

# REVERSE LOGISTICS STRATEGIES IN A FRENCH CONTEXT: A THEORETICAL PERSPECTIVE

*MONNET Marlène*

*CRET-LOG (Centre de Recherche sur le Transport et la Logistique)*

*University of Franche-Comté*

*Tel : (33)3.84.75.95.11*

*E-mail : [marlene.monnet@gmail.com](mailto:marlene.monnet@gmail.com)*

## **ABSTRACT**

**Purpose** – To illustrate how theoretical approach to the stakeholders and to the supply chain management can contribute to the analysis of the reverse logistics strategies. To underline some of the strategic behaviours of the actors involved in the French context of Electric and Electronic Equipment Waste (WEEE) recycling.

**Design/methodology/approach** – is based on forty interviews with experts in the implementation of the reverse logistics system and in the statutory context of the WEEE. The literature review also depends on data collecting (legislative texts, business press, topical documents, and internal documents).

**Findings** – Major findings show that the French context of WEEE recycling is characterised by clashing interests, uncertainties and the absence of a consensus. The relational quality between the stakeholders appears as essential, as for instance, political relationships. Then, the logistics service provider develop an interesting strategy in the reverse logistics system, by introducing economic and quality criteria of service in this context. We conclude by discussing future research directions: to look for the levers to the relational skills, to study collective environmental strategies, to discuss the influence of the institutionalization in the management of the supply chain in the context of sustainable development.

**Research limitations/implications** – The main methodological limitations are linked with our contextualized research, then we suggest to broaden future researches to other kind of waste and to other countries than France. Other limitations are connected with the objectives of our research to focus on the stakeholders theory and the supply chain management approach.

**Originality/value** – This paper provides a comprehensive review of the reverse logistics strategies in the French context of WEEE recycling. The combination between theory and empiricism expands the analysis of the stakeholders strategies and the management of the

reverse logistics system. It demonstrates the integration of the three advantages of sustainability into the process of reverse logistics.

*Keywords: reverse logistics strategies, stakeholders, supply chain management, sustainable logistics, French context of waste recycling*

## **INTRODUCTION**

Sustainability of natural environment and energy efficiency are seen nowadays in a paradigmatic frame. The current article context processes questions of the sustainable logistics practices. The political views in the European Union develop today more towards the agreement among the 27 Member States on the minimization of greenhouse gas effect. The "Grenelle de l'Environnement", introduced in France in 2007, confirms the involvement of French authorities in the study of global logistics solutions while protecting environment.

We can observe an increase in a number of academic and professional researches on logistics management made by universities, research centres, and institutional forums. The main areas of research in sustainable logistics are: transportation, with a focus on intermodality, optimization of rounds and taxes (carbon, heavy vehicles, urban toll); storing, with a focus on High Environmental Quality normalization; reverse logistics, with aim of effective and efficient system of recycling products at the end of product life cycle; and supply chain, with the quality of service in accordance with the environment and working conditions of employees.

The sustainable logistics begin to be studied, in the field of logistics management, under the strategic perspective. Actors integrate environmental and/or social indicators into their logistics initiatives. Their mentalities are evolving and so are the sustainability practices. The regulation pressures, concerning the design and the recycling of some products, lead to various behaviours of the actors responsible for reverse logistics.

Our research focus on the strategic behaviours of the actors in the context of sustainable development, and more specifically, in the reverse logistics system of Electric and Electronic Equipment Waste (WEEE). Our principle objective is to illustrate how theoretical approach to the stakeholders and to the supply chain management can contribute to the analysis of the reverse logistics strategies.

This article is divided into three parts. The first introduce the concept of reverse logistics as a part of sustainable logistics. It presents the general characteristics of the reverse logistics systems and underlines its "theoretical needs". The second part brings to light the contribution of the theory of the stakeholders into the description and the analysis of the strategies of the actors in the reverse logistics systems. The last part shows how the theoretical approach of the supply chain management can contribute to the development of the reverse logistics strategies of certain actors in the context of sustainability.

## **REVERSE LOGISTICS**

### **Reverse logistics as sustainable logistics**

Within the field of supply chain management, most researchers (Jahre, 1995; Carter and Ellram, 1998 ; Rogers and Tibben-Lembke, 1999 ; Dowlatshahi, 2000), define reverse logistics as a cross-disciplinary process of planning, implementing and controlling of various material and informational flows, from the point of consumption to the point of origin, for multiple objectives relating to sustainable development (recycling, re-using, etc.). This definition suggests that reverse logistics is a transverse initiative of management of reverse flows. It represents a process of management of physical streams (raw materials, packaging, and products) and information associated, while considering the total life cycle of these flows. Six activities of reverse logistics are: collecting, sorting, storing, transportation, intermediate treatment and reprocessing (Kokkinaki et al., 2000).

These activities require having substantial resources and skills -such as capacities of collecting, specific transportation, centres of sorting, treatment processing and recycling- that varies according to volume of returns and costs. Reverse logistics is often perceived as green logistics. Referred also as environmental logistics, green logistics protects environment by measuring and by minimizing impacts of the logistics activities on environment (Rogers and Tibben-Lembke, 2001), as for example, the pollution resulting from its activities of transportation or the recovery and the disposal of the waste throughout the logistic processes. The case of the waste management is one of the most interesting examples as it requires the coordination of reverse logistics activities (logistics and treatments processes) with green logistics that minimizes the environmental impacts of reverse logistics.

In this case logistics becomes a tool of environmental protection. Having its origins mainly from the implementation of sustainable development policy, reverse logistics is then developed by more elaborated regulations and pressures of stakeholders. At the same time it also results from a competitive context, marketing motivations and economic issues (De Brito and De Koster, 2002). Moreover, the actors concerned by reverse logistics may adopt strategic behaviours in context of sustainable development. Defined by the Brundtland Commission as: "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*", this context requires a spatio-temporal dynamics and supposes an understanding of limits of the environment and of the basic human needs (World Commission on Environment and Development, 1987: 8).

The sustainability, as noted by Carter and Rogers (2008), implies three criteria of economic performance, social coherence and respect for the ecosystem. Reverse logistics strategies are in the heart of our research. That is why the integration of these three criteria into the process of reverse logistics is appropriate. The question becomes then: on what terms can the reverse logistics combine the three advantages of sustainable logistics?

