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Market power and sustainability: a new research agenda

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Abstract
Perfectly operating markets only exist in theory. Market failures are known to not only inhibit the proper functioning of the market, but also affect sustainability and thus a sustainability transition. In this regard, much attention has been paid to externalities or missing markets, even though these are not the only market failures. In this paper, we argue that market power and its relationship with sustainability has been neglected, despite the fact that, back in 1931, Hotelling indicated the connection between the two concepts. However, research that has been dealing with this connection has not been comprehensive and has only looked at one aspect of sustainability and market power. Due to the rising relevance of market power as well as of sustainability concerns, the connection between the two deserves thorough attention. Accordingly, we propose initiating a new interdisciplinary research agenda to comprehensively analyze the complex relationship between market power and sustainability.

Keywords Market power · Sustainability · Sustainability transition · Interdisciplinary research · Resource depletion · Innovation

1 Introduction

It is acknowledged [1–3] that economic activities can have a negative impact on sustainability. This relationship between the economy and sustainability is most notably captured by the discussion surrounding market failures and sustainability. According to economic theory, a market should not create inefficiencies such as environmental destruction or human exploitation. Such negative impacts are understood to be partly the result of market failures that hamper efficient market allocation [4]. The accused market failures are usually externalities, missing markets, public goods, and inadequately assigned property rights. It is understood that by, solving the problems of market failures, inefficiencies and thus sustainability problems would disappear. Hence, to facilitate a sustainability transition it is key to at least reduce market failures. Accordingly, a great deal of research has been undertaken in this regard and initiatives have been created to provide solutions. Initiatives such as the Economics of Ecosystems and Biodiversity (TEEB) [5, 6], The Economics of Land Degradation (ELD) [7], and Carbon Trading Schemes [8–10] deal with the valuation of the environment or components thereof to internalize them in newly created markets [4].

Economics textbooks cover more than these market failures, so one may wonder whether other market failures impact sustainability as well; if so, they also need to be studied and addressed. The two market failures and their relationship with sustainability that have not yet been studied to the same extent as the ones above are asymmetric information

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and market power. These two market failures are connected and, in practice, cannot be separated [11, 12]. Nevertheless, the following discussion is dedicated to market power and its relationship with sustainability and thus a sustainability transition.

An Industrial Organization[1] textbook defines market power as "the ability to set prices above costs, specifically above incremental or marginal cost, that is, the cost of producing one extra unit" [13]. This definition has not only limitations due to its focus on prices, it is also limited as it does not indicate how market power is generated [14]. The provided definition could lead one to the conclusion that market power is easy to identify. Though, this is not the case. Yet, while market power is difficult to measure [12, 15–18], there are indications of increasing market concentration [4, 12]. An IMF [17] study showed that, in advanced economies, markups across industries have been rising [19–22]. In reality, the assumption of perfectly competitive markets is a condition that hardly ever applies. Accordingly, the markets are hampered in their function to efficiently allocate goods and services. As Lipsey and Chrystal [4] pointed out, all companies have some degree of market power and "for this reason, no real market economy has ever achieved anything even close to perfect allocative efficiency." And Cabral [13] states that successful companies have to maintain their market power. Thus, even if market power issues were not on the rise, the fact that market power is the norm rather than the exception and a sign of entrepreneurial success, calls for an analysis of the relationship between market power and sustainability. Research needs to clarify if and how market power contributed to sustainability issues in positive and negative ways.

While market power should be inhibited by governmental intervention to reduce inefficiencies and the thereby created societal damage [4], market power seems to also have positive impacts. Interestingly, market power and its effect on natural resources has been discussed before. Hotelling showed in 1931 that monopolies are good for the environment, as they slow down resource extraction [23]. Since then, this relationship has been studied extensively [24–33]. However, all of those studies have been inconclusive, so it cannot generally be stated that market power has a positive effect on resource preservation.

This discussion is not the only one that would attest to market power having a positive effect. Some argue that market power supports innovation, which in turn may not only increase efficiencies,[2] but is often also understood to be a cornerstone to achieving sustainability [35–37]. This debate about market power and innovation, kindled by Schumpeter [4, 38], can also be found in transaction cost theory, where market power is accepted if it supports efficiency [39]. The focus on efficiency is of course born out of the basic economic ideas that cherish the elegance of the market economy to create efficient allocation of goods and services. One can speculate as to how far such perceptions on the positive effects of market power have contributed to the continued rise of market concentration and to a possible reconsideration of such views due to the increasing problems that result from this development [40]. While market power has received less attention as it was mostly seen in the light of efficiency gains [41], the topic has received more attention in the last years [42, 43]. Indeed, the discussion is not limited to big tech [44, 45]. Big pharma [46, 47] or agribusinesses are cases that have been criticized already earlier [48, 49].

