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## Managing Big Cities

Action nets for waste prevention

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# Action nets for waste prevention

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## Abstract

Although waste prevention is considered the best possible option in the European waste-hierarchy model, it is not always clear what is meant by “waste prevention”. This chapter presents three cases of waste prevention, selected to illustrate the variety of these practices: a waste-management company selling waste-prevention services, the opportunity for Swedish householders to opt out of unaddressed promotional material, and a car-sharing program. The analysis is informed by an action net perspective, focusing on the way organizing comprises connecting actions, often prior to or in conflict with networking among actors. Through each of these examples, we demonstrate how waste prevention depends on specific physical artifacts and infrastructures and is the result of specific ways of connecting actions. In conclusion, we emphasize that waste prevention rests on the emergence of new modes and patterns of interactions that both build and disrupt the existing institutional order of consumption. We also stress that waste prevention as it is discussed in this chapter is not a step forward in the European waste hierarchy but constitutes a break with the traditional notion of waste management.



## Introduction

According to the European waste directive (The European Parliament and the Council of the European Union 2008/98/EC), waste policy in the Member States of the European Union is to be organized according to a waste hierarchy. This model ranks waste-management options from best to worst, with waste prevention being the best possible option, followed by re-use, recycling, incineration with energy recovery, and landfilling (Article 4.1).

The rationale for the waste hierarchy includes, among other things, the goal of making consumption more sustainable by reducing the use of resources (Preamble 6), supporting the use of recyclates (Preamble 29), and reducing greenhouse gas emissions originating from waste disposal on landfills (Preamble 3). The Commission stated that “Waste prevention is closely linked with improving manufacturing methods and influencing consumers to demand greener products and less packaging” (European Commission 2014). More generally, the purpose of the waste hierarchy is to prompt new forms of engagement with waste that reorganize material flows at the precommodity and postcommodity phases of production (Corvellec and Hultman 2012).

The Commission defines waste prevention as:

... measures taken before a substance, material or product has become waste, that reduce: (a) the quantity of waste, including through the re-use of products or the extension of the life span of products; (b) the adverse impacts of the generated waste on the environment and human health; or (c) the content of harmful substances in materials and products (European Commission 2008/98/EC).

This definition brings two major aspects of waste prevention to the fore: prevention of waste generation and prevention of harm through waste (Arcadis Belgium 2010). Specific to consumption are eco-labels, awareness campaigns, the development of incentives for clean purchases, and the promotion of the reuse and/or repair.

Despite the definitional efforts of European Union authorities, the contours of waste prevention remain blurred. In practice, waste prevention is a broad endeavor that can refer to any of the lifecycle phases of a product or service: design, extraction, production, distribution, use, waste, and end-of-waste (Arcadis Belgium 2010). The best waste-prevention initiatives identified by the European Pre-Waste research project differ widely; they range from the optimizing of packaging for organic food products, to the re-use of furniture, the promotion of decentralized composting, an eco-taxation on disposable plastic bags, and the introduction of washable diapers in the nursery, the development of water dispensers, and information about municipal services (Pre Waste 2010).

Many definitions of waste prevention remain debatable. Composting is part of the definition in some countries but not in others. Waste prevention includes

re-use because it is performed on non-waste; the preparation for re-use is not considered prevention, however, as it is performed on waste – although it is often next to impossible to distinguish between the two (Arcadis Belgium 2010). It is not possible, therefore, to define waste prevention once and for all, not least because definitions of waste are fluctuating and contextual, despite the European Union's harmonizing attempts. The absence of a clear definition is probably beneficial, considering that many innovative solutions may be yet to come. But even an advocate of diversity must not stop exploring the rationale behind certain waste-prevention initiatives.

The exploration is performed in this chapter with the help of an action net perspective, where action nets are understood as assemblages of collective actions, connected to one another because they are perceived, within a given institutional order, as requiring each other; or, if new, because they are perceived as effective means of accomplishing a goal that lies outside the present order (Czarniawska 2004).