The strategic advantage can be an economic one and be represented by the costs reduction. The development of environmental activities might decrease costs by getting back some energy, by decreasing the used resources and by reusing and by recycling the used materials (Wu and Dunn, 1995). A good initiative of reverse logistics not only reduces the costs but also increases incomes. The improvement of organization and flexibility of

companies, the increase of efficiency of return processes and the creation of new markets (interested in recycled products) are so sources of financial gains (Rogers and Tibben-Lembke, 2001 ; Philipp, 1999).

Reverse logistics also has environmental advantages. It improves the management of products at the end of their life cycle, the recovery of natural resources and the disposal of waste while respecting coordination of activities of selective collecting, sorting, treatment and so on. The actors concerned by the implementation of these activities control their environmental impacts.

Reverse logistics has social advantages as far as it allows to create jobs in the activities of collecting, sorting and recycling. The actors of the social and united economy (such as Emmaüs or Envie in France) are integrated as indispensable actors throughout the process. Companies of social inclusion are created and allow engaging unemployed or reinserted persons.

Figure 1 presents reverse logistics like a sustainable logistics. Reverse logistics combines three components of sustainability: economic, environmental and social impacts.

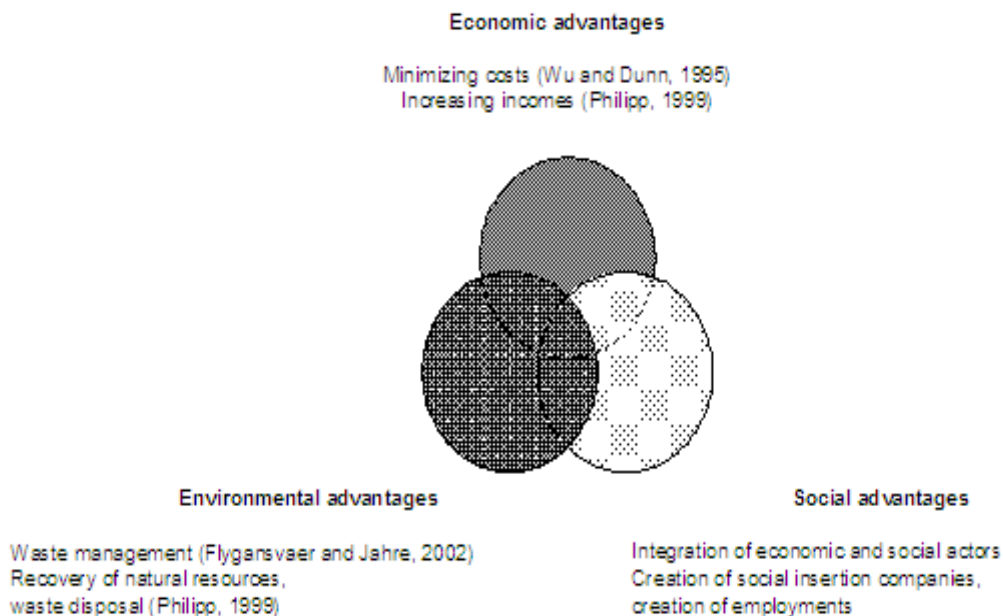


Figure 1 – The reverse logistics: towards a sustainable logistics

### **What are the characteristics of reverse logistics systems?**

The implementation of reverse logistics activities involves a certain complexity (Beaulieu, 2000), as it requests a system consisting of high variety of elements and of interconnections between them. Among researchers who study reverse logistics in a systemic perspective, Dowlatshahi (2000) suggests that the reverse logistics system can be represented as a supply chain redesigned to handle flows of products and parts in order to recover, to recycle, to dispose them and to use resources effectively. Kokkinaki et al. (2000: 4) proposes a visual

representation (cf. Figure 2) where the organizational basis of the system is a traditional supply chain from which various reverse logistics activities are related to flow movement. As in any manufacturing process, quality and coordination of activities are essential. The efficiency of collecting and recovery activities determines the quality of sourcing, the status of inbound flows, good achievement of sorting and selection activities, then good achievement of treatment and recycling activities or a storage in dumps. The process of production is "adapted" because it combines specific activities of production in reverse logistics: re-use, recycling and remanufacturing according to the flows. According to their characteristics, these flows replenish the traditional supply chain or are directly delivered to customers. Thus, the Figure 2 shows that the complexity of a reverse logistics system does not lie in its activities because this one is based on activities of supply logistics, of "adapted" production logistics and of distribution logistics. However this system is particular because the physical activities start from the final consumer, who, traditionally, is at the end of the supply chain after the activity of distribution (Ginter and Starling, 1978; Stern and El-Ansary, 1988).

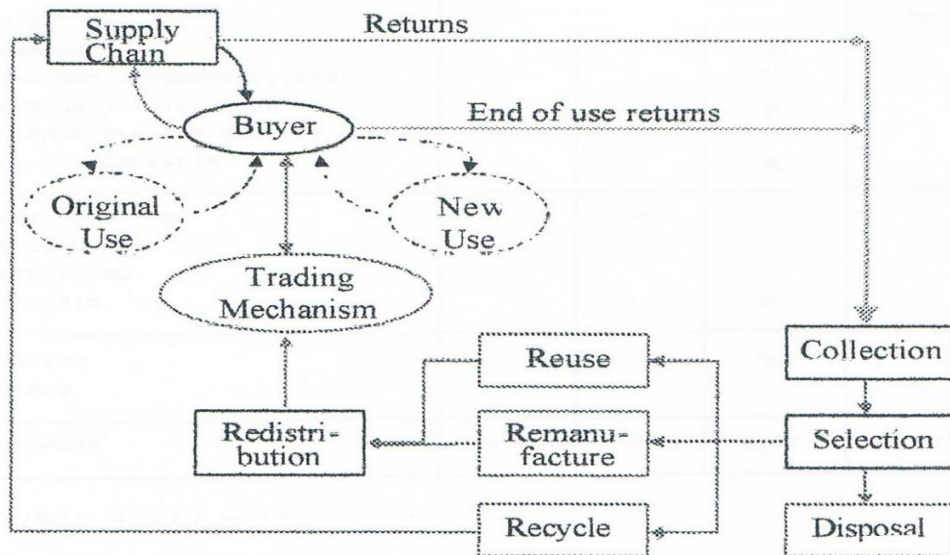


Figure 2 – Reverse logistics system (Kokkinaki et al. 2000:4)