Market power and sustainability are clearly related and, given the rising relevance of market concentration and that of sustainability, the relationship needs to be studied. Despite the obvious connection between market power and the environment, as uncovered by Hotelling, comprehensive research is lacking. While research does investigate the relationship between market power and resource depletion, as noted above, sustainability is more than resource depletion. The nexus market power, innovation and sustainability would also indicate the need for further research. However, an explicit research agenda in this regard seems to be missing. This latter nexus indicates another important point: market power is more than markups, firm size, or market share. Themes that are related to market power that also relate to sustainability need to be included in research endeavors.

Market power is not a simple concept, but neither is sustainability. Despite the ubiquitous use of the term, there is considerable debate about what it really means. Which dimensions should sustainability encompass [50–55] and how should the dimensions relate with each other? Can one trade parts of one dimension with parts of another one, or are they all of equal importance [56–59]? Another core aspect of sustainability is inter- and intragenerational equity. Although sustainability concepts usually do encompass both aspects [51], there is no consensus on how to deal with these aspects [60–62].

While some have argued that sustainability should not be defined more precisely [63], we argue that it should be because any analysis will deliver different results depending on the sustainability stance taken. Thus, even if a

[1] Industrial Organization is an economics sub-discipline, specifically looking at ways firms compete (see [13]).
[2] Inefficiency itself can also be understood to be unsustainable. See Ref. [34].

universally accepted definition cannot be found, researchers need to be clear about the sustainability understanding applied for their analysis. Hence researchers need to make an explicit normative decision when their research is conducted and disseminated. Clarity pertaining to the normative stance taken is relevant as it will determine the commensurability or incommensurability of sustainability and market power. However, this paper does not focus on normative questions, but rather outlines possible research avenues connecting market power ad sustainability. Sustainability is complex and, as will be shown below, market power is too. If one combines two complex matters, the result can be expected to be even more complex. For that reason, we are not claiming that this is a complete discussion of the relationship between market power and sustainability. The humble aim of this paper is to show that a long-overlooked research field needs to be studied further. It needs to be highlighted that understanding the relationship between market power and sustainability is key to understanding whether market power can support or hinder a sustainability transition.

While we are not intending to provide a definition of sustainability, we want to point out that sustainability is used in two different ways for this analysis. Firstly, sustainability can be understood as an end itself. This means that sustainability is pursued for the sake of sustainability, rather than for some other goal. Second, sustainability can be understood as an instrument. In that case, sustainability is not pursued for the sake of sustainability, but rather to pursue some other goal, such as profit. Some business literature does address the instrumentalization of sustainability, taking a rather *positive* perspective on this instrumentalization. It is presented as a business strategy to increase profits [37, 38, 64–66]. Ideas proposed in such literature are in line with win–win–win rhetoric, where sustainability creates profits for business, people, and the planet.

The remainder of the paper is structured along the identified potential research avenues. The first one is to understand the co-occurrence of market power and sustainability issues as a coincidence. Next, we introduce the nexus of innovation, market power and sustainability. This is followed by two research avenues that have either market power or sustainability as a starting point for investigations. Finally, another nexus is introduced; policy, sustainability and market power. The introduction of these research avenues is concluded by a discussion section.

2 The avenue of (un)fortunate coincidence

The first possibility to study the relationship between market power and sustainability is to understand the connection as a (un)fortunate coincidence. Hotelling's observation is the oldest known reference to the market power sustainability nexus [23, 67]. Reflecting on Hotelling's work, Solow [67] made an observation that amused him: "There is an amusing sidelight here. It is not hard to show that, generally speaking, a monopolist will exhaust a mine more slowly than a competitive industry facing the same demand curve would do. […] The amusing thing is that if a conservationist is someone who would like to see resources conserved *beyond* the pace that competition would adopt, then the monopolist is the conservationist's friend. No doubt they would both be surprised to know it" [67]. It is flabbergasting that monopoly power may support the preservation of resources. However, it needs to be underscored that this is just a coincidence.