The choice of this perspective is motivated by the goal of moving beyond the ABC (attitude, behavior, choice) model of social change toward sustainability, which dominates the present understanding of social change for environmental transitions and sustainability (Shove 2010). Rather, we demonstrate that waste prevention involves the connection, re-connection, and disconnection of various collective actions, either according to patterns dictated by a given institutional order or in an innovative way (Czarniawska 2010). Waste prevention requires and encourages the construction of new action nets, and/or the reconstruction of existing ones. Effectively connected action nets may stabilize into networks or formal organizations; others may prove temporary. In this way, waste-prevention action nets both build and disrupt the existing institutional order of consumption.

The three empirical examples have been selected to illustrate our claims and the variety of practices in the field: a waste-management company selling waste-prevention services to its waste-producing customers, the opportunity for Swedish householders to opt out of unaddressed promotional material, and a car-sharing program. The first example focuses on waste that relates to the consumption of producers, a relatively neglected topic; the second curtails an existing action net rather than constructing a new one; and the third is an example of an initiative that is spreading globally.

Before beginning our analysis, however, a closer look at the concept of action nets is necessary.

## An action net perspective

The concept of action nets (Czarniawska 2004) originates in a combination of new institutional theory (Powell and DiMaggio 1991) and actor-network

theory (Latour 2005). From new institutional theory, it borrows the insight that it is possible in every time and place to speak of a prevailing institutional order, in the sense of an arrangement of institutions that dictates which actions, by convention, should be tied together. In the current institutional order, for example, producers are supposed to try to sell their products, and people with money are supposed to save or invest it. From actor-network theory, the concept of action nets borrows the idea that connecting actions into nets requires the translation of different actions into others, and stabilizing requires the work not only of people, but also of objects. For example, waste collection in residential areas in Sweden presupposes that residents take their containers to the curbside, that waste collection companies provide adequate vehicles, and that they follow announced collection routes and schedules.

The chronology of an action net perspective is the opposite of the chronology assumed by a conventional network perspective. From an action net perspective, the analysis begins earlier than actor-network theory would suggest, and decisively earlier than the mainstream network theory suggests. According to traditional network theory, actors come first, networks come second, and actions in the network come third. From the action net perspective, actions come first; networks come second (this is where actor-network theory comes in; Latour 2005); and actors, in the sense of such established and recognized units as formal organizations and associations come third. Rather than speaking of actors, actor-network scholars have noted, it is therefore better to speak of “actants” – that which accomplishes or undertakes an act (Greimas and Courtés 1982). Actants can be individual humans or collectives; they can be artifacts created by humans, such as a machine or a protocol; or they can be natural things such as a molecules or animals. This choice of words emphasizes a shift in attention from established actors – who are, in fact, networks – to their origins as humble actants. It caters to the fact that not all actors are constituted as such at all points in the organizing process. It is through the actions they perform successfully that actants become actors; otherwise they remain objects of someone else’s actions. It is also from their actions that actors derive an identity. Nobody is born a waste-service provider; but anybody can become one by performing the type of activities associated with a waste service. What matters is the proven ability to act that way.

The term “net” provides a signal that the focus is on connections among actions rather than actors. This focus does not deny the existence of networks of actors, of course; there are a great many actors, from private cliques to large corporations. The point of an action net perspective is to capture organizing at an earlier stage, when things still need to be done, long before powerful actor-networks present themselves to an admiring audience. Actions in action nets are like threads woven or knotted together. If successfully stabilized, they hold in ways that resist tractions and pressure to forces of deformation and displacement.

The action net perspective belongs to processual approaches that focus on organizing (see, e.g., Hernes 2008), designed in contradistinction to essentializing



approaches that focus on organizations. Action net perspective targets “what is being done, and how this is connected to other things that are being done in the same context” (Czarniawska 2004). The purpose is to track the process of organizing within organizations and across organizational borders.