The complexity of the reverse logistics system results from its numerous uncertainties because it is not linear and varies according to the considered flows (Jahre, 1995; Rogers and Tibben-Lembke, 2001; Krikke et al., 2001; De Brito and De Koster, 2002; Flygansvaer and Jahre, 2002; Philipp, 2007). The unpredictability of this system comes from the numerous possibilities for places and dates of returns. It also depends on specificities of return flows in terms of volume, quality, mix or composition. A rigorous and fast process of selection of the activities (of recycling) and resources (means of collecting, storing and transportation; capacities of sorting and treatment) adapted to handle the various flows is necessary. The actors must be able to coordinate the activities and combine the adequate resources for recycling the returns. The management is considered as "passive"

management by the actors because they have reactive attitude of adaptation to the organization of the activities and the automation is not so developed in reverse logistics. Furthermore, the actors do not actually have any predefined place in the reverse logistics system because they can play multiple roles and are not always associated to the same activities. Communities can, for instance, fulfil activities of collecting and sorting and even waste treatment. Actors take into account the expectations and interests of the stakeholders in order to implement activities or deploy resources. The centres of sorting, for example, try to get a certain volume; the carriers intend to optimize their round trips whereas the holders need to get rid of their waste quickly.

### **Which research protocol to study the strategies of reverse logistics?**

Researches on issues of reverse logistics suggest being interested in the complexity, in the unpredictability and in the uncertainties relative to these systems. More exactly, it seems relevant to focus on the actors who coordinate the reverse logistics activities and combine various resources, according to their expectations and interests. Faced with characteristics of systems of reverse logistics and stakes in sustainable logistics, we intend to analyze in which measures can the actors go over passive management and reactive behaviours of adaptation to the environment towards strategic behaviours?

In this research, we are taking into account interests and expectations of numerous actors, and then, the increasing of transactional and relational interfaces between them. That is why; we assume that stakeholders theory can be used for describing and analysing reverse logistics strategies (towards strategies of outsourcing, collaboration, and so on). We also extend the design of supply chain toward the final handling of end of life products and toward the coordination of logistics and waste treatment activities. Thus, the supply chain management approach can be considered as relevant to understand how to develop reverse logistics strategies (shared management tools, integrated information system, collaborative supply chain, and so on).

This paper aims at illustrating how theoretical framework can contribute to the analysis of the reverse logistics strategies. We adopt a non linear research process evolved from a hybrid exploratory direction – according to Charreire and Durieux (1999) – and an abductive, scientific line of reasoning – highlighted by Kovacs and Spens (2005). We then characterize that abductive research process – using the terms of Dubois and Gadde (2002) – through a phenomenon of systematic combination between theory and empiricism requiring the process of assortment of theory and reality.

We therefore focus on reviewing theoretical literature and we study the implementation of a reverse logistics system of WEEE in the French context. The statutory context of the WEEE illustrates and contextualises the review of literature. This contextualisation appears as relevant to support and to go deeper into the research with concrete examples.

We adopted a qualitative method in France and tried to combine the different techniques in data collecting. Singled out by Hlady Rispal (2002) and Demers (2003) as a relevant method of data collecting in a qualitative process, the interview was given a top priority. We organized forty interviews with experts in order to gain access to the perceptions and the interpretations of the involved actors: logistics service providers, waste management industries, suppliers on the Electric and Electronic Equipment market, and political actors.

Then, we added the technique of data collecting (legislative texts, business press, topical documents, and internal documents concerning the actors) with the aim of complementing the interviews. In the Table 1, we present the summary of our interviews with the different experts.

Table I – Summary of interviews with experts

Actors	Experts	Number of interviews
Waste management industries		
	Ecologic	1
	Ecosystème	1
	Ecoplanet	1
	Valenda of Geodis subsidiary	7
	SITA	2
	Envie	1
	Emmaüs	1
	Recylum	1
	Micro-Orange	2
Suppliers on the Electric and Electronic Equipment market		
	IBM	1
	Canon	1
	HP	1
	Electrolux	1
	Braun-Gillette	1
	Sony	2
Political actors		
	Federation of electric, electronic and communication (FIEEC)	1
	Federation of commerce and distribution (FCD)	1
	National center of recycling (CNR)	1
	AMORCE	1
	Agency for the environment and the energy control	2
Logistics service providers		
	Members of the European Recycling Platform (Géodis)	10

## THE STAKEHOLDER THEORY

In 1984, the concept of stakeholders found its foundations in the Freeman's research. The stakeholder is defined as "*an individual or a group of individuals which can affect or be affected by the realization of organizational objectives*". We here justify the relevance of the stakeholders theory in the research context of environmental management by using authors such as Donaldson and Preston (1995), Pouloudi (1999), Ummenhofer (1998), Mercier (2001), Sharma (2001), Persais (2004) and Martinet and Reynaud (2004). These researchers suggest that the stakeholders theory can be a relevant theoretical framework to

include other factors than economic factors -such as the sustainable development, the organizational ethics, the societal commitment, the environmental management and the information systems- in Management Sciences.

Ummenhofer (1998: 43) considers that "the theory takes into account all the groups (in the broad sense) and individuals who can influence or be concerned by the objectives of the company or their realization". Then, the stakeholders theory suggests to consider other actors (than customers or shareholders) who have also expectations to the organization. According to Martinet and Reynaud (2004), organization represents a set of convergent and/or conflicting interests. Thus, organization is a knot of relations which has to merge the multiple interests. This integration of numerous interests of the stakeholders is even understood, by the organizations, as a survival strategy. Martinet and Reynaud (2004: 71) conclude that "*companies survive only if they satisfy expectations of various groups of interests on which they depend*".

### **Why is the stakeholder theory relevant?**

Donaldson and Preston (1995) present three perspectives of the stakeholders theory in strategic management: a normative, an instrumental and a descriptive one. The normative perspective recommends practices and attitudes to organizations by explaining the reasons to manage all the stakeholders and the reasons to merge their interests. For instance, the implementation and the development of the reverse logistics activities require considering the interests of stakeholders such as political actors.