There is a difference between consciously preserving a resource or this merely being a fortunate coincidence. The fundamental rationale in both instances is the same: to increase profits. It is interesting to note that research connecting market power and sustainability (resource depletion), which is a well-established field of study, tends to describe the serendipity of market forces rather than the connection between market power and sustainability. It is a fortunate coincidence that, with market power in place, the fishing stock may not be overexploited. While one could understand this as a verification of the elegance and sophistication of the market system and the invisible hand, it needs to be pointed out that studies in this regard are inconclusive. For example, Fischer and Laxminarayan [27] showed that market power may lead to an under-exploitation of resources in one area, but to an over-exploitation in another one due to spillover effects. van der Ploeg and Withagen [31] found that competition is better for preserving resources, while Gopinath and Wu [24] showed that monopoly is better for the environment. Accordingly, it is a risky strategy to leave sustainability to a fortunate coincidence. While more research about these coincidences is needed, it is more important to investigate ways to guide our society towards sustainability by conscious (business) decisions.

3 Innovation—market power—sustainability

Another main research stream is the nexus between innovation, market power and sustainability. Innovation is not the same as an invention, nor does one condition the other. An innovation is a groundbreaking change or novelty, but an invention does not need to be groundbreaking [68]. Innovation does not only pertain to technology and can be related to all aspects of life. For example, business models [69], social systems [70], or supply chains [71] can be innovative. Thus, an innovation can be about how things are organized, whereat this innovation exhibits a fundamental improvement of the previous situation.

We live on a planet with finite resources. Human existence depends on the provision of these finite resources, so the continuity of humanity depends on the management of these finite resources [51, 72]. The human population continues to grow and lifestyles are becoming increasingly resource-demanding, so the challenge of managing the limited resources is becoming more pressing [3, 73–76]. Hope has been put in innovations, most notably technological innovations, to minimize resource depletion and environmental pollution. This hope is not unfounded.

Innovations do not need to support sustainability. Leach, Rockström [77] argued that innovations need to be directed in order to tackle sustainability issues. Schaltegger and Wagner [78] stated that sustainability innovations need entrepreneurs who strive to positively contribute to sustainability. They also argued that sustainability innovations call for radical innovations that create completely new markets and present a disruption for producers and consumers alike [see also: 64]. According to the research by Schaltegger and Wagner [78], such radical innovation is more likely for start-ups and small businesses. Best [38] concluded that sustainability can trigger innovations that may lead to competitive advantages, a perspective also taken up by Laszlo and Zhexembayeva [64].

Thus, sustainability issues are not understood as a burden, but as an opportunity. Companies need to deal with the reality of dwindling resources, of consumer demand for sustainable products and production processes, created by awareness raising campaigns of NGOs and the like [64, 79, 80]. Innovation is understood to be key in successfully dealing with this reality. *Successful*, in this context, does not refer merely to whether sustainability issues are *solved*, but also to the financial performance of firms. Thus, solving sustainability issues by companies is not interesting for the sake of sustainability, but is for profitability reasons [37, 64, 66]. Firms may want to pursue a sustainability business strategy as it is a promising strategy to increase profits.

This suggestion fits well with industrial economics textbook wisdom, where market power is presented to be the cause for firms investing in ways to (further) improve their profits [12]. The connection between innovation and market power has prominently been discussed by Schumpeter. Next to the argument provided by Hotelling, Schumpeter does also provide arguments for a positive relationship between market power and sustainability via the vehicle of innovation [38]. There is no agreement whether Schumpeter's theory regarding disruptive innovation is correct or not [81, 82]. Nevertheless, it does tie nicely into the strategy suggested by Laszlo and Zhexembayeva [64] pertaining radical innovation, which should be disruptive in nature [see also: 37]. It may not have been intended as such, but the book *Embedded Sustainability* by Laszlo and Zhexembayeva [64] can also be read as a guide on how to increase market power using sustainability. According to Laszlo and Zhexembayeva [64], this is because nothing needs to change pertaining the logic of our market economy, when their suggested sustainability business strategy is applied.

Profit maximization is understood to be the basis of firm behavior [10, 12]. Sustainability can either be understood as a challenge to profits or as an opportunity to increase profits. Laszlo and Zhexembayeva [64] explained how the sustainability challenge can be used as a business strategy to harness profits, arguing that sustainability should be understood as a competitive advantage, a strategy not to bolt onto, but one that is embedded into the company [37]. Laszlo and Zhexembayeva [64] present their strategy as a "set of new profit drivers". Accordingly, the strategy is not limited to innovation, although innovation is a key aspect of how a company can successfully respond to sustainability issues.