The nature of connections between actions is as varied as the human imagination, but it always consists of translating the conditions of one collective action into those of another. It can be a matter of mutual adjustment. Recycling centers may hold extended open hours during the Easter weekend, for instance, to accommodate the fact that many individual home owners use that weekend to clean their gardens for spring. Or the connection can rest on the introduction of a new artifact, as when waste-management companies ask householders to sort food waste in special paper bags or when refill fountains are installed in shops so people can purchase detergent by filling their own containers. Connections can be established by individual human action, as when charities collect second-hand items door to door; or they can be mediated by long chains of actants, human or non-human. Such connections must be maintained and, in the case of innovative action nets, perhaps even defended against institutionalized options.

The connecting of actions also requires that actants involve themselves in sensemaking (Weick 1995, 2011) of each other’s actions, attempting translations (e.g., Callon 1986; Latour 2005). Translations can thus be understood literally, as talking together and explaining intentions to one another, but also non-linguistically, in the sense of transforming one action into another at the connection point. A great deal of linguistic translation is clearly involved: from one type of specialist vocabulary to another and from one language to another. But perhaps the main point is the translating of actions into one another – by coordination, for example (containers are brought to the curb on the day the collection vehicles arrive).

Once the connections between actions have been made and the entire action net is in place, this connection must be stabilized and maintained in good shape (Lindberg and Czarniawska 2006). When relationships among actions are not only stabilized, but also a normative and cognitive fixity (that is, they can be justified in an appropriate vocabulary and taken for granted), they will become the basis for actors to acquire character (“he is a pioneer of waste prevention”) and allow them to build networks (“No need to change those providers; we can rely on them.”)

Not all connections between actions will become stable, however, and a researcher’s interest in an action net lies in showing whether or not and how ongoing processes of organizing practices build stable relationships (Lindberg and Walter 2013). Another aspect of the construction of new action nets is the extent to which such innovative nets draw upon, adapt to, or change the existing institutional order.

## Three examples of waste prevention

In what follows, the action net perspective has been used to analyze three cases of waste prevention in Sweden. The first case is the only example of corporate waste discussed here; it focuses on the production stage – a waste-management company selling waste-prevention services to its waste-producing customers (NSR, Helsingborg). The second case concerns household waste: an attempt at waste prevention by providing the opportunity to opt out of unaddressed promotional material (“No advertising, thank you” signs) offered to Swedish householders. The third case is a car-sharing program (Sunfleet, Sweden) that illustrates the construction of an alternative pattern of consumption. The concept is globally spread, but we focus on a local example.

### Waste-reduction services

NSR is an advanced solid-waste management company co-owned by six municipalities in the Northwest Scania region of Southern Sweden, and as such it is responsible for waste-collection and waste-treatment services in the entire region. NSR is one of the major biogas producers in Sweden; a producer of biofertilizers; and, more generally, a company with competence in biological treatment, waste characterization, recycling, and landfill research (NSR 2013).

Since 2007, NSR has offered tailored waste-reduction and waste-prevention services to waste-producing companies. This offer required the construction of a new action net, which in turn required the creation of incentives. Larger companies or companies with environmental goals were offered a comprehensive waste-management contract, with personal contact, proximity to services, and an overview of the waste-management situation (NSR 2011) – thus, an entrance to a network. Smaller companies were offered effective management of waste streams, with custom waste collection and proximity to efficient service (NSR 2011) – thus an invitation to join the action net. Moreover, NSR provides hazardous-waste consulting services to businesses throughout the region, offering the services of its chemists and safety advisers in the classification and handling of all categories of hazardous waste, with the exception of radioactive waste (NSR 2007). The offer of waste-prevention services is part of the mission given to NSR by its owners (Helsingborg Stad - Kommunfullmäktige 2012), part of its business model as a waste-management company (Corvellec and Bramryd 2012; Corvellec, Bramryd, and Hultman 2012), and a way for the company to innovate in order to climb the waste hierarchy (Corvellec, Zapata Campos, and Zapata 2013) and contribute to the sustainability of consumption.

