action to inform the users of the platform (providers and consumers) about the (il)legality of the platform, its transactions and the legal duties of the users (g + h + i).

A provider and user rating system in the model to eliminate 'bad' actors. Although this could result in discrimination, we suggest including this in order to have a control system that is not resource intensive. In order to counter several externalities, e.g. moral hazard, responsibility and liability should be shared among platforms and providers using the platform (g).

4. Prevent aggressive competition and monopolies

It is hard to intervene here but we think that aggressive competition can be avoided by a correct system of internalization of externalities which leads to more correct pricing models (j). There is a clear link with the measures for feature 2: partial internalization of externalities. Awareness building is also here a central aspect.

In order to fulfil these requirements, companies in the sharing economy can realize these features themselves or governments can take legal action to oblige sharing businesses and consumers to comply with this. We believe that there is no best method and optimization is context dependent. Government interference or independent labelling might even be the best solution to push or pull, even if this is against the principles of the free market system.

Maybe one needs to think out of the box when discussing a truly sustainable economy. It may require a completely new system for value measurement – not at the level of the model, but at the level of society as a whole.

A new value measurement system that includes non-financial side-effects should be established. This suggestion could be part of further research because this means that a

business model needs to be (1) able to compete in a price-driven market, for more than 3 years without external financing in order to be sustainable (Deckmyn, 2014) and (2) decoupled from benefit- and price-driven structures and linked to other types of value.

Although general perception is shifting towards a more favourable mindset for sustainability and many individuals are able to recognize unsustainable behaviour, models with unsustainable externalities do flourish. We suppose that the main reason for this is the focus on profit and economic growth in our markets. Several authors recognize this for sharing business models. Miller (2016) and Katz (2015) recognize that the sharing economy serves an insatiable market since the specific characteristics lead to fewer costs for consumers. When competition is price based and businesses need to survive in the market, other created (sustainable) value will become of inferior importance.

We suggest that it is therefore necessary to go one step further than legal restrictions and awareness raising activities. The complete underlying product and service valueing system of the market should be adapted. Several authors, e.g. Jonker (2014), Jackson (2009), Maxwell et al. (2014), Choucron (2011), Deckmyn (2014), confirm that growth, innovations and improvement are not necessarily connected to economic profits and that we must rethink our value system. Truly value creating activities and models go often unnoticed because the value they create is not contributing to the GDP of a country (Demailly & Novel, 2014).

6. Conclusion

With our research we aimed to investigate the sustainability paradox for sustainable business models, more specifically sharing economy business models as a part of the product-to-service economy. The paradox claims a contradiction between obvious positive effects and the often less visible or ignored negative externalities of those models. We were especially interested in one side of the paradox, i.e. the side of the negative externalities. We concluded that the sharing economy is less sustainable as generally indicated since the improved supply creates demand, the economic rationale still excels the introduction of truly fair practices, working conditions are unstable and the market will be highly competitive.

A framework or checklist could facilitate early detection of negative externalities in sharing economy models and simplify action taking by different stakeholders. We identified 10 solutions to test sharing economy business models on their true sustainability, summarized into 4 features:

- Minimizing consumption;
- Partial internalization of externalities and reinvestment in social projects;
- Employee (provider) and user protection;
- Prevent aggressive competition and monopolies.

The 10 solutions are a bottom-up checklist or they can also be positioned as domains of legislative action-taking, i.e. top-down constraints. Platforms, providers and consumers

must be protected, however not in a too prescriptive way. In that way we can solve the sustainability paradox

Apart from the solutions we suggest that a new system for value measurement should be subject of future research. Alternative value capturing systems are nowadays only developed to a limited extent and market structures are not yet adapted to new ways of trading. When the underlying price-driven system and the extreme profit seeking behavior of the consumer are weakened, most drivers to implement systems that oppose the features of a sustainable economy will fall away and business models will become more sustainable from the inside-out. This domain should be the subject of future research.

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