4 Market power and sustainability

According to Laszlo and Zhexembayeva [64], there are seven responses to the sustainability challenge that can create profit for the respective firm: (1) risk mitigation, (2) efficiency, (3) differentiation, (4) new markets, (5) brand image, (6) standards, and (7) innovation. Laszlo and Zhexembayeva [64] present their ideas in the book *Embedded Sustainability:*

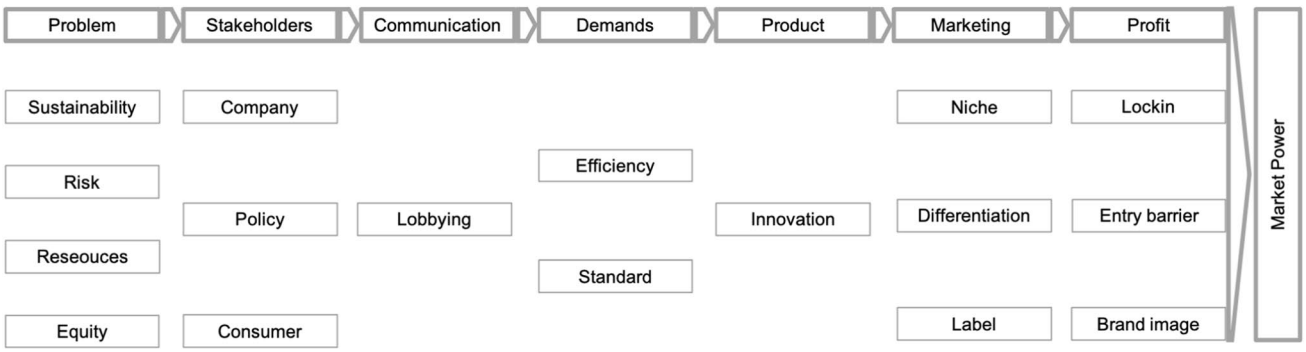

Fig. 1 Sustainability triggers market power. From recognizing a specific sustainability problem to demanding product improvements, to marketing the improved product, to generating above-average returns

the Next Big Competitive Advantage. This work builds on Porter's work and refers, for example, to the relevance of differentiation. The book by Best [38] does as well indicate a connection to Porter's work. Best [38] focuses on technology management and on technological innovation as an endogenous variable to economic growth. For this analysis, it is relevant to point out that the last chapter of Best's [38] book outlines the economic growth opportunities that the sustainability challenges provide. Translated to the business level, these opportunities are captured in the sustainability challenges listed by Laszlo and Zhexembayeva [64].

The seven responses listed by Laszlo and Zhexembayeva [64] should drive down costs and increase profits. Compared with the industrial organization literature [12, 13], one can see that these responses play a key role in market power research. Belleflamme and Peitz [12] specifically dedicated three chapters to the *sources of market power* (part III): product differentiation, advertising and marketing strategies, as well as consumer inertia. Cabral [13] discussed themes such as product differentiation, innovation, networks, and efficiency. Other chapters in the book by Belleflamme and Peitz [12] deal with market segmentation, branding, and innovation. In Porter's work market and industry structure are key factors that determine the potential profitability of a business [83]. Market structure is commonly part of market power estimations [84–86]. Thus, it can be argued that the responses brought up by Laszlo and Zhexembayeva [64] are common themes within market power research. Accordingly, these responses not only support the profitability of companies, but may also give rise to market power. Hence, to analyze the relationship between market power and sustainability, one should not only look at markups, but also at other aspects of market power.

As analytical lens to study the connection between market power and sustainability, two different starting points can be chosen from; market power or sustainability. These starting points are introduced below.

4.1 Sustainability as a starting point

Above it was indicated that sustainability can be viewed as an instrument. This section focuses on sustainability as an instrument to predominantly serve business interests. Sustainability can be seen as the trigger for actions [37, 64, 66]. Sustainability is a complex issue that comprises at least three dimensions, with inter- and intragenerational relevance. Sustainability issues need to be perceived; otherwise they will not be considered [87]. Sustainability is not perceived in its *entirety*, and instead different stakeholders perceive different problems that are all part of the sustainability issue. Each stakeholder will find different sustainability issues relevant and then push to address these issues. Civil society and politicians may want to address sustainability issues through some sort of regulation or standards. While this may also be an avenue for companies, they may as well strive for increased efficiency realizing that the resource base is dwindling. Figure 1 illustrates the chain of actions, starting with sustainability issues and the cognition of these issues by stakeholders.

