E-waste management policies and consumers' disposal: a comparative case-study between Milan and Paris

A joint doctoral diploma between:
(Co-tutorship)

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Department of Social Sciences and Research
Doctoral Program in Urban and Local European Studies (URBEUR)

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December 2014

UNIVERSITA' DEGLI STUDI DI MILANO BICOCCA

TELECOM Ecole de Management

Acknowledgements

I wish to express my deepest gratitude to my supervisors: Prof. Mario Boffi for strongly supporting and trusting me since the beginning of my research, and Dr. Cédric Gossart, for the fundamental substantive and methodological guidance he offered me during my stay in Paris and for being an amazing mentor.

I am very grateful to Prof. Gabriel Péries, for his helpfulness availability, and to Prof. Serena Vicari for her dedication, kindness and competence. I thank Dr. Jean-Baptiste Bahers and Prof. Giorgio Osti for supporting me in various stages of my thesis, and for having accepted to join my defence.

I am also grateful to Dr. Nicoletta Corrocher for her enthusiasm and for trusting my project, and to Prof. Natalie Benelli, for her precious help at the very initial step of my work. My thanks also go to Marianna d'Ovidio for always being present when I needed help. I thank the staff of EcoLogic, as working with them provided to me an extremely relevant professional opportunity.

I also thank the professionals involved in the e-waste sector for spending their time to help me with my thesis, and in particular Federico Magalini, Luciano Teli, Fabrizio Longoni, Sara Mossetta, Luciano Arrigoni, Bertrand Reygnier and Thomas Deshoulières.

I am grateful also to all my colleagues, and in particular to Sofia Pagliarin, Emanuela Struffolino, Loris Mazzagatti, Altay Özaygen and Linda Salahaldin, for their support, for the fruitful discussions we had and for their friendship.

I want to express my gratitude to the whole Gossart family for adding an invaluable personal and professional value to my French experience.

Thanks to my *ever green* friends: Luisa Vismara to be as usual an extraordinary *travelling companion.* Thanks to The Elf for the wonderful time we spent together in the last three years, we both enthusiastic about our coloured and bizarre projects (by the way: long life to them!). Thanks to Super-Lillona as she is such a good friend and surprising person. Thanks Malnerich to teach me and The Elf the straight path. Thanks to Enriquez to be always a close friend and to Nik for our endless Skype conversation. Thanks to Fabry who has provided a warm presence in my life since long time. Thanks to Fra for her friendly support.

Thanks to my soccer team-mates from the A.C. Paris and in particular to Mathi and Yass, and also to my Salvadorian soccer team-mates in Italy, with a special thanks to Joce, Nubia, and Claudia.

Thanks to all others that there is not room to mention here, but which represented however a sweet opportunity of friendship and sharing of experiences in these years.

I am grateful to The Hen for being my best friend.

I am full of gratitude also to Mariella for always supporting and trusting me and to being a fundamental person in my life.

I thank Minnie for supporting and accompanying me always, for being patient and full of attention.

I finally want to thank my family for teaching me the sense of humour and for being so full of life, inclusive and warm, whatever happened.

Abstract

In recent years the matter of waste of electrical and electronic equipment, also referred to as *WEEE* or *e-waste*, has become a relevant field of analysis amongst several disciplines and research contexts. This is due to the very specific nature of this waste component, which contains hazardous as well as valuable materials. Moreover, of the whole rate of urban solid waste, the e-waste component is comparatively the fastest rising, and this trend is expected to continue according to the quality and quantity of hi-tech product consumption. Such multifaceted characterisation makes the e-waste question a very challenging topic on the political, social and environmental levels.

The general research aim of this doctoral thesis is to draw insights about the factors affecting the act of disposal of e-waste on an urban scale. Such interest meets a double goal. From the one side it relates to the issue of environmental agency, which is a very relevant research topic whose understanding holds relevant theoretical implications to social and management sciences. Secondly, framing the act of e-waste disposal in city spaces means providing useful insights on the front of urban waste governance, which is a largely investigated topic due to the role that city spaces actually play as key drivers of the societal transition towards goals of sustainability worldwide. In particular, by adopting a multiscalar and transdisciplinary approach, the thesis is built as a comparative case-study between Milan and Paris, where the implementation of the e-waste supply chain is analysed and the related disposal behaviour of consumers is interpreted.