The instrumental perspective tool aims at making leaders of organizations understand how relationships management with stakeholders impact the performance of their organizations. For example, leaders could identify convenient partnerships with specific stakeholders, such as urban community, in order to reduce costs of collection. The descriptive perspective describes (and sometimes explains) characteristics and behaviours of the organization. It depicts differences among multiple interactions of the company with its environment. Thus, we use the descriptive perspective to present and explain relationships between actors involved in the implementation of reverse logistics processes.

According to Martinet and Reynaud (2004), the stakeholders theory reminds management that "*the company is "in society" and its environment is composed of all the actors in economic transactions or in socio-political interaction with it*". By their interactions in a supply chain in the context of sustainable development, the actors are considered as stakeholders who must respect their commitments. In the literature about stakeholders, there exist different typologies of stakeholders: internal / external, primary / secondary, voluntary / involuntary (Mercier, 2001; Persais, 2004). Martinet and Reynaud (2004) distinguish also stakeholders on two levels: the first is transactional and the actors have a contractual link with the company; the second is interactional and the actors have a more indirect link with the company, but this one may reveal itself as important according to the context. Thus, the economic and financial actors, i.e. customers, suppliers, subcontractors, employees, shareholders, banks and insurances, belong to the transactional sphere while the institutional actors and the pressure groups, i.e. governments, public opinion, trade unions, the media, associations as well as competitors, belong to the interactional sphere. By describing the



actors, the stakeholders theory is useful for understanding requests and expectations of stakeholders but also their ways of pressure on organizations and their strategic behaviours. Within the field of environmental management, the strategic behaviors of the actors vary from passive attitudes to more or less basic strategic behaviors based on various criteria such as environment awareness, decision logics, access to information, exploitable resources, and so on (Carroll, 1979 ; Ummenhofer, 1998 ; Buysse & Verbeke, 2003 ; Martinet & Reynaud, 2004 ; Grandval et Soparnot, 2005 ; Philipp, 2007). Inherent to strategic management, the process of strategic environmental management is an active process of adaptation to the environment. In coherence with its policy, the company mobilizes and organizes its resources and skills in order to, on the one hand, analyze the environmental variations to minimize its environmental impact and, on the other hand, to take into account the interests of the stakeholders and satisfy their expectations.

At a broader level, the strategic behaviors of the actors in the reverse logistics system result from their own way of integrating sustainable development in their practices. The behaviors depend on their idea of constraints and/or opportunities relating to reverse logistics. Three basic strategies are depicted: a defensive or reactive attitude, an offensive or accommodative attitude, an anticipative or proactive attitude. The defensive attitude is concerned with short term financial advantages. The actors try to minimize all the costs relating to environmental investments. This “wait-and-see” attitude is also relied on lack of data and information about statutory constraints and environment. The accommodative attitude consists in studying legislations and environmental constraints to get ready for the evolution and to respect the statutory constraints. Environmental and social management are decision-making criteria. The proactive attitude represents the behavior of companies which consider sustainable development as a goal to reach in order to get a competitive advantage. The stakeholders who adopt this anticipative attitude have financial resources and get a strategic position (control by the costs, improvement of their legitimacy, and differentiation on the market).

### **The contributions of the stakeholder theory**

By using the stakeholders theory, we can distinguish five groups of actors according to their responsibilities and their involvements in processes of reverse logistics. The stakeholders of the reverse logistics system are represented through the roles of the suppliers on the market, the political actors, the salvage dealers, the operators and the holders. This classification avoids attributing one activity to one stakeholder. Table 2 presents activities and/or responsibilities (on line 1) and strategic attitudes (on line 5) of the groups of actors. This table provides information about the analysis criteria of reverse logistics strategies.

Two European directives relating to the Electric and Electronic Equipment Waste (WEEE) underline the necessity for the companies to handle and recycle their waste. Directive 2002/95/CE regulates the manufacturers upstream so that the dangerous components in their products are replaced by innocuous ones. Directive 2002/96/CE makes producers aware of their responsibilities downstream for recycling their products. These regulations set the principle of responsibility for suppliers in the market—that is, producers, importers, and distributors who have their own brands—until they ensure the elimination of the WEEE.

It is mainly the suppliers on the Electric and Electronic Equipment market who undergo restraints and have to take financial responsibility for collection, treatment, and elimination of WEEE in proportion to their market share. The producers and the distributors, who have their own brands, are especially responsible of their products from “cradle to grave” and on the whole supply chain. The responsible industries of Electric and Electronic Equipment—in agreement with the authorities—can create companies of waste management that coordinate streams and manage, for instance, the systems of collection.

The political actors symbolize the government, the ministries but also the associations, the trade unions, the public opinion and the media. They play an important role in the planning, building and controlling the statutory tools but they do not directly handle flows of waste. According to the typology of stakeholders of Martinet and Reynaud (2004), the political actors are very important interactional stakeholders who have an indirect link with the companies.

The WEEE salvagers are concerned with the collection. They are represented by the points of collection, the carriers and the centres of gathering and sorting such as townships, social and economic actors, associations and service providers.

The operators are centres of treatment and recycling. They can be public or private organizations. The treatment decomposes into multiple activities of sorting, dismantling, refurbishing, recycling and disposal.

Finally, the holders of WEEE are the consumers of electric and electronic products. They are represented by households and by private and public organizations. The final consumer, as producer of waste, is at the first step in the supply chain. The quality of sourcing of the reverse logistics system depends on the holders. That is why; they have to keep themselves informed of the conditions of collecting and recycling.

Thus, we can deal with the diverse strategic behaviours of the group of actors in the reverse logistics system that depends on their involvements: reactive, accommodative or proactive. Table 2 (line 5) gives the detailed list of all the strategic attitudes of these group of actors.

We observe the different behaviors of the waste management industry that attempt the lawful activities of collecting, sorting, gathering, dismantling, and treatment. Townships can be held responsible for selective collection and distributors are responsible for the recovery of household WEEE, according to a "one-for-one" principle. Other companies of waste management -which have anticipated the rules- are intermediaries when they use organizational skills. In a strong position because of their relational experience and their specific skills, the actors in the waste management industry (the operators and the salvagers) have two options: adapt themselves or show aggressiveness because they try to capitalize their know-how while respecting the new recycling constraints.

The suppliers on the market behave differently according to their interests and the positions they wish to reach. Some try to master the piloting of streams and mobilize financial skills in the management of structures (such as structures of waste management industry). Others aim at optimization and prefer to contract with a provider possessing organizational skills (such as a logistics service providers who is able to manage a set of actors and to introduce competition into this regulated context). Finally, a majority of suppliers on the market simply adapt to the structures already existing.

The political actors have an anticipatory behaviour because of their planning skills and so do the government who has the legitimacy to conceive rules. The behaviours of the political

actors can also be considered as adaptive insofar as they do not try to influence the organization of the supply chain.

By understanding the attitudes of the groups of actors, the research then shows interactions among the stakeholders of a supply chain in the context of sustainable development. We consider that it can be schematized as an organizational form spreading to two spheres of stakeholders (transactional and interactional) according to a public interest in a sustainable development policy related to the circulation of the physical streams of waste / products and information associated throughout their life cycles.

The transactional sphere includes the actors contractually connected. It includes the interactions among the actors of the waste management industry, then those between all the stakeholders and the industry of waste management. They develop long-term contractual relationships with service providers of treatment and logistics. They create and maintain partnerships through the stakeholders with specific skills. The operators and salvagers entertain narrow relationships in order to pool their resources and skills and provide global solutions.

The interactional sphere includes the actors indirectly connected by the context. It contains the interactions between all the stakeholders and some actors of the waste management industry, then those between all the stakeholders and the political actors. Interestingly, the actors develop their capacities to maintain relationships of political interest with the political actors and with the points of collection in order to improve the access to the waste. Table 2 (line 3) also shows the specific relationships between the stakeholders for each group of actors.

## **THE SUPPLY CHAIN MANAGEMENT PROSPECT**

We consider the reverse logistics system by extension of the supply chain, as defined by the theorists of the supply chain, Harland (1996), Mentzer et al. (2001), Christopher (2005), and the ones of the organizations -such as Jarillo (1988), Gulati et al. (2000) - as an organizational form in strategic and dynamic network. The functions of the company suppose that actors playing a downstream and/or upstream role in the supply chain: marketing, research and development, forecast-programming, sale, after-sales service, recycling. In its most complex degree of relations in the channel « *An ultimate supply chain includes all the organizations involved in the upstream and downstream flows of products, services, finances, and information from the ultimate supplier to the ultimate customer* » (Mentzer et al., 2001 : 4). The supply chain can then be considered as an organizational form including actors with a common interest.

We also associate the reverse logistics system to the closed loop supply chain developed by the theorists of the reverse logistics - Dowlatshahi (2000), Krikke et al. (2001), Kokkinaki et al. (2000) - as an organizational form extended to the actors grouped together by a common interest in sustainable development policy. In a context of sustainable development, the actors are then involved in the circulation of the physical streams of products and information associated throughout their life cycles.

When the actors anticipate the management of the reverse streams of a supply chain, the initiative of management of the supply chain, including that of logistics management, seems more appropriate. We consider the perspective of the management of the supply chain in the

same way as the Council of Supply Chain Management Professionals (CSCMP), Mentzer et al. (2001), Stock and Lambert (2001), Stank et al. (2005), and so on. This prospect considers the supply chain management as an initiative of global management wider than the logistic initiative while including it in the same way as the other activities.

### **Why is the prospect of supply chain management relevant?**

The prospect of supply chain management offers to study a network organizational form which builds itself in an active way with regard to its objective. Authors such as Jarillo (1988) and Gulati et al. (2000) consider that the network organizational form is more than a simple structure and that it translates a strategic initiative between organizations. We distinguish supply chain management from the organizational form which represents the supply chain. It is not because the supply chain exists that the active management of flows is organized. Mentzer et al. (2001) clarify that the supply chain is a phenomenon while the supply chain management requires efforts on behalf of all the organizations. The existence of a supply chain does not necessarily assume that it is managed.

Referring to the research of Harland (1996), Lambert and Cooper (2000) and Christopher (2005), we consider the supply chain management as a management at network level as a whole but also take into account its interfaces and interconnected activities. Researchers, who are interested in the field of the supply chain management, register their works on the four various levels distinguished by Harland (1996). According to Oliver and Webber (1982), the first level of management concerns the internal channel. The second level is the management of the dyadic relation between two actors with immediate suppliers. The third level concerns the management of external channel where the activities include suppliers, the suppliers of suppliers, customers, the customers of customers and so on. The fourth level is the management of the network where organizations interact with the others.

Researches at the relational and network levels are particularly interesting to study the supply chain management in a global way and improve the management of its interfaces. Christopher (2005) introduces the relational dimension of the supply chain management and describes this management as the management of organizations' network. At this holistic level, we also rely on the industrial approach of networks, Industrial Marketing and Purchasing (IMP), developed by Hakansson and Snehota (1995). They allow the study of an organizational form according to these various levels of analysis: the actors, the activities and the resources. The resources are mobilized and controlled by actors through their relations. The actors are defined by the activities they realize but also by the resources they control; they are connected to the other actors by the resources and the activities. The supply chain management is the management of a network of interconnected organizations. Thus, it seems relevant to manage the reverse logistics system.

The supply chain management is recognized as a transverse initiative which combines strategic, tactic and operational dimensions. Ganeshan et al. (1999) distinguish three research orientations in supply chain management: competitive strategy, company focused tactics, and operational efficiencies. At the strategic level, researches are interested in objectives and policies of the supply chain. They study how the supply chain can support needs of the company and improve its competitiveness. At the tactic level, they are concerned by the way for organizations to apply their strategic decisions and to reach their

objectives. At the operational level, researches deal with operations, controls and measures of performance in the supply chain.

Thus, the supply chain management is appropriate in a system characterized by phenomena of uncertainty and complexity as is a reverse logistics system. The implementation of the reverse logistics activities requires the anticipation of constraints plus the analysis of the actors, products, resources, and the processes related to the returns. The strategic behaviors in environmental management also require taking into account a set of strategic and operational factors that influence a reverse logistics system. These factors were extensively reviewed by Carter and Ellram (1998) and Dowlatshahi (2000).