Companies need to react to the problems they are facing in order to stay in business (see in Fig. 1 items below "problems"). Sourcing, production, processing, logistics, sales and products need to be adapted to align with changing circumstances. This is the response to a recognized problem as described by Laszlo and Zhexembayeva [64], which ideally leads to an innovation (see in Fig. 1 "product"). In order to profit from the innovation, it needs to be merchandized. From a marketing perspective, an innovation is, in the first instance, a means to differentiate. The differentiated product needs to be labeled and/or offered on a niche market (see in Fig. 1 "marketing").

The successful marketing of the innovation is a crucial step. If a company cannot demand a premium price for the innovation, it may not invest in its development [79]. The competitive advantage of the innovation can also be realized

by lobbying for industry-wide standards to profit from the first-mover principle [12, 88]. It is not only companies that use lobbying or other communication channels and tools. NGOs and civil society groups may also lobby for sustainability standards, and may even create the demand for sustainable products. It is the task of innovative companies to foreshadow such developments, have the demanded products ready and communicate the availability through labels. Companies may not only be able to increase profits, as they can ask for a premium for their innovative product, but may even be able to demand a higher product price due to their market position.

Reacting to circumstances may put companies in the position of a first mover, being the only company providing a specific demanded good. This position can be enhanced through entry barriers, which can be installed through patents, for example. Other options are lock-ins, tying consumers to the innovation by providing specific products that only work with the new product or creating path dependencies. Another means of tying consumers is through brand image, which also makes it possible to ask a higher product price (see in Fig. 1 "profit").

Therefore, we argue that the responses introduced by Laszlo and Zhexembayeva [64] happen at different stages. First, a firm needs to be aware of a problem that could pose a risk to the business operations. Based on this recognition, a company must craft a solution (the innovation), which must then be monetized in order to be a viable business strategy. Therefore, following a sustainability business strategy is not only palatable because it can be profitable, but also because it can create, enhance and/or solidify market power.

It is beyond the scope of this article to discuss all stages and elements of Fig. 1 in detail. A detailed discussion would exceed the space that one paper offers, so we leave this to future research. Nevertheless, in the following, each element is outlined briefly.

The mechanisms that connect market power and sustainability cannot be singled out. A successful sustainability business strategy will need to make use of a compound of elements. In fact, depending on the innovation, the innovation alone may not generate excess profits. The innovation may only generate a competitive advantage on its own if efficiency gains and costs reductions are large enough. If this is not the case, research needs to investigate innovations in concert with additional abilities of a respective company to increase their profits. Communication is a key factor here and relates to lobbying, standards, labels, or brand image (marketing). Further, the capacity to create dominance on a certain market will matter. Will a company be able to install entry barriers or create lock-ins or path dependencies?

Whether these mechanisms are positive or negative for sustainability depends on the goals of the respective company applying them. For example, entry barriers can hinder startups from successfully marketing new technologies that are more sustainable [89]. On the other hand, entry barriers, such as those created by patents, can be positive as they can be an incentive for companies to undertake the necessary investment to develop new products [46]. However, patents can lead to societal welfare losses caused by the created market power [90, 91]. Moreover, patents can create lock-in effects [92]. Depending on the product, this may or may not be desirable from a sustainability perspective. A lock-in may cause path dependencies, prohibiting new and potentially better technologies from being developed and marketed [89, 93, 94].

Another interesting complex is related to communication, ranging from lobbying to branding. Specific communication tools cannot be singled out because they are usually connected as part of a larger business strategy. For example, the introduction of standards and labels can be influenced by lobbying. Standardization allows the harmonization according to specific criteria. A standard can apply to processes as well as to behavior (such as a code of conduct, or supply chain governance). Thus, standards are not only limited to technology, but can help regulate social aspects of life as well. A well-known example that links sustainability, with lobbying, standardization, and market power is that of DuPont. Having an alternative ready, DuPont lobbied in 1991 for the phasing out of chlorofluorocarbons (CFCs), which put them in a favorable market position [95]. Cozier [96] and Puller [97] provided a couple of examples of companies influencing decisions pertaining to standards. These examples illustrate not only that companies lobby for the reduction or delay of standards, but also the opposite. Increasing standards can provide a competitive advantage for companies that have technology ready [98]. Such strategic disruption aims to increase competitor's transaction costs [99, 100]. Hence, a sustainability strategy can increase or consolidate a company's market share.

Labels and standards do not have to be initiated by governmental regulations; they can also be businesses' or industries' strategies to harmonize production processes [101] or satisfy consumer demand [102]. Standards and labels are not only a means of communication, but also a means of securing market share [103]. Henson and Reardon [101] argued that, in the agri-food sector, competition shifted from a mere price to a quality (label) competition. They further pointed out that standards are not only a means of communication, but also a means of differentiation.

Product differentiation is a strategy for making a product stand out on a respective market based on its product characteristics and aims to trigger consumers' specific taste. The more a product differentiates itself from alternatives, the more market power the respective company may obtain [13]. One aspect through which products can be differentiated

is sustainability. There are numerous sustainability characteristics, which are usually communicated through labels. To profit from this differentiation, the performance pertaining to a specific label matters less than simply using a label [104].

The label itself is not only a means of differentiation, but also a way to generate market power. Having or not having a specific label can influence a company's revenue. The endeavors to create one's own label are explained by their intention to circumvent difficult eligibility processes and differentiate on a respective market [105]. Differentiation can also be a means of exploring alternative markets as a reaction to changed circumstances. Oberling, Obermaier [89] investigated the differentiation endeavors of oil majors as a reaction to the call for alternative fuels. They also highlighted that those already in power will determine the path ahead. Regulations can cause product differentiation, which can then also lead to price distortions [106]. This is a clear case where the quest for more sustainability causes market power. The case study presented by Purnomo, Guizol [107] is an example of a private label, which is a means of differentiation, creating an entry barrier and thus giving rise to market power considerations. Differentiation is a clear example of how the demand for more sustainable products can generate market power issues.

Standards and labels can be entry barriers, thus contributing to market power issues. Greenberg [108] analyzed the South African wine value chain and indicated the importance of sustainability standards for the sector. Any company that is not able to comply with minimum standards cannot participate in the market. Additionally, particularly in fragmented markets, transaction costs for labeling are too high and, thus, also forecloses small players [109]. In this respect, the sustainability challenge, which leads to the demand for sustainable products, and the introduction of sustainability standards, both represent entry barriers. Vos and Boelens [110] analyzed the effect of private standards in the water industry, consolidating market power. Some of these standards are not due to the sustainability challenge but rather reasoned by tractability.[3] Still, companies use standards and certifications to satisfy the demand for more sustainable products. While smaller companies may be at a disadvantage pertaining to labeling and standardization costs, compliance becomes even more important for large companies. Gulbrandsen [80] elaborated the reason for eco-labeling, finding that it is not demand, but NGOs' power to name and shame that leads companies and retailers to apply private standards. Moreover, NGOs target big companies as leverage, rather than small ones [111, 112]. Market power related to labels is interesting because it illustrates vertical power structures. Foley and Havice [113] analyzed the Marine Stewardship Council (MSC) eco-label, originating from the Unilever company and initiated by World Wildlife Fund (WWF), which lost part of its market power due to the decision by Walmart, the world's largest retail chain, to also support other labels. A similar case was reported by FAO [114] in the banana sector. Thus, market power on one level can be mediated by market power on another level.

Finally, corporate social responsibility (CSR) makes up another avenue for future research to investigate the relationship between sustainability and market power. CSR can be understood as a form of lobbying or, how Lock and Seele [115] put it, "politicized CSR". Companies' benevolent actions can be ascribed to their CSR activities, which can be marketed to support the company's reputation. Edson, Fernandes [116] reported from a bank that invests in CSR to increase its brand value. Hicks [117] indicated a connection between firm size and the likelihood of engaging in CSR activities, pointing out that larger companies are more likely to take up CSR activities because they do have the financial means to do so. The relationship between national governance and CSR was highlighted by Schleifer [112], who found that internationally operating companies diverge their CSR efforts depending on the respective country. It is argued by Schleifer [112] that consumer's preferences influence a company's incentive to invest in CSR. Thus, in developing countries, consumer preferences lead to reduced CSR efforts. This finding opposes the notion that companies would take over governmental responsibilities and instead indicates that companies intend to respond to consumers' demands. Hence, CSR may mostly be a means to improve a company's reputation and thus its market share.

4.2 Market power as a starting point

The second starting point for an analysis of market power and sustainability is market power. The aim of this paper is not to give a normative perspective on the relationship between market power and sustainability. However, it can be stated that market power might be questioned altogether from a strong sustainability perspective as it is not in line with equity.[4] This is subject to future discussions. Instead of a normative discussion, we attempt to deliver an analysis of the

[3] In the highly complex commodity chains of the global market, standards can be used to simplify the complexity [120].

[4] Equity refers to the social dimension of sustainability. Taking a strong sustainability stance, anything that is based on and/or creates inequality should be avoided. Market power is based on the unequal distribution of (tangible or intangible) assets and is therefore not in line with equity.

potential relationship between market power and sustainability. If one does not question the system as such, but merely looks at how market power can support or hinder the implementation of certain sustainability measures, then the key aspect is the potential lever of a company with market power [65, 118].

Sustainability is again understood as a business strategy, but now the focus is on how the application of such a strategy affects and is related to sustainability as a goal. Whether or not a company takes up a sustainability business strategy depends on factors such as the goals of the respective company. Thus, nothing can be stated in general regarding whether market power has a positive or negative effect on sustainability. However, what is the result for sustainability if a company with market power applies a sustainability business strategy? Obviously, a company with market power has a larger lever to impact sustainability goals in one or the other way. This explains why NGOs specifically target large companies with their campaigns. They try to either cooperate with them [79] or name and shame them [80, 119, 120]. Either way, the goal is to harness their leverage.

The lever of companies works within a respective market structure [119]. This structure and the power one actor has over the other actors within this structure may increase the lever. The market structure and how companies can make use of this market structure affects the lever. One can distinguish between horizontal and vertical market structures, both of which can exhibit various forms. Gereffi, Humphrey [121] provided a comprehensive discussion on how companies can control value chains depending on the respective chain structure.

The abuse of market power is prohibited by anti-trust legislation, which also covers the abuse of market power horizontally (collusion) as well as vertically [122–124]. Harnessing market power through market structures is also a balancing act. A company may need market power to control the value chain (vertical), but it may not need market power to cooperate with other firms on the same level (horizontal).

The control over the value chain is also relevant for sustainability [119]. If a company decides to make use of the sustainability business strategy, it will be easier to implement sustainability measures along the value chain if the company has control (power) over it. A prominent example in this regard is Walmart. The impact of a large multinational company greening its entire supply chain is larger than when a comparatively smaller company does the same [65, 103]. Unilever represents another example with ambitious sustainability goals. One of its best known initiatives is the MSC label, which the company installed together with the WWF. Despite being criticized for various reasons, this label has become the most important standard in the fishing industry [125].

Freidberg [126] argued that the power of companies is not sufficient to change sustainability along the value chain as companies may not have the necessary means (such as knowledge). While that may be the case, it does not override the potential ability of companies with market power to affect sustainability; instead, it points out that other factors are relevant too. However, this is the case for any response to sustainability issues and this makes up the difference between successful and unsuccessful companies. Not every company will be able to innovate and profit from this innovation. Those that are able to do so increase their chances of establishing, increasing, and/or solidifying market power [127]. This may be a reason why companies invest in sustainability issues without the immediate ability to market it. Companies are aware that sustainability has become a sales argument and investments need to be undertaken to maintain their market position [22].

Horizontal cooperation (legal or illegal) may not require the participating companies to have market power. Horizontal cooperation may not only refer to practices such as price fixing, but also to the establishment of industry-wide standards. The Chicken of Tomorrow initiative represents such a case. In the Netherlands, retailers (as well as suppliers) agreed to establish an industry-wide minimum standard for broiler chicken. Interestingly, despite the potential positive effect on animal welfare (as an example of a sustainability issue), the Dutch competition authority did not allow the initiative to continue due to market power issues [123, 128]. A company with market power can indirectly *coerce* the industry to adhere to its private standard. If a company is large enough and has enough influence, other companies will have to catch up [120, 125]. Another option is that a company with market power lobbies for (or against) an industry-wide standard issued by the government [97]. Thus, there are different avenues a company can take in reference to horizontal structures.

5 Policies—sustainability—market power

Finally, a potential avenue for research is the nexus policies, sustainability and market power. Governmental intervention may be necessary in order to support the sustainability transition. The market economy cannot be separated from the socio-political environment in which it is embedded. Thus, analysis of the relationship between market power and sustainability should also cover the role of policies. Indirectly, this relationship has already been discussed above by

referring to lobbying, as well as standards, or granting of patents. Policies may lead to unintended side effects, such as increasing market power and undermining sustainability.

Policies aiming to improve sustainability may have the opposite effect to what is intended, since higher prices can lead to lower adoption of (more) sustainable practices and the lower purchase of (more) sustainable commodities [129, 130]. This shows that just internalizing costs, through higher prices may not be sufficient to solve a specific sustainability problem. Such examples show that policy makers must be careful when formulating environmental policies as they may create unintended effects that countervail environmental protection. Hareau [131] described lower adoption of biotechnology due to price mark-ups caused by the market power of multinational corporations in the seed industry. The sustainability of genetically modified plants is another discussion [132]. However, assuming a general case of the development of more sustainable agricultural technologies, low adoption due to price distortions would affect sustainability negatively. Governmental intervention may not always be the most efficient way to achieve a certain goal. The socio-economic system is complex and the ways in which it works is often disguised. Therefore, thorough analysis of policies to support sustainability is required. Another interesting example of governmental intervention gone wrong was reported by Reinert [133], who examined how the Finish government wrecked the traditional Finnish reindeer industry.

In some cases, governmental support is needed to support sustainability. In fact, the absence of governmental regulation can be a hindrance to the quest towards sustainability. While EU and national anti-trust regulations aim to ensure that market power is disabled, they can pose a hindrance to sustainability initiatives. This has been showcased by two initiatives in the Netherlands. Energie Akkoord in the energy sector and Chicken of Tomorrow in the food sector are initiatives that support industry-wide sustainability. However, both initiatives intended to integrate several players within the sector, making them cases for anti-trust legislation. Finally, neither initiative was allowed to continue due to market power issues [123]. Competition law can present a hindrance to sustainability initiatives and has recently been put on the agenda of EU institutions [134, 135]. It can be concluded from this that if an industry intends to change practices industry-wide, standards need to be enacted by governments in order to avoid infringing on anti-trust legislation. Thus, the two above-mentioned cases also represent instances in which legislation is slower than industry in terms of making considerable changes towards sustainability. It was indicated above that large companies can indirectly install industry-wide standards due to their market position, which forces other companies to go along [125]. Further, large actors in particular are often expected to regulate quality through the installation of standards [126]. Thus, there is a paradox, where individual powerful companies can indirectly install industry wide standards without any legal consequences. In contrast, if this happens through cooperation among companies, it is a case for anti-trust legislation.

6 Discussion

This paper showed that market power and sustainability are connected in various ways. Market power and sustainability are increasing in importance and are both complex matters. Sustainability has received wide attention in the scientific community but also in the political arena or in civil society. Due to recent discussions around big tech, big pharma or agribusinesses market power has as well attracted more attention. Though, this attention is only slowly penetrating into the scientific community. While many people are aware that sustainability is complex, market power is often believed to be limited to market share and firm size. This is not the case, as explained in Biely, Maes [14]. We believe that there is a need for a new research area that investigates the connection between those two complex themes. The complexity does not allow simple answers. While aspects of market power are interrelated, analysis will have to focus on some of these aspects. It will also be necessary to connect findings to avoid losing sight of the bigger picture.

Since market power and sustainability are connected in various ways, market power does also affect a sustainability transition. No general statement can be made, whether market power inhibits or supports a transition since this depends on many factors. One such factor is how sustainability is framed. How does a sustainable future look like? Can market power be part of this future after all? All potential research avenues presented in this paper are relevant for a transition towards sustainability. Are we putting a blind eye to power imbalances, since market power may coincidentally lead to resource preservation? Do we need market power for sustainability innovations? Or are innovations suppressed by powerful companies? How are powerful companies influencing or even orchestrating a sustainability transition through lobbying, standardizations, brand image or the creation of entry barriers? Are policies further solidifying market power and by that unintentionally inhibiting a sustainability transition? Would powerful companies or the (illegal) collaboration among companies be faster and more efficient in propelling a sustainability transition?

In this paper we have addressed some relevant avenues for research as well as two potential starting points. However, the presented avenues are not a complete list, and the avenues are not discussed in full depth. For example, each item illustrated in Fig. 1 would need further research. In the same section we have referred to Porter [83] and Best [38] who use different approaches to competitive advantage research; market-based and resource-based. Placing either focus on market power and sustainability could also be investigated further. As there are different approaches to competitive advantage research, there are as well different approaches to market power research and models. A review of market power estimation models in relation to sustainability issues could be another interesting endeavor. Further, attention needs to be given to the social dimension of sustainability and the connection to market power. The question of systemic stability and resilience in the context of sustainability and market power would also provide options for future research. Normative questions also need to be addressed. This starts with the selection of a sustainability concept (such as weak or strong). Results will differ depending on the chosen sustainability concept.

The title of this paper calls to establish a new research agenda analyzing the connections between sustainability and market power. It needs to be highlighted that this would need to be an interdisciplinary quest. Thus, this is not a research avenue that should be investigated by economists alone. Hence, another research avenue would be to investigate the scientific fields that could contribute to this interdisciplinary research agenda and which methods could potentially be employed. The complexity of both themes requires comprehensive analysis. Market power clearly transcends the economic sphere, and sustainability is about more than economic sustainability and it is more than just an instrument.

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