Several action nets had to be initiated and coordinated earlier in order to give life to these prevention services. NSR had to canvass waste producers within its geographical zone of activities; proceed to systematic and standardized waste analyses in order to assess the kind and quantity of waste delivered by

waste producers with an interest in these services; design custom-made waste-management solutions for the materials in this waste, identifying how to process and where to sell them; collaborate with the waste producer to redesign its internal material management processes to reorient material flows from waste to recycling; and introduce economic incentives for waste producers to enter a waste-reduction program, while maintaining its own profitability. In order to connect their actions to those of NSR, waste producers must integrate NSR's view into their material processes designs – translate those designs so that they fit this view. They need to redesign their work processes to replace nonrecyclable material with material that NSR can recycle; install dedicated waste and material containers to sort their key waste streams by volume, worth, and toxicity; and introduce incentive schemes to promote and monitor the internal waste-prevention policy – sharing the savings with employees, for example. Many of these actions have been undertaken in common by representatives of each company; but many other actions have been taken by NSR and waste producers with their own suppliers and customers.

NSR and vegetable wholesalers have developed a separate collection and processing system for unsold vegetables. Instead of being mixed with other waste, unsold vegetables are pressed; the water they contain is drained off into wastewater, nutrients are collected in a form pure enough to be fed directly into NSR's biogas production chain, and only the packages become waste. This press reduces costs for wholesalers by reorienting their waste toward the wastewater-management system and increases their income by connecting the remaining material to energy production; the new action nets are acting on both ends of the economic value creation process.

In the case of a local thermal insulation manufacturer, NSR analysis led to ways of reprocessing by-products to turn them into a filling material that can be sold, rather than their ending up as an inert material in an expensive landfill. It is noteworthy that this waste-prevention action net played a key role in the decision to maintain the thermal insulation plant when the international head office had decided to terminate one of three similar plants in other European locations. Establishing a new action net prevented this actor from being reduced to an actant with undetermined identity and an uncertain future.

A press for unsold vegetables and a machine to upgrade waste into filling material are both highly visible stabilizers, of the connections that have been built to establish waste-prevention services. But no less important are the less visible connections upon which NSR's waste-prevention action net depends: common definitions of waste and materials; agreements on collection frequencies; and, more generally, a shared view of the relevance of thinking in terms of waste prevention. There is more than the visible to action nets.

## “No advertising, thank you” signs

The second case involves an action net that grafts itself onto an existing action net in order to reduce the latter. In 1993, the Swedish Royal Postal Agency (now called Posten AB), the Swedish Consumer Agency, and the Association of Swedish Companies (SWEDMA) agreed to work together to address the issue of direct marketing. This agreement provided Swedish householders with the opportunity to opt out of unaddressed promotional material from door-to-door mail distributors by simply placing a “No advertising, thank you” sign beside their mailbox or letter slot. Because the original sign did not stop civic information such as bus timetables, information from political parties, or free newspapers from being distributed, householders were given the opportunity to post a “No free newspaper” sign by their mail slot. They can also refuse addressed advertising by listing themselves at a central register. Likewise, private individuals can register centrally to indicate that they do not want direct marketers to telephone them. (Konsumentverket 2013; Svensk Direktreklam n.a.).

The limiting of advertising has been an established policy to reduce the consumption of such products as alcohol, tobacco, and prescription medicines, even if the impact of advertising on aggregated demand may not be significant for either drinking (Wilcox, KyunkOk Kacy, and Schulz 2012) or smoking (Capella, Taylor, and Webster 2008), and people may be neutral on the appropriateness of advertising medicine (Miller and Waller 2004). A public ban on advertising can also be a means of protecting specific groups such as children from obesity (Dhar and Baylis 2011). In this case, however, it was not a matter of a public ban, but of a multipartite agreement to offer an opt-out option to householders. Householders can make the deliberate choice of placing a “No advertising, thank you” sign on their doors, possibly shifting the blame for excessive consumption on advertisers and marketers (Pereira Heath and Chatzidakis 2012).