### **The contributions of the supply chain management**

By extending the CSCMP's definition of supply chain management, we assume that reverse logistics is included in the global initiative of supply chain management in the same way as logistics management. This theoretical approach allows highlighting strategic dimensions of the reverse logistics. According to Tibben-Lembke (2002), reverse logistics appears as a strategic advantage more and more important for many companies. A sustainable logistics assumes then to combine logistic management and strategic management. At this strategic level, the constraints, the traps and the characteristics related to the returns and the stakeholders must be analyzed before the management of reverse logistics system, in order to develop an efficient and effective management (Rogers and Tibben-Lembke (2001), Trebilcock (2002), De Brito and Dekker (2002), Gooley (2003), and so on).

The various interviews led and the diverse documents analyzed offer knowledge of the constraints relative to the implementation of reverse logistics activities and to the management of the supply chain in the context of recycling WEEE. These constraints inherent to the regulated context concern uncertainties, conflicting interests, the differences of perception. For example, uncertainties can be relative to the process of returning products coming to an end, as far as place and time are concerned, but also to the misunderstandings as for the quality of the services of treatment and transport realized by the suppliers who were selected. Conflicting interests are connected with disagreement on distribution of the costs, financial resources, responsibilities, etc. The grouping of the diverse interpretations of the stakeholders, concerning these constraints, constitute useful data base for the future evolution of the supply chain or in the management of the other organizational forms. These characteristics contribute also to explain the strategic behaviours and the involvement of the actors in the reverse logistics system: reactive, accommodative or proactive. In the Table 2 (line 2), we present the constraints which are more important for each group of actors.

The interviews and the data analysis also show the strategic attitudes of the groups of actors and the strategic dimension of reverse logistics. We can discuss certain strategic factors –as emphasized by Carter and Ellram (1998) and Dowlatshahi (2000) -influencing the reverse logistics system. We agree with the researches showing that a business policy – integrating the values of sustainable development - may facilitate the commitment of the stakeholders and also that the importance of the buyers is linked with an attentive attitude to political relationships. Then, we can observe a phenomenon of new waste management companies who are created under the collective impulse of trade unions, federations or the suppliers on the market themselves. However, we do not agree with the research showing that an

increase of the uncertainties implies the development of vertical coordination or partnerships. These waste management companies do not really take into account the uncertainties, the characteristics of the supply chain management and the skills that need to be mobilized. Indeed, their developments depend on the grouping of the similar interests of the stakeholders concerning the distribution of the costs, financial resources, responsibilities, etc. By combining reverse logistics with strategic management in the context of sustainable development, the prospect of supply chain management is based on a philosophy of environmental management and on an extended organisational form. We can develop researches on the practices of supply chain management to manage processes of reverse logistics such as cooperation, information system and coordination of activities. Mentzer et al. (2001) bring to light that supply chain management requires narrow cooperation between the actors involved in the supply chain, coordination of their activities for effective and efficient global management of the whole supply chain. Ganeshan et al. (1999: 16) introduce integration, cooperation, coordination as well as information sharing as essential conditions in the implementation of the supply chain management. Fabbe-Costes (2002) also shows that information systems are central in the supply chain management.

The data related to the French context of WEEE recycling show that the multiple relationships between the stakeholders depend on diverse constraints of reverse logistics system. The relational skill, i.e. the capacity to enter into relation, interact or cooperate, is considered as necessary for the implementation of supply chain management. The condition of relational quality appears as essential whereas the condition of common conception is hardly observed. The interviews show that there is a will to exchange the information among stakeholders but there is no consensus. Then, the uncertainties are still numerous and the available data are insufficient to set up an effective information system. That is why, the organizations -which have to adapt themselves to their environments- should rather mobilize their skills of analyzing, of planning and of monitoring the statutory context.

Finally, by studying the practices in the French context of WEEE recycling and by taking into account the strategies of reverse logistics, we mainly observe that the suppliers on the market choose to outsource the management to providers. According to the network approach (Hakansson and Snehota, 1995), we focus on resources which are mobilized by the stakeholders of reverse logistics system. Indeed, the constraints of this system and the characteristics of its management legitimize the outsourcing of a set of skills to the provider. Some skills and/or resources appear as important to develop reverse logistics strategies. Table 2 (line 4) presents these strategic skills and resources for each group of actors. We can discuss about the actors who is able to manage the supply chain: industrials, experts in logistics management, and experts in treatment of waste.

The suppliers on the market are responsible for recycling their products. We observe that they gather into structures or associations. They are able to manage physical and informational flows of the reverse logistics system but they try to protect their interests and to control organizations following a logic rather political than economic.

Among the salvagers and the operators, private and public providers are expert in treatment and recycling waste. We observe that they invest in activities of research and development in order to develop their know-how of collecting and treatment of waste. They are few actors and they seems able to manager the reverse logistics system. They appear as aggressive

because they try to "lock the market" by integrating big groups and by managing multiple waste: waste from households, industrial waste, WEEE, and so on. Finally, the logistics providers -who are expert in logistics management- do not have recognized know-how in terms of collecting and treatment of waste. Some of them take the opportunity of the statutory pressures to mobilize physical skills and capacities of innovation to adopt a proactive behaviour. This behaviour implies that the providers combine their organizational, planning, relational and specific skills to propose a global service of statutory responsibility for suppliers on the market, as for instance, Géodis in France for the customer European Recycling Platform. We observe that the logistics providers aim at introducing competitiveness into a regulated context according to logics of cost-cutting, stream gathering, and service quality increasing.

Table 2 – Reverse logistics strategies of stakeholders: a theoretical perspective

Groups of actors Analysis criteria	Political Actors	Suppliers on the market	Salvagers	Operators	Holders
<b>Activities / Responsibilities</b>	To plan, to build and to control the statutory tools	To finance the system (responsible from "cradle to grave")	To collect and to sort waste while respecting regulations	To treat and to recycle waste while respecting regulations	To keep informed on conditions of collecting and recycling
<b>Constraints</b>	Conflicting interests: responsibilities, distribution of the costs, financial resources		Quality of services Quality of sourcing	Quality of collecting and sorting Coordination of activities	Place, time, quality of returns
<b>Specific relationships</b>	Relationships with all the stakeholders	Long-term contractual relationships with service providers of treatment and logistics	Long-term contractual relationships with suppliers Partnerships between salvagers and operators Political relationships		Relationships with the points of collection
<b>Strategic skills / resources</b>	Relational skills (to entertain)	Relational skills (to develop) Skills to control and to protect their interests Financial resources	<u>Waste treatment providers :</u> Relational skills (to entertain) Specific skills (know-how in collecting and treatment) Financial resources <u>Logistics service providers :</u> Relational skills (to develop) Organizational and planning skills Financial resources		Skills to gather information
<b>Strategic attitudes</b>	Anticipative (to conceive rules) Adaptative	Adaptative (to the structures already)	<u>Waste treatment providers :</u> Adaptative		Adaptative or Accommodative

	(they do not handle directly the system)	existing)	Accommodative (to capitalize know-how, to provide global solutions)	(It depends on people)
		Accommodative (to outsource the management)	<u>Logistics service providers :</u>	
		Proactive (to create companies of waste management)	Proactive (to offer a global service of statutory responsibility according to logics of cost-cutting, stream gathering, and service quality increasing)	

## LIMITATIONS AND PROSPECTS OF THE RESEARCH

The main methodological limitations are linked with our exploratory and contextualized research. Exploratory logic - connected with a slow transcription of European directives into French law - postponed the time of starting up the inquiring phase of our research. The context being strictly limited to WEEE, we do not claim to reach a generalization of the results. Finally, if we tried to interview all the stakeholders, the context directed the constitution of the sample of the actors interviewed which points to the existence of representative bias.

Thus, we could transpose the research to other countries than France. Insofar as the number of cases was sufficient, we might elaborate a questionnaire based on the essay on the typology of the strategies of reverse logistics. We could complete the present qualitative approach - directed by an exploratory logic - with a quantitative approach.

Furthermore, we suppose that this research could be widened to the other contexts of recycling waste which will also be subjected to the principle of responsibility extended to the producers. In conformity with to the rules related to the packaging waste and the pneumatics waste, then to the WEEE which are an exception to the 1992 law, we suggest to broaden future research to other waste - for which the rules to come will also give responsibilities to suppliers on the market instead of to waste holders.

Other limitations are connected with the objectives of the research with the absence of other theories than the stakeholder theory and the supply chain management prospect. We indeed reduced the possibilities of analysis the strategies of reverse logistics with another prospect, such as the institutional perspective. That is why, we intend in future research, to integrate the concepts of power, control and conflicting interests in order to analyze the strategic behaviour of the actors involved in the context of sustainable development. We also formulate the possibility to study collective environmental strategies in spite of clashing interests, uncertainties and the absence of a consensus. The study of the influence of conflicting of interests as an issue or as a resource seems equally interesting. Depending on the causes - uncertainties, absence of a consensus - and on the influences - positive or negative – on conflicting interests, we might then discuss the characteristics of collective environmental strategies.

We also suggest thinking harder about the specificities of the management of the supply chain in the context of sustainable development. We stressed that multiple relationships seem indispensable - even if they are difficult to handle as, for instance, political relations. We thus raise questions on the consolidation of the management of the supply chain in the



context of sustainable development. Is it dependent on the building of partnerships with suppliers on the market? Can it take place, in the long term, without the creation of a consensus or without strictly defined rules?

We therefore suggest discussing the influence of the institutionalization and the political dimension in the development of the management of the supply chain in the context of sustainable development. We intend to lead researches on the strategic skills and more specifically on the relational skills. We suggest looking for the levers to the relational skills via the study of management of the human resources or the organization of a project. We finally intend to estimate the stake of information systems for the supply chain management in the context of sustainable development. The objective would then be to try to reduce the uncertainties related to management of the supply chain in the context of sustainable development.

## REFERENCES

- Beaulieu, M. (2000), Définir et maîtriser la complexité des réseaux de logistique à rebours. Paper presented at 3rd International Conference on Research and Logistics (RIRL), 9-11 May, Trois-Rivières, available at : [http://www.lomag-man.org/recyclage/reverselogistique\\_beaulieu\\_ca.pdf](http://www.lomag-man.org/recyclage/reverselogistique_beaulieu_ca.pdf).
- Buysse, K., Verbeke, A. (2003), Proactive environmental strategies : a stakeholder management perspective. *Strategic Management Journal*. Vol. 24 No.5, pp.453-470.
- Carroll, A.B. (1979), A three-dimensional conceptual model of corporate social performance. *Academy of Management Review*. Vol. 4 No.4, pp.497-505.
- Carter, C.R., Ellram, L.M. (1998), Reverse logistics: a review of the literature and framework for future investigation. *Journal of Business Logistics*. Vol. 19 No.1, pp.85-102.
- Carter, C.R., Rogers, D.S. (2008), A framework of sustainable supply chain management: moving toward new theory. *International Journal of Physical Distribution & Logistics Management*. Vol. 8, No.5, pp.369-387.
- Charreire, S., Durieux, F. (1999), Explorer et tester. In : Thiétart R-A et coll., *Méthodes de Recherche en Management*. Editions Dunod.
- Christopher, M. (2005), *Logistics and supply chain management, Creating value-adding networks*. Third edition, Financial Times Prentice Hall.
- Demers, C. (2003), chapter 5, L'entretien. In : Giordano Y (coord), *Conduire un projet de recherche, une perspective qualitative*. Collection Les essentiels de la gestion, Editions Management & Société.
- Dubois, A., Gadde, L-E. (2002), Systematic combining : an abductive approach to case research. *Journal of Business Research*. Vol. 55, pp.553-560.
- De Brito, M.P., Dekker, R. (2002), *Reverse logistics : a framework*. Report EI2002-38, Econometric Institute, Erasmus University, Rotterdam.
- Donaldson, T., Preston, L.E. (1995), "The stakeholder theory of corporation : concepts, evidence, implication", *Academy of Management Review*, Vol. 20 No.1, pp.65-91.
- Dowlatshahi, S. (2000), "Developing a theory of reverse logistics", *Interfaces*, Vol. 30 No.3, pp.143-155.
- Fabbe-Costes, N. (2002), "Le pilotage des supply chains : un défi pour les systèmes d'information et de communication logistiques", *Gestion 2000*, Vol. 19 N°1, pp. 75-92.

- Flygansvaer, B., Jahre, M. (2002), How do reverse logistics systems scope with supply uncertainty. Department of Logistics, Norwegian School of Management.
- Freeman, E. (1984), Strategic Management: A Stakeholder Approach. Pitman Publishing.
- Ganeshan, R., Jack, E., Magazine, M.J., Stephens, P. (1999), A taxonomic review of supply chain management research. In Tayur, S., Ganeshan, R., Magazine, M. Quantitative models for supply chain management. MA Kluwer Academic Publishers, Norwell, pp.839-879.
- Ginter, P.M., Starling, J.M. (1978), Reverse distribution Channels for Recycling. California Management Review. Vol. 20, No.3, pp. 72-82.
- Gooley, T.B. (2003), The who, what and where of reverse logistics. Logistics Management, available at: [http://findarticles.com/p/articles/mi\\_hb3208/is\\_200302/ai\\_n7887081](http://findarticles.com/p/articles/mi_hb3208/is_200302/ai_n7887081).
- Grandval, S., Soparnot, R. (2005), Le développement durable comme positionnement stratégique. In Wolff D., Mauléon, F. (eds.), Le management durable : l'essentiel du développement durable appliqué aux entreprises. Editions Lavoisier, Paris, pp.173-211.
- Gulati, R., Nohria, N., Zaheer, A. (2000), Strategic Networks. Strategic Management Journal. Vol. 21 No. 3, pp.203-215.
- Hakansson, H., Snehota, I. (1995), Analysing Business Relationships. In: Developing Relationships in Business Networks, Routledge.
- Harland, C.M. (1996), Supply chain management : relationships, chains and networks. British Journal of Management, Vol. 7 Special Issue, S63-S80.
- Hlady Rispal, M. (2002), La méthode des cas, Application à la recherche en gestion. Editions De Boeck.
- Jarillo, J.C. (1988), On strategic networks. Strategic Management Journal. Vol. 9 No.1, pp.31-41.
- Jahre, M. (1995), Household waste collection as a reverse channel, A theoretical perspective. International Journal of Physical Distribution & Logistics Management. Vol. 5, No.2, pp.39-55.
- Kokkinaki, A., Dekker, R., De Koster, M., Pappis, C. (2000), From e-trash to e-treasure : how value can be created by the new e-business models for reverse logistics. Report EI2000-32/A, Econometric Institute, Erasmus University, Rotterdam.
- Kovács, G., Spens, K.M. (2005), Abductive reasoning in logistics research. International Journal of Physical Distribution and Logistics Management. Vol.35 No.2, pp.132-144.
- Krikke, H., Pappis, C., Tsoufas, G., Bloemhof-Ruwaard, J., (2001), Design principles for closed loop supply chains: optimising economic, logistic and environmental performance. Report ERS-2001-62-LIS, Erasmus Research Institute of Management, Erasmus University, Rotterdam.
- Lambert, D.M., Cooper, M.C., (2000), Issues in supply chain management. Industrial Marketing Management, Vol. 29 pp.65-83.
- Martinet, A.-C., Reynaud, E. (2004), Stratégies d'entreprise et écologie, Editions Economica, Paris.
- Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D., Zacharia, Z.G. (2001), Defining supply chain management. Journal of Business Logistics, Vol. 22 No.2, pp.1-25.

- Mercier, S. (2001), L'apport de la théorie des parties prenantes au management stratégique : une synthèse de la littérature. Paper presented at the 11th International Association of Strategic Management (AIMS), 13-15 June 2001, Canada, available at: <http://www.strategie-aims.com/quebec/web/actes/F-152-cd.pdf>.
- Oliver, R.K., Webber, M.D. (1982), Chapter six, Supply chain management: logistics catches up with strategy. In : Christopher, M. (1992), Logistics, the strategic issues, Chapman & Hall, pp.63-75, London.
- Persais, E. (2004), L'excellence durable : vers une intégration des parties prenantes. *Revue des Sciences de Gestion*, No. 205.
- Philipp, B. (1999), Reverse logistics : les formes adéquates de coopération pour la chaîne logistique de valorisation des produits en fin de vie. *Logistique et Management*, Vol. 7 No.2, pp.45-57.
- Philipp, B. (2007), Supply chains durables : changement de paradigme, modèle ou mode ? In : G. Paché et A. Spalanzani (éds.), *La gestion des chaînes logistiques multi-acteurs : perspectives stratégiques*, Presses Universitaires de Grenoble, Grenoble, pp.85-100.
- Pouloudi, A. (1999), Aspects of the stakeholder concept and their implications for information systems development. Paper presented at the 32nd Hawaii International Conference on Systems Sciences (HICSS-32), available at: <http://www.emeraldinsight.com>.
- Rogers D.S., Tibben-Lembke, R. (1999), Reverse logistics : stratégies et techniques. *Logistique & Management*, Vol. 7 No.2, pp. 15-25.
- Rogers D.S., Tibben-Lembke, R. (2001), An examination of reverse logistics practices. *Journal of Business Logistics*, Vol. 22 N°2, pp.129-148.
- Sharma, S. (2001), L'organisation durable et ses stakeholders. *Revue Française de Gestion*, N° 136, pp.154-167.
- Stank, T.P., Davis, B.R., Fugate, B.S. (2005), A strategic framework for supply chain oriented logistics. *Journal of Business Logistics*, Vol. 26 No.2, pp.27-45.
- Stern, L.W., El-Ansary, A. (1988), *Marketing Channels*. Pentice Hall, New-Jersey.
- Stock, J.R., Lambert, D.M. (2001), *Strategic Logistics Management*, fourth edition, Irwin / McGraw-Hill.
- Tibben-Lembke, R. (2002) Life After Death: Reverse Logistics and the Product Life Cycle. *International Journal of Physical Distribution and Logistics Management*, Vol. 32 No.3, pp.223-244.
- Trebilcock, B. (2002), The seven deadly sins of reverse logistics. *Logistics Management & Distribution Report*, Vol. 41 No. 6, pp.33-36.
- Ummenhofer, M. (1998), *La logistique dans une perspective d'écologisation : vers l'écologistique intégrée*, Thèse de doctorat en Sciences de Gestion, Université de la Méditerranée (Aix-Marseille II), november.
- Wu, H-J., Dunn, S.C. (1995), Environmentally responsible logistics systems. *International Journal of Physical Distribution and Logistics Management*, Vol. 25 No.2, pp.21-38.
- World Commission on Environment and Development (1987), *Our Common Future*. Oxford University Press, New York.