Due to the lack of previous studies focusing on e-waste disposal in developed countries, and to the specific features that this waste component is supposed to hold –apparently *clean*, valuable, hazardous, recoverable, etc.- it is approached by a qualitative explorative proceeding and a pragmatist perspective. Here, the unit of analysis of consumers is questioned via in-depth interviews with a sample of students in the two cities, while the e-waste supply chain is analysed by investigating the role of the institutional actors involved via interviews with key informants and archival data analysis.

The overall objective of the study is not only to emphasise the connections between the macro dimension of policies and the micro sphere of social behaviours, but also to understand what configuration the different stakeholders involved in e-waste management take and what are the most relevant weaknesses and strengths of the chain. This overall insight is expected to provide useful key reading into the possible alternative method of e-waste management and consumers' environmental agency.

Sommario

Negli ultimi anni la questione dei rifiuti da apparecchiature elettriche ed elettroniche, anche conosciuti con l'acronimo *RAEE*, è divenuta una tematica di grande rilievo ed interesse in diversi ambiti disciplinari. I RAEE contengono infatti materie prime seconde dal valore economico crescente, ma sono al contempo rifiuti pericolosi. Inoltre, sul totale dei rifiuti solidi urbani sono la componente maggiormente in crescita, e tale tendenza è destinata ad accelerare in conseguenza della rapidità di innovazione del settore tecnologico. Tali caratteristiche rendono la gestione dei RAEE una questione ancora molto aperta, la cui ricomposizione rappresenta una grande sfida sia a livello politico, che sociale e ambientale.

La presente ricerca si pone l'obiettivo di indagare quali sono i fattori maggiormente significativi nell'influenzare il comportamento di raccolta dei RAEE su scala urbana. Tale obiettivo ha un doppio interesse. Da un lato contribuire alla riflessione concernente il comportamento ambientale dei consumatori: una tematica già largamente presente nella riflessione sociologica e negli studi di gestione, a causa delle importanti implicazione teoriche e pratiche che la sua comprensione comporta. Dall'altro lato, un inquadramento dei comportamenti di smaltimento dei RAEE nel contesto urbano arricchisce l'ampio dibattito relativo alla gestione dei rifiuti in città: tematica che deve il suo rilievo al particolare ruolo che gli spazi urbani giocano nel loro potenziale di contribuzione al raggiungimento di obiettivi di sostenibilità su scala gobale. Più in dettaglio, la ricerca è condotta attraverso un approccio multidisciplinare e multiscalare, ed è empiricamente costruita come un caso di studio comparativo tra Milano e Parigi: qui viene analizzata l'implementazione della filiera di gestione dei RAEE nonchè il comportamento di smaltimento dei cittadini-consumatori.

A causa del ridotto numero di studi precedentemente condotti in relazione al comportamento di smaltimento dei RAEE nel mondo sviluppato, ed anche in relazione alle specifiche caratteristiche di questa componente dei rifiuti –apparentemente *puliti*, contenenti materie preziose, pericolosi, altamente recuperabili, ecc.- la questione viene analizzata attraverso un approccio esplorativo e qualitativo. L'unità di analisi dei consumatori viene investigata tramite interviste approfondite a un campione di studenti nelle due città, mentre il lato della filiera è interpretato tramite l'analisi del ruolo degli attori istituzionali coinvolti, grazie a delle interviste e allo studio di fonti precedenti.

L'ambizione complessiva del presente lavoro non si limita all'analisi delle interazioni tra la sfera macro delle politiche di gestione dei RAEE e la relativa dimensione micro dei comportamenti sociali e individuali di smaltimento, ma anche si estende alla comprensione della configurazione che la rete di attori coinvolta nella gestione dei RAEE assume, e di conseguenza all'individuazione dei punti di forza e di debolezza della filiera. L'obiettivo centrale della tesi è produrre delle chiavi di lettura del fenomeno *RAEE* utili a suggerire metodi di implementazione della filiera più efficaci, nonchè di incoraggiamento dei consumatori ad uno smaltimento proprio.

Résumé

Au cours des dernières années, la question des équipements électriques et électroniques, aussi connus à travers l'acronyme DEEE, est devenue un domaine d'étude dans plusieurs disciplines et contextes de recherche. Cela est dû aux spécificités des DEEE, car ils contiennent des composants dangereux ainsi que des matières précieuses. En outre, parmi les différentes typologies des déchets urbains, les DEEE sont la composante qui connait la plus forte croissance, et cette tendance va se poursuivre car elle est liée à l'hyper génération et consommation d'appareils électroniques. Cette série des caractéristiques rend la question des DEEE complexe et pertinente sur plusieurs plans d'analyse : politique, social et environnemental.

L'objectif général de cette thèse est de tirer des enseignements sur les facteurs qui impactent l'acte de tri des DEEE des consommateurs à l'échelle urbaine. Cet intérêt répond à un double objectif. D'un côté cela soulève la question des comportements verts, qui est un sujet de recherche largement débattu et dont la compréhension a des implications théoriques et pratiques relevant à la fois des sciences sociales et des sciences de gestion. deuxièmement, enquêter sur le geste de tri à l'échelle urbaine signifie contribuer au débat scientifique concernant la gouvernance de déchets en ville, qui est un thème très important du fait du rôle que les espaces urbains jouent aujourd'hui en tant qu'acteurs clés de la transition vers un développement durable. En particulier, en adoptant une approche multi-échelle et transdisciplinaire, la thèse est construite comme une étude de cas comparative entre Milan et Paris, où la mise en œuvre de la filière des DEEE est analysée et le comportement de tri des consommateurs sont interprétés.

En raison du nombre réduit d'études portant sur le geste d'élimination des DEEE dans les pays développés, et du fait des caractéristiques spécifiques de cette composante des déchets - apparemment *propres*, précieux, dangereux, récupérables, etc.- le thème est étudié grace à une méthode exploratoire et qualitative, et dans une démarche pragmatiste. Dans cette recherche l'unité d'analyse des consommateurs est analysée à travers des entretiens approfondis sur un échantillon d'étudiant(e)s universitaires dans les deux villes, tandis que la filière des DEEE est analysée à travers l'étude du rôle des acteurs institutionnels impliqués à la fois via des entretiens et une analyse des données et rapports publiés.

L'objectif global de l'étude n'est pas seulement de mettre l'accent sur les liens entre la dimension macro des politiques de gestion et celle des comportements individuels et sociaux, mais aussi de comprendre quelle est la configuration prise par les différents acteurs impliqués dans la gestion des DEEE et quelles sont les points faibles et forts de la chaîne. Cette réflexion devrait fournir des clés de lecture utiles pour nouspermettre de suggérer des méthodes alternatives de gestion des DEEE en ville ainsi que des pistes de réflexion pour encourager le bon tri des DEEE par les citoyens-consommateurs.

Contents

List of Figures iv
List of tables vi
Chapter 1 1
1. Introduction 1
1.1 Theoretical and policy relevance of the research 3
1.2 Research question and hypotheses 4
1.3 Outline 6
Chapter 2 10
2. Environmental behaviour: a theoretical framework 10
2.1 Modelling behaviour: the methodological individualism 11
2.2 Situational approaches: understanding the dynamics of contextual and social conditions 16
2.3 Psychological and external conditions: which lesson? 18
2.4 Institutional framework: a macro contextualization of individuals' agency 20
2.5 Claiming a meso perspective: the focus on habits and practices 25
1.6 An integrative and multi-disciplinary view 28
2.7 E-waste recycling behaviour: insights and theoretical treatment 30
Chapter 3 32
3. The challenge of e-waste for the lifestyle of Western society: environmental, economic and socio-cultural implications 32
3.1 Waste: historical and cultural trends 33
3.2 Waste: normative framework in the European context 35
3.3 Defining E-waste 37
3.4 E-waste: a multifaceted issue 41
3.4.a The dramatic climb of e-waste 41
3.4.b E-waste hazardous components and Environmentally Safe Management (ESM) 43
3.4.c Urban mines: The monetary value of e-waste series 45
3.5 E-waste impact in the digital era: between Local and Global 46
3.6 E-waste management in the European Union: the WEEE Directive 49
3.7 Multi-stakeholder approach and shared responsibility in e-waste management 53

3.8 The WEEE Directive transposition: common patterns in Italy and France 54
Chapter 4 56
4. Methodology 56
4.1 E-waste recycling behaviour: between theory-test and exploration..... 57
4.2 Contextualising the case: an urban comparison 60
4.3 Research design and concepts..... 62
4.3.a The individuals' unit of analysis..... 65
4.3.b Sampling strategy 69
4.3.c The supply chain of e-waste management 70
4.4 Conclusive methodological considerations..... 76
Chapter 5 80
5. E-waste supply chain and consumer disposal: the Italian case-study 80
Part I 82
5.1 The Italian supply chain of e-waste management 82
5.1.1 The clearing house model in Italy 83
5.1.2 The Reimbursed Compliance Cost 87
5.1.3 The paradox of an efficient supply chain with a poor collection rate..... 89
5.1.4 The partial success of the clearing house model in Italy 93
5.1.5 Conclusive reflections on the clearing house model implementation in Italy 102
Part II..... 105
5.2 E-waste governance on urban scale: the Milan case-study 105
5.2.1 Waste and e-waste collection performances in Italy 105
5.2.2. Waste and e-waste collection performances in the Lombard provinces and in Milan 110
5.2.3 Waste governance in Milan 115
5.2.4 E-waste take-back design 119
5.2.5 Disposing of small WEEE: the effectiveness of e-waste SC in Milan 121
5.2.6 Conclusive considerations on e-waste collection performances in Milan 127
Part III 130
5.3 E-waste collection behaviour in Milan: the case of students 130
5.3.1 The matter of attitudes 130
5.3.2 Environmentally significant behaviour and waste collection conduct 135
5.3.3 Awareness concerning waste and e-waste topics 138
5.3.4 Behaviour-specific knowledge: waste and e-waste disposal channels 140
5.3.5. Interaction with institutional stakeholders: AMSA, retailers and the SSE sector 142

5.3.6 Social norms and interpersonal influences on recycling behaviour 143
5.3.7 The (W)EEE object in the Italian case 147
5.3.8 Past behaviour and disposal habits 148
5.3.9 Profiles of e-waste recyclers 152
5.3.10 Conclusive considerations from the Italian case 154
Chapter 6 159
6. E-waste supply chain and consumers' disposal: the French case-study 159
Part I 161
6.1 The transposition of the WEEE Directive in France 161
6.1.1 The French e-waste SC: differences and similarities with the Italian case 163
6.1.2 Compliance cost and visible fee: a double financing mechanism 169
6.1.3 Performances of the French e-waste SC 171
6.1.4 E-waste leakage from the official SC: informal and dispersed channels 173
6.1.5 The Italian and French e-waste SC: formal, informal and illegal channels 177
Part II 186
6.2 The Paris case-study: e-waste governance and comparative insights 186
6.2.1 A general view on waste and e-waste collection performances within the French territory 186
6.2.2 The estate of the art about waste and e-waste collection in Île-de-France 188
6.2.3 Waste management policies in Paris 193
6.2.4 E-waste management in the French capital: a multi-stakeholders approach but a poor collection rate 196
6.2.5 Conclusive and comparative insights 208
Part III 212
6.3 E-waste disposal behaviour: findings from the Paris case-study 212
6.3.1 Environment and attitudes 212
6.3.2 The matter of behaviour: environmental indicators 217
6.3.3 Awareness on waste and e-waste topics amongst French students 221
6.3.4 Disposal skills 221
6.3.5 Individual behaviours and institutional actors 223
6.3.6 The social side of individuals' conduