

Greening the Supply Chain at a Distance. Interlinkages of Waste Policies and Green Supply Chain Management in the EU, Japan and the United States

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Abstract

The research framework proposed here aims to analyze the interrelations between environmental policy measures and the ecological activities of companies along their supply chains. The underlying assumption states that companies should play a key role as co-regulating actors in the context of new modes of governance and product-oriented environmental regulation. Taking the example of waste management in the EU, Japan and the United States the question will be addressed whether the regulative framework can considerably influence companies’ “Green Supply Chain Management” (GSCM) and which appear to be the most promising strategies in this regard.

First, it is assumed that product-based policies are especially effective in tackling negative externalities along the entire life cycle. Secondly, it is stated that against the background of a number of extremely hard-to-manage environmental problems, an effective instrumentation of environmental policies and product policies in particular necessitates the mobilisation of third actors for regulatory strategies. The active role of such co-regulating, non-state partners along the supply chain shall help to overcome the shortcomings of hierarchical steering for a large number of globalized environmental problems. Research in corporate GSCM has, however, so far rather neglected the role of regulation and especially disregarded a differentiated analysis of single policy measures.

Regulatory measures from waste policies in the EU, Japan and the U.S will be chosen as practical examples. A special focus will lie on regulations for end-of-life-vehicles, packaging waste and electric and electronic waste. The research design proposes to apply a qualitative comparative methodology in order to detect best practice examples and thus better understand the theoretical interlinkages between environmental regulation and GSCM. Analyzing the role of third parties it will also contribute to recent questions of environmental governance. The empirical gap with regard to the detailed effects of environmental regulation on GSCM is supposed to be closed at least for the field of waste policies.

1. Introduction

During the past years environmental policy strategies with a focus on product regulation have gained substantial importance. Integrated Product Policies (IPP) or Sustainable Consumption and Production (SCP) have become keywords in a changing debate about how to deal with hard-to-manage, “persistent” environmental problems. Since knowledge about the environmental damages of certain product groups has also grown (cf. Tukker et al. 2006), product regulations are considered a promising approach for integrated policy measures. By focussing on products these strategies hope to adopt an all-encompassing approach without shifting the burden from one environmental medium to another. Products are seen as control points for the struggle against negative externalities along all phases of the life cycle (Dalhammar/Mont 2004).

Such considerations about product-oriented environmental policy are taking place against the background of an intense discussion about new steering modes for policy under the heading “governance instead of government” (cf. Blumenthal/Bröchler 2006; for product policies Scheer/Rubik 2006). It is assumed that the multitude of challenges for the problem-solving capacity of traditional, centralist environmental regulation necessitates the mobilisation of helpers’ interests (Prittwitz 1990) in order to solve those problems which cannot be addressed via traditional steering logics.

Given completely globalized material flows, supplier and customer relations this problem becomes especially virulent in the field of product regulation. Therefore, different conceptions of a modern “regulatory state” claim that the state ought to withdraw from certain tasks because an authoritative societal fine tuning does not correspond to the changing perception of how the state should fulfil its regulatory tasks (cf. Levi-Faur 2005). Proponents of a lean state regard the government’s lack of detailed knowledge as hallmark and at the same time core problem of its capacity problems. In other words: If the state wants to organize an overall environmental modernisation, it must gain sufficient knowledge about production processes, technological trajectories and behavioural logics along the entire supply chain. Since such a universally informed regulator is hardly realistic, less interventionist steering modes are regarded as suitable in the context of new governance. These in turn depend highly on the willingness of private actors to provide critical information for sustainable policy formulation like emission data, marginal abatement costs or technological options, and on their willingness to take regulatory action themselves (De Bruijn/Norberg-Bohm 2005). The role of non-state actors thus changes from a pure regulatee to a virtually co-regulating actor: “The free market as an institution is not a sphere of freedom from the state but a mechanism encouraged by the state to allow it to manage “at a distance” a complex process it cannot directly govern” (Slater 1997).

This idea of the state having developed to a primarily cooperating actor, and of governance taking place in almost post-hierarchical spheres should not be uncritically shared (cf. Töller 2007). However, this research is based on the assumption that, not only in product-oriented environmental policies, economic actors along the supply chain must play a decisive role for the redefinition of governmental activities. Consequently, modern environmental policies

should “harness these third parties as surrogate regulators” (Gunningham et al. 1999). A number of strategies in environmental policy in the sense of “smart regulation” like the US 33/50 programme or the XL initiative aim at better relationships between agency and regulated companies (cf. Fiorino 2006; Mackendrick 2005). The assumption underlying this work is therefore not that of a „semi-sovereign state“ (Katzenstein 1987). Quite the contrary: The state can and should play a crucial role in order to instigate green corporate activities along the supply chain.

This *Green Supply Chain Management (GSCM)*, its practical examples and its drivers have been analyzed by a number of empirical and theoretical contributions (exemplarily Laming/Hampson 1996; Sarkis 2006; Zhu et al. 2007). However, given the aforementioned discussion about changing modes of governance we can hitherto detect a twofold deficit in environmental research. *First*, this research design presumes that political science research has until now not sufficiently analyzed the interlinkages between policy and GSCM. *Second*, it is argued that also on an empirical level – this applies primarily to management science literature – research on the effects of policies on corporate GSCM has been insufficient. Those studies that did indeed analyze these interlinkages were mostly restricted to a rather aggregated level (cf. Zhu/Sarkis 2006) or an analysis of a narrow set of instruments like LCA (cf. Crotty 2006; Frankl/Rubik 2000; Zhu/Sarkis 2006). The design sketched here aims at closing this gap. Taking the example of waste management two general questions will be answered:

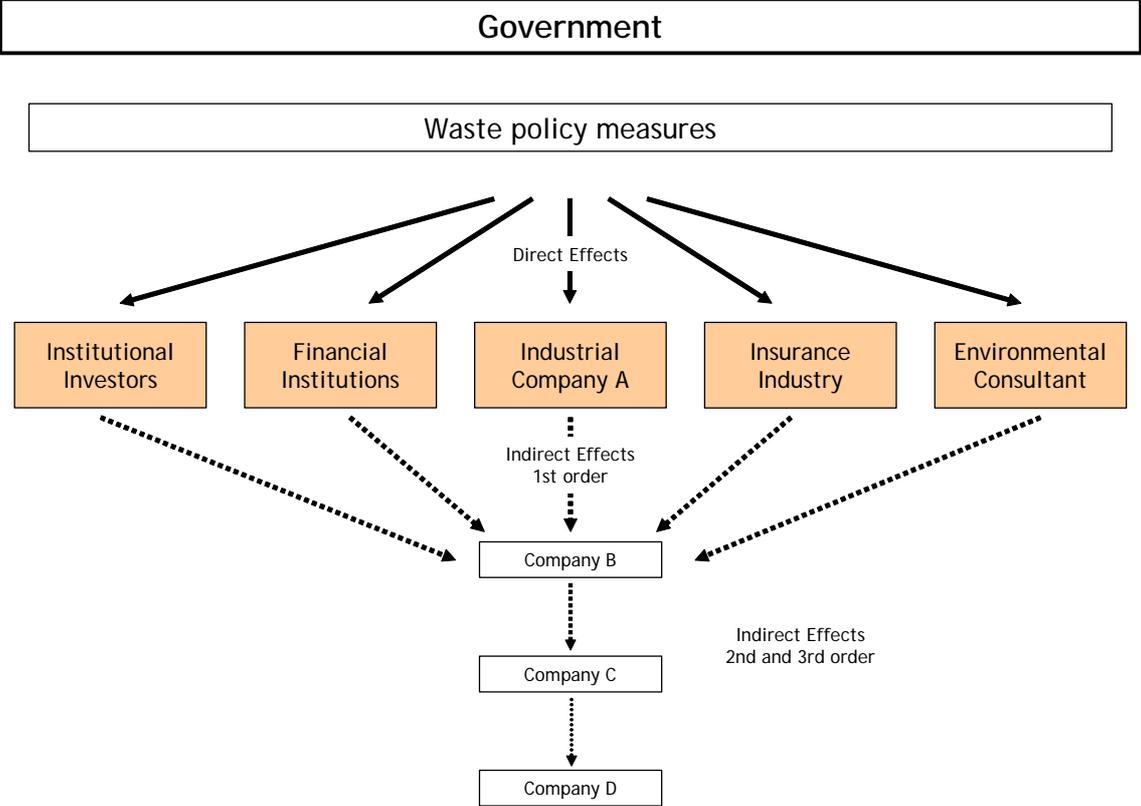
- 1) Which effects of waste management strategies on GSCM are being defined as policy goals and are consequently incorporated in the respective measures?
- 2) Which GSCM measures are actually applied on a corporate level in response to political initiatives?

Analyzing the subject from two angles – regulator and regulatees – intends on the one hand to find evidence for the actually perceivable policy effects on GSCM from an ex post perspective (*question 2*). It will furthermore contribute to the control of political goals by contrasting the actual effects with actors’ original intentions (*question 1*). Methodologically I propose a qualitative comparative design, carrying out expert interviews with actors from waste management in three jurisdictions: EU, Japan and the U.S. A major part of the empirical research will be to detect causalities between policies and GSCM through direct contact with relevant actors in the supply chain and on agency level. Here a standardized questionnaire design with a large number of cases could be prone to create misunderstandings in certain cases or fall short from reality because certain actors lack specific knowledge. There would, e.g., be no guaranty that the responsible purchasing manager in a company has actually initiated certain GSCM practices with a supplier, or whether he is only managing practices that were started in the past by someone else. A qualitative design allows to correct mistakes in data gathering at an early point in time.

Figure 1 gives a preliminary overview of the underlying logic. Five different actors along the supply chain are identified, focussing on those that seem relevant for the proposed research and are subject to waste policy strategies (cf. Gunningham et al. 1998): Institutional investors,

financial institutions, industrial companies, insurances companies and environmental consultants. Direct effects are expected to act upon these chosen actors. It is also expected that these actors will take GSCM measures under the regulatory framework being set up by the direct

Figure 1: Schematic Depiction of the analyzed effects



effects. These measures (indirect effects in the figure) act upon further actors in the supply chain, here indicated as company B, C and D.

The remainder of this paper is organized as follows. The following chapter will discuss the term GSCM and reasons for its applications on a corporate level. The next chapter briefly describes the theoretical framework forming the research’s background by deriving the complex of environmental governance and taking into account the connections between policy and GSCM. The methodological considerations are then discussed together with the selection of cases.

2. Green Supply Chain Management (GSCM)

The following section analyzes the term *Green Supply Chain Management* (GSCM) in comparison with the behavioural logic of the firm. It also analyzes the preconditions under which economic actors show support for ecological innovations along the supply chain.

Which varieties of *Green Supply Chain Management* can be identified? Theyel (2006) distinguishes between three different forms of mutual influence along the supply chain:

- sharing environmental requirements (such as purchasing requirements, employee training, ISO-14000-certification)

- sharing environmental information (new product samples, regulatory updates, best practices)
- improving environmental aspects of products and processes (new product samples, regulatory updates, sharing personnel and equipment to co-developing recyclable products and cleaner processes)

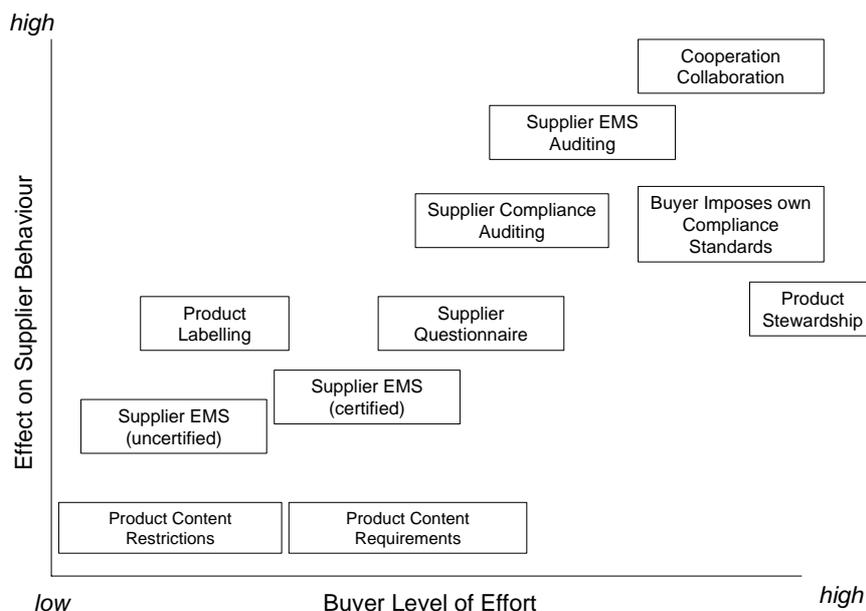
Lamming and Hampson (1996) propose five types of GSCM instruments: questionnaires, environmental management systems, life-cycle analysis, extended producer responsibility and institutionalised cooperation. Hamner (2006) however, argues that solely green corporate purchasing cannot be equated with a real ecological commitment of the firm:

Suppliers can produce „greener product“ without necessarily becoming green themselves [...] The German ban on textiles dyed with azotropic dyes has caused thousands of textile producers to change their dyestuffs to more ‘friendly’ types but has generally not caused them to reduce pollution or improve their environmental management practices, yet this is what is necessary for a sustainable supply chain (Hamner 2006: 27).

Hamner himself creates an encompassing typology of GSCM strategies in companies, which consists of 11 elements and shall be used as a theoretical basis for this work. He distinguishes first after the expected effect on the supplier’s behaviour and then tries to show how much effort the customer firm will have to employ (see *Figure 2*).

Regarding the question why firms should engage in GSCM a number of arguments can be derived from literature. Bowen et al. (2006) mention several reasons for the potential benefits GSCM could have on society, companies and corporate purchasing. In their view the advancement and diffusion of ecological practices and life cycle approaches in industry are a

Figure 2: Green Purchasing Strategies



Source: Hamner 2006

benefit for society. The company itself would profit from cost reduction, a better risk management and better products and services.

Lamming und Hampson (1996) mention cost reduction and a secure supply as beneficial for the whole corporate purchasing process. An intensified collaboration between companies can insofar be useful in terms of risk minimization – the ecological capacities in companies rise through the collection, analysis and diffusion of new information about resource use and emissions. (De Bruijn/Norberg-Bohm 2005). Hall (2006) makes a similar point by stating that firms invest in environmental innovations along their supply chains in order to evade the risks coming together with their suppliers' bad environmental performance. In a society being more and more sensitised for sustainability aspects, a focus on ecological aspects in product design becomes important especially for firms operating close to the customer. The application of LCA or eco-labelling is a prominent feature of this development (cf. Fussler/James 1996; Mackendrick 2005; Rex/Baumann 2007).

Accordingly internal and external factors can be identified for the adoption of GSCM in companies. With regard to the abovementioned stakeholders four different groups can be distinguished (Henriques und Sadorsky 1999):

- regulatory stakeholders, who have the power to regulate themselves or who can exert power on political actors to regulate
- organizational stakeholder (customers, suppliers, employees, shareholders)
- community groups (environmental organisations and those that can mobilise the public against a company)
- media

The view of the firm has, however, changed insofar as the cost argument and the stakeholders' pressure are not anymore regarded as sole drivers for the establishment of GSCM activities. While the neoclassical firm follows no altruistic motive to reduce its external effects on the environment, based on Porter's and others' works this perspective has to some extent changed. This changed perception can partly be explained by the presence of companies that do not only comply, but actually overcomply with regulations. A continuum proposed by Drumwright (1994) takes into account these potential differences in environmental attitudes. Drumwright's continuum ranks companies with a clear commitment to socially responsible behaviour (so called *type I* and *II*) to those companies that only adopt ecological purchasing criteria because of strict cost-benefit assumptions (*type III* und *IV*). Tomer und Sadler (2007) transfer this differentiation of strategies and behaviour to the political level. They see a new generation of highly successful companies arising, which have internalized a strong environmental performance as part of their corporate strategies and which should be supported by environmental policies. Fiorino employs a similar argument in his conception of "new environmental regulation" (2006), criticizing the until now adversarial, "one size fits all" style in environmental policies. This traditional environmental regulation targets especially the laggards among companies, while there are only few incentives to leap forward for companies showing an already high environmental performance.

These findings and their implications for a new conception of environmental regulation should nevertheless not lose focus on the premise that a company's primary motivation is still

the maximization of corporate value. Without doubt sustainability aspects can play a prominent role in corporate strategies – it would be careless to deny this fact given the rising number of companies which openly communicate their sustainability performance. However, referring to Gunningham et al. (2003) it is assumed here that behavioural management motives are one, but not the only driver for overcomplying with standards. There is always an interplay between internal and external variables. The next section will shed light on the role of regulatory drivers in this determination framework.

3. Policy and GSCM in the context of „new“ governance

In order to analyze the regulatory influence on corporate Green Supply Chain Management, we should first of all clarify the conception of the term governance underlying this research framework. Afterwards potential forms of influence by environmental policy instruments will be shortly discussed.

In its usual application the term “government” describes first and foremost top-down steering processes with superior authority within the state (i.e. law making and sanctioning). In contrast “governance” as intended here means the fulfilment of public tasks by public *and* private actors (cf. Dose 2006). Consequently governance is less discussed as a complete renunciation of hierarchical steering modes, but as an addition through “the whole range of institutions and relationships involved in the process of governing“ (Pierre/Peters 2000). A broad understanding of governance is employed which encompasses hierarchical governmental policies as well as flexible and voluntary approaches in co-operation with non-state actors.

Regulatory instruments are important in the context of a transition from government to governance as traditional and modern steering modes are mirrored in certain types of instruments. Accordingly traditional command-and-control environmental regulation is characteristic for “government”, while the adoption of “new” steering instruments is supposed to symbolize forms of “governance” (cf. Jordan et al 2005). Thus, regulation effectively serves as a proxy for governance, because the choice for regulatory instruments reproduces its core characteristics (Braithwaite et al. 2007; Jordan et al. 2005). Levi-Faur accordingly calls regulation “an art and craft of governance” (Levi-Faur 2005).

Given these considerations the regulation of the supply chain by third parties is to be understood as another category of governance – a privatised form of governance which assumes that private actors’ ability to steer can under certain circumstances be superior to that of the state (cf. Mackendrick 2005). The idea of restricted governmental ability to regulate and to solve problems seems to be especially virulent when looking at so-called persistent environmental problems. This applies to those problems that not only appear to evade technological options, but are furthermore characterized by an especially hard-to-manage, socio-economical problem structure which makes finding win-win solutions virtually impossible (cf. Jänicke/Volkery 2001).

Two objectives have to be pursued in the light of these assumptions about co-operative rule-making and successful regulation of GSCM. On the one hand we need more knowledge about the internal behavioural logic of the firm. Johnstone (2007) states that many analyses of envi-

ronmental policy measures regard companies as a “black box“, including the assumption that companies will always react in the same way. Secondly, as was already mentioned, the view on inter-firm utility functions have to be adapted. The neo-classical view considers the firm to be an “amoral calculator” (Kagan/Scholz 1984), complying to regulatory standards only in case the costs of non-compliance are higher. This assumption, however, falls short of the reality in the light of a sanctions regime that can hardly be labelled flawless (cf. Gunningham et al. 2005). It should be further elaborated in order to be able to explain the behaviour of those companies that actively try to overcomply and enhance their environmental performance.

Against this background Gunningham et al. (2003) – based on Roome (1992) and especially Prakash’s study about internal factors – stress the importance of an interaction between external and internal variables for corporate environmental performance.¹ Accordingly, external variables include the regulatory style in the respective jurisdictions (regulatory license), economic factors (economic license) and societal pressure (social license). Another variable concerning behavioural aspects in the firm (Environmental Management Style) is supposed to act as a sort of filter for external pressure. Hutter and Jones (2007) present similar findings. They identify two sources of non-state regulation, i.e. economic and civil society pressure. According to Hutter and Jones, the economic dimension comprehends industry and trade associations, private consultancy firms, the insurance industry, lawyers, private standards and self regulation/best practice. The civil society comprises professional associations, scientists, advocacy and pressure groups, external accreditation agencies, assurance schemes, consumer NGOs, the public and the media (Hutter/Jones 2007: 32ff.). Hutter and Jones’ empirical work follows insofar the findings of Gunningham et al (2003) as state regulation is still said to exert considerable influence on corporate risk management. The relative influence of economic and civil actors is, however, heterogenous, while consumers’ influence is supposed to be high in contrast to a varying influence of private consultants depending on a firm’s size. Media’s and NGOs’ influence on corporate risk management appears to be rather indirect, while the lawyers’ influence is said to be low.

Similarly to these considerations and based on the work of Hood et al (2001), Hutter (2006) analyzes the role civil society actors (NGOs, standardization organizations, professional organizations) and economic actors (companies, insurance companies, external auditors, and consultancies) play in the context of non-state regulation. The author states that non-state actors can have comparative advantages in standard setting as well as behaviour modification (cf. Hood et al. 2001). This is said to be due to the economic actors’ competence advantages in information collection and in the definition of flexible and targeted standards, but also the behaviour-modifying role of civil society organizations, who help to guarantee a broad societal representation in the rule-making process. Nevertheless Hutter also refers to the effectiveness problems of pure non-state regulation, which makes an interplay, co-regulation or regulatory mix of state and non-state actors necessary. An often cited example for the lack of sanctioning power in self-regulating systems is the free-riding problem in regimes like the Chemical Industry’s “Responsible Care”-initiative (cf. King/Lenox 2000).

¹ Banerjee et al (2003) discover similar findings on the basis of company surveys.

Following these assumptions, private actors indeed follow an ambitious strategy for higher environmental performance under certain internal and external framework conditions. How can the exact role of policies in the supply chain be defined under these circumstances?

Table 1 provides an overview about political actors' possibilities to support the respective actor groups from figure 1 (institutional investors, financial institutions, industrial companies, insurance companies, environmental consultants) in their GSCM efforts either intentionally or as a measure's side effect (cf. Gunningham et al. 1998; Gunningham et al. 1999; Hutter 2006; Hutter/Jones 2007). Thereby, following the typology of Henriques and Sadorsky (1999), the focus is on regulatory and organizational stakeholders. The basic idea of this research can be briefly depicted taking the example of disclosure requirements, which seem to be a promising initiative according to the given context. Measures like the Toxic Release Inventory in the United States (Graham/Miller 2005), the Indonesian *Program for Pollution Control, Evaluation and Rating* (PROPER) (Blackmann et al. 2000), or the *GreenWatch-Programme* in China (Wang et al. 2004)² appear to be suitable approaches to evoke ecological effects along the supply chain. The logic is simple: These programmes' outcome are not only better environmental performances in the firm itself (cf. Foulon et al. 2002; Blackmann et al. 2000) – capital markets, customers and insurers also react to the publication of environmentally relevant data (cf. Hamilton 1995; Lanoie et al. 1998).

Table 1: Policy measures and potential effects on GSCM

Institutional Investors	Financial Institutions	Industrial Companies	Insurance Companies	Environmental Consultants
<ul style="list-style-type: none"> - Disclosure Requirements for Companies - „Community-Right-to-Know“-legislation 	<ul style="list-style-type: none"> - strict liability legislation - ensure that companies report about their environmental performance on a regular basis 	<ul style="list-style-type: none"> - ecological product labeling schemes covering aspects up and downstream of the supply chain - Producer Responsibility along a product's life cycle - Green public procurement - Resource Taxation close to the source - Product and Process standards (requirements for eco-design) - strict liability legislation - ecological public innovation initiatives 	<ul style="list-style-type: none"> - High standards as well as long-term orientation and predictability of regulation, making it possible for insurers to orientate along easily calculable risks - Mandatory insurance for licensing 	<ul style="list-style-type: none"> - Subsidies, tax exemptions, easier licensing, preferences in criteria for public procurement in case of regulatory environmental audits. - Incorporation of independent environmental auditing in coregulatory arrangements

The overview in Table 1 shows that this research does not apply a one-sided instrument focus. It assumes that “hard” as well as “soft” instruments can produce the postulated effects. Accordingly, environmental policy research has mainly given up the focus on single instruments in policy analysis (cf. Jänicke et al. 2000). The empirical work should therefore not focus on

² See in this context also the diverse emission registers in different jurisdictions like the EPER in the European Union or the NPRI in Canada.

single instruments but take into account entire programmes and bundles of measures in waste policies.

4. Methodological Considerations and Case Selection

The following section describes the selection of cases and the applied methodology. It will also provide a brief overview about the characteristics of waste management and its relevance for this work.

Waste

The objectives of this research will be analyzed in an area which seems to fit well to an analysis taking into account the entire supply chain: waste management.

Steering material flows encompasses a broad field of environmentally problematic issues. Mass production and consumption especially in developed countries have led to a dramatic decrease of non renewable natural resources, extensive degradation of soil and water and a large number of other serious environmental problems. The opportunities to landfill municipal waste are naturally restricted, and general concerns about hazardous substances increase. Despite a decrease in the amount of waste per capita in some countries and regions the absolute global amount of waste rises dramatically – a process that has gained even more speed with countries like China, Brazil, and India catching up economically. Inefficient production processes and unsustainable product design are being accompanied by increasing consumption rates on a global scale.

Against the background of the observable trends in current consumption patterns the European Commission expects global resource use to quadruple if we continue to follow existing consumption patterns (COM 2005). Another problem concerns a too strong dependence on resource imports, which is being addressed by calls for less resource use through ecological product design and higher recycling and reuse rates for waste.

Consequently waste policies are more complex than the search for how to reuse, recycle or landfill hazardous and non-hazardous substances. Located at the top of the hierarchy of sustainable waste management is the reduction of material flows – waste policies are thus also resource policies. In this light the German waste legislation following Community laws has developed more and more to an all-encompassing material flow and resource protection legislation (SRU 2004). The reduction of waste volume is primarily meant to be based on a reduced resource use. Furthermore the importance of waste as an industrial resource by recycling and reusing has to be strengthened.

This research framework proposes to focus on three product groups within waste management:

- electric and electronic waste
- end-of-life-vehicles
- packaging waste

These can be labelled three of the central problematic areas in waste policies (SRU 2000; Töller 2007). Following the aforementioned questions about interlinkages between policies and GSCM this design also proposes to concentrate on waste regulations in three regions of the world: the European Union, Japan, and the United States. Comparing these three jurisdictions it should be possible to derive differences, conditions for success and best practice. This does not mean to perform a pure performance analysis of the respective approaches to material flow regulation. The objective is to be able to understand the aforementioned claims about the benefits of promoting GSCM in the observed cases. Concretizing the original general objectives this will pose the following questions:

- Which approaches of life-cycle oriented waste policies do the three jurisdictions follow?
- Which objectives and intended effects of the respective waste policies can be identified concerning the influence on corporate green supply chain management?
- Which forms of GSCM can be identified at the level of the regulatees in waste policies, i.e. the economic actors along the supply chain, as a reaction to the political strategy?

Methodology

In order to answer these question the research should follow a method of qualitative comparison. The comparative method allows to draw general conclusions in case statistical methods seem impracticable due to a restricted number of cases. Comparing allows to generate general statements of higher validity. Based on Mill and referring to Lijphart (1975) two basic comparative approaches can be identified: the method of difference and the method of agreement. These basic types have been elaborated by Przeworski and Theune, differentiating between a *most similar system with different outcome-Design* (MSDO) and a *most different system with similar outcome-Design* (MDSO). In general the comparative method is suitable for analyses with medium-N cases. This design, however, proposes to restrict the focus on three cases by analyzing the EU, Japan and the U.S. Comparative case studies with a small number of cases (2-4) and a higher number of variables allow only restricted systematic analyses with strong causal relationships. This research design therefore proposes to follow a “most similar systems with different outcome” design (Przeworski/Theune 1970) with comparable case studies. Consequently cases should be compared which show fairly similar context conditions but which vary in the independent and thus the dependent variable. By comparing three cases in contrast to a single case study more findings about the interplay and causalities between policy and GSCM may furthermore be expected. The possibility that the EU, Japan and the U.S. are dealing with waste policies in a completely identical way can be excluded (*see below*). Insofar a variation in the different political framework conditions, waste policies und therefore the independent variable will lead to better knowledge about which environmental policy measures are really suitable to influence the GSCM of economic actors. Thus it will also be possible to identify best practice examples in international comparison.

The EU, Japan, and the United States as the world’s leading economic powers are characterized by an above average high level of welfare, measured as GDP per capita. and a high de-

gree of industrialization. All regions are, however, confronted with the negative implications of non-sustainable consumption and production patterns for the supply with necessary resources and the subsequent disposal of wastes. Indeed the regions show in parts strongly diverging characteristics on the parliamentarian-presidential axis or the degree of federalisation. In addition, decision making structures in the EU's multi-level governance system cannot be easily compared with that of nation states. Nevertheless, these macro variables will be neglected in this research design because of a strong focus on policy outputs and its effects on strategic corporate behaviour. The political system's context variables and the socio-economic background are in this respect considered constant and homogenous. The independent variable will be set as waste policy measures in the respective countries. The dependent variable will be defined by the economic actor's activities in *Green Supply Chain Management* that can be identified as reactions to the respective policies.

Data shall be collected in form of expert interviews with members of those groups having been identified in the main research questions – regulators and regulatees. In order to identify the intended effects of the analysed policy measures specialists from regulating authorities shall be surveyed. To analyze the actual effects along the supply chain interview partners from firms playing a key role in the supply chain will be chosen. This will include institutional investors, insurance companies, industrial companies, financial institutions and environmental consultants. It will be especially interesting to choose companies with global supplier and customer relations in order to shed light on the effectiveness of national policies in dealing with globalized value chains.

Waste policies in the EU, Japan and the U.S.

Against the background of their high economic stage of development the EU, Japan as well as the U.S. are exposed to a rising burden of conventional solid and hazardous waste. In all three regions waste policies have developed to a field of environmental concern with top priority, and regulating agencies are trying to solve the problems with a number of different strategies and regulatory initiatives. In the EU the Commission has recently presented a number of reasonably concrete proposals in its Thematic Strategy for Waste Prevention and Recycling (COM 2005), in Japan the so-called 3R programme remains high on the agenda, while in the U.S. model projects for sustainable waste and resource management are rather adopted on a state level. However, there are differences in these approaches concerning focal points and the choice of regulatory concepts (Jofre/Morioka 2005; Sachs 2006).

Regarding the oft-cited principle of extended producer responsibility (EPR) in waste management Japan, the EU and the U.S. are following different routes. In the past years and especially in the regulation of electrical and electronic substances the EU has established a relatively strict systems of producer responsibility, taking as an example the Directive Waste Electrical and Electronical Equipment (WEEE) or the Restriction of Hazardous Substances Directive (RoHS), the effectiveness of both being however not uncontested (Sachs 2006). A comparable, coherent policy approach can not be found in the U.S., at least not on a federal level. Nevertheless, a number of states has adopted similar rules. California, e.g., adopted a regulation of hazardous substances in 2003 (Electronic Waste Recycling Act) clearly based on

the European RohS directive. However, regulatory approaches in the U.S. in general mainly focus on a rather non-binding Product Stewardship approach (cf. Nicol/Thompson 2007; Sheehan/Spiegelman 2006) which does not necessarily apply stringent recycling quota and thus often abstains from strict objectives. Japan, whose high population density creates a higher necessity to find alternatives to landfill, adopted a far reaching bundle of measures for sustainable waste management with its so called 3R programme (Reduce, Reuse, Recycle). The 3R programme comprises concrete targets for the development of resource productivity until 2010 as well as clear reduction targets for indicators like the development of municipal waste per capita. Economic instruments like public procurement are combined with command-and-control measures for EPR like strict take-back obligations. Due to its explicit multitude of used instruments the Japanese approach is of special interest for the analysis of waste policies' GSCM effects. Altogether we can easily detect different foci in the EU, Japan, and the U.S. when it comes to design waste policies. This is the reason why these three cases have been selected for closer scrutiny.

5. Expected Results

The research will yield new findings about the effects of environmental policy instruments in general and of waste policy measures in particular. Analyzing the role of third parties in regulatory strategies it can contribute to recent topics of environmental governance. The empirical gap about the detailed effects of environmental regulation on Green Supply Chain Management is to be closed at least in the field of waste policies. The focus will be on the question to what extent environmental regulation is indeed capable to exert an influence on strategic corporate environmental behaviour.

The results of this research will shed light on the success of different waste policy measures in three different political and regional contexts, thus making it possible to draw lessons for the design of best practice policies. In so doing the research will be able to formulate suggestions for the future design of environmental policy and its conditions for success in a context of changing governance structures.

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