For householders to be able to stop unaddressed advertisements requires scores of actions to be coordinated into an action net. The efficacy of the No ads or No free newspaper signs depends on SWEDMA reminding its member organizations of the necessity of respecting these signs, and the Swedish Consumer Agency’s handling of complaints about failure to respect them. Registers for people to record their wish not to be disturbed by unsolicited phone calls must be connected to the databases that Swedish telemarketers use, and householders must monitor the calls by reminding telemarketers that they are actually not allowed to phone them. A continual connecting and reconnecting of these actions is necessary for the goals of the scheme to be achieved.

One noteworthy aspect of the No-ads scheme is the argument of some commercial actors: Opting out may cause people to miss crucial information – when a car is due for its mandatory annual checkup, for example (TV4 2013). Clearly, the No-ads action net runs against interests that find their expression in direct-marketing action nets. The purpose of the No-ads action net develops

in competition with these nets and, more generally, conventional commercial action nets, in order to limit (some people would say “damage”) their reach. The two compete in their attempts to impact consumers’ behavior.

## A car-sharing program

A product of yet another waste-reduction action net is Sunfleet, a business-to-consumer car-sharing service. The company was started in the early 1990s by Hertz and Volvo, as a way of filling the market segment between permanent car ownership and occasional car rental. The service was developed around the notions of convenience, flexibility, cost effectiveness, and sustainability. Cost effectiveness here refers to an absence of fixed costs and the opportunity for individuals to monitor their car transportation costs and sustainability refers to the possibility of choosing the size of car that exactly fits the need of the moment, to the incentive to choose other means of transportation such as cycling or public transportation whenever possible, and to Sunfleet’s choice of fuel-efficient vehicles, often less than two years old. To clarify the contribution of car sharing to sustainability, the company quotes the Swedish Transport Administration’s claim that one car in a sharing program replaces five individually owned cars. The company’s commercial motto is “A car only when you want it”. Sunfleet presents itself as a “car revolutionary”, claiming to lead, together with its members, the way toward a more sustainable mobile society. It declares that its goal is to introduce car sharing in Sweden – to change how Swedes look at owning and using a car (Sunfleet 2013).

Car sharing is not only emblematic of an innovation in the logic of service (Michel, Brown, and Gallan 2008). It is also emblematic of a consumption based on access (Bardhi and Eckhardt 2012) and, more generally, of sharing as an alternative to possession (Belk 2010). Car sharing is also emblematic of an evolution of mobility consumption toward greater sustainability (Antonio, Maria Vittoria, and Michele 2012).

To develop a car-sharing action net, Sunfleet had to produce a significant change in the relationship between the car user and the car (Michel et al. 2008). It had to coordinate its own actions and develop new types of connections among the actions of car producers, financing bodies, and car-maintenance companies, but also with the municipality and other land owners that provide parking lots, and, not least, with people interested in trying this type of service who need to disconnect the idea of mobility and the freedom attached to it from the idea of owning a car. In addition, Sunfleet has established collaborations with housing companies and such organizations as the City of Gothenburg and Gothenburg University to offer packaged solutions for carless urban dwellers. Part of these solutions is the hyperlinks that direct Sunfleet members toward environmental education programs, supporting a ride-sharing community, and hiring electric bicycles – all literal expressions of the connective logic of action nets.

Fitting the local institutional context is helpful, of course (Mont 2004). But the car-sharing action net rests primarily on well functioning economic, legal, technical, and behavioral connections among the actions described here. And these connections need to be maintained and redesigned whenever any of the actants and actors change their ways of doing things – that is to say, all the time. Such ruptures in the connections as poorly maintained vehicles or an ill-functioning booking system would dissolve the action net and effectively stop the service. Trust, commitment, respect for such rules as punctuality and, more generally, the commons are implicit actants of car-sharing systems. Along with the right incentives (Lerner 2012), service innovations depend on reliability for their success.

## Action nets for waste prevention

Several insights can be gained from analyzing these three waste-prevention initiatives from an action net perspective.

First, it is possible to speak of waste prevention because the connections between the actions in the nets have reached some level of stability, at least temporarily. A sign of this stability is the fact that the nets are no longer dependent on the idiosyncrasies of actants. The interactions are stable enough that a waste producer, a car manufacturer, or a charity organization can replace one another. They become stabilized to the point at which they can be seen as a pattern to be imitated – after all, Sunfleet is not the first car-sharing company in the world. The No-ads scheme has served as a source of inspiration to establish a method for saying “no” to unsolicited advertisement in mobile phones ads.

Stabilization does not mean lack of change, however. Action nets are constantly evolving. Actants can agree to change some aspects of the *modus operandi* of their interactions – to answer to changes in legislation or let the activity evolve, for example. Entrepreneurial actants and actor-networks can include new actions into existing nets, or even connect action nets to one another. Nets can develop in unexpected directions. Some companies have even started selling ready-to-use No ads signs. Likewise, texts like this chapter can connect these initiatives to new actions if they are considered a source of inspiration by waste decision makers. Stability does not mean that actions within the net remain the same.

A second noteworthy aspect of these three waste-prevention initiatives is the shape they give to specific perceptions of waste prevention: reducing the volume of unaddressed advertisements being produced and distributed; integrating the constraints and possibilities of contemporary waste management in the design of material management processes; and reorienting people from ownership to rental and use, which is a key tenet of what is called *économie de la fonctionnalité* in French (Bourg and Buclet 2005) – literally the economy of functionality, but unfortunately translated as service economy. Each initiative is an effort to reduce

the volume of material throughput (Daly and Farley 2004) in the economy. Furthermore, it decouples waste production from economic growth, which is one of the key goals of globally sustainable waste management (UNEP 2011). These ideas may have existed before the first actions were taken; they may have emerged slowly along with the organizing process; or they may be born only after the process is complete – when people made retrospectively sense of what they have done. Action nets materialize visions, but into dynamic processes rather than static structures.

A third insight concerns the key role played by artifacts in action nets. Human actants appear to depend on good relationships with their non-human counterparts if they want to connect waste-reducing actions. All three initiatives in this study depended on dedicated technological devices: waste containers, signs, roofed facilities, or booking systems. Action nets must also connect well to such places as householders' letter slots for the No ads scheme or the Helsingborg region for NSR's waste-prevention services. Waste prevention may aim at dematerialization, but artifacts are central to the construction and maintenance of waste-prevention connections.

Fourth, waste-prevention initiatives can also be considered relational spaces. A relational understanding of space (Shields 2013) suggests that spaces are constituted by a series of practices and materials that determine their character. Action nets can travel – literally – but such travels require effective translations that make them the nets fit for the place they land (Czarniawska and Sevón 2005). An action net perspective emphasizes the fact that waste-prevention initiatives are global, but only to a point. They are also eminently local, not least due to the localness of the interactions out of which they emerge.

Fifth, action nets are always being constructed in relation to existing action nets. On the one side, new action nets build on existing nets. NSR's waste-prevention services build on existing nets that allow recycled materials to re-integrate production processes in particular and the economy in general. The No-ads initiative builds on an existing collaboration between public authorities in charge of consumption and the direct marketing industry. Sunfleet relies on the existing automobility infrastructure.

On the other hand, new action nets challenge existing nets. NSR's waste-prevention services challenge existing waste-handling action nets that thrive on increasing waste volumes. The No-ads initiative is an effort to limit the spread of the direct-marketing action net. Sunfleet's car-sharing service creates an alternative to car ownership and car rental nets. New action nets coexist with existing action nets in many ways, sometimes coexisting, sometimes complementing one another, sometimes competing.



## The challenges of waste prevention

Our analysis has demonstrated that waste prevention requires the invention, development, and stabilization of new connections between collective actions. Translating the goals expressed in the highest step of the European waste hierarchy into concrete results requires the invention, development, connection, and stabilization of nets of actions based on new and often innovative understanding, priorities, habits, and artifacts.

An action net perspective focuses on the dynamics of organizing. It clarifies the fact that waste prevention is a matter of developing new connections among collective actions that will hopefully result in less, if any, waste, according to the European Union's definition of waste, and less adverse impact on the environment. It also underscores the need to understand transition policies as the creation of new infrastructures that make possible but also constrain the emergence of new action nets.

Action nets are constrained by the existing institutional order, but they challenge this order as well. Our analysis indicates that waste prevention is disruptive of the institutional order of consumption. Initiatives based on the prevention of waste tend to aim at slowing or reducing material flows in society. As such, they have the potential to attract the ire of many types of people – advocates of the growth paradigm upon which rest many current business welfare models in contemporary societies, for example. One can therefore expect protests by the actors who are against the introduction of waste-prevention patterns of production, distribution, consumption, and disposal.

Our analysis also indicates that the "higher step of the waste hierarchy" is not above the lower steps. It stands for a rupture. Unlike the initiatives at the lower steps of the waste hierarchy (e.g., incineration or recycling), in which waste is considered as a resource to exploit, waste prevention challenges the existing order of wasting. Prevention runs against the traditional reasoning, which merely addresses existing waste. Whether it is a matter of preventing increases in energy use, urban transportation, or greenhouse gases, the rationale of prevention differs in character from the rationale of managing that which already exists. Management assumes a normalization of waste (Corvellec 2014), whereas prevention involves preventing something coming into being. Non-existence, rather than diligence, is the measure of the performance of prevention, which requires innovative action nets.

Indeed, the initiatives discussed here suggest that a new institutional order of waste may be under development, as other studies have implied. In this new institutional order, "wasting less" could become the leading societal narrative (Corvellec and Hultman 2012). Waste-management companies would develop business models based on circularity and waste prevention, excessive consumption (Urry 2010) would be questioned, and shopping for secondhand items would become a cultural standard (Gregson and Crewe 2003). In such an order, waste



governance is pluralistic (Zapata Campos and Zapata 2013) and multi-leveled (Bulkeley et al. 2005), and global waste prevention is a necessary part of sustainable urban development (Zapata and Hall 2013).

Finally, an action net perspective on waste prevention encourages a key question: *Why not all efforts at connection become stable?* Actor-network theory (Latour, 2005) states that projects fail because some participants do not manage to translate the interests of other participants and therefore fail to align them. Action net theory confirms this observation, but adds that actions are sometimes not translatable into one another, or the connection points are not maintained with enough care. With all interests aligned, actants can see the net they connected dissolve – because they did not take enough care, because the stabilizing artifacts were not resilient enough, or because the existing networks destroyed it. Such a negative case should provide a fascinating study, even though actor-networks tend to hide failures, making them difficult to document.

The analysis of waste prevention made from the perspective of action nets demonstrates that, in practice, the diversity of waste-prevention initiatives is doubled by a diversity of actions specific to each initiative. The richness and intricacy of connecting diverse actions and maintaining these connections as conditions change strongly contrasts with the linear simplicity of the European waste-hierarchy model. We believe that developing waste prevention would benefit from a recognition of the far-reaching diversity of waste-prevention actions – a critical recognition, not least for construction of waste-governance models for waste prevention. If waste prevention is to improve the sustainability of consumption, it is not by step by step, but connection by connection, action by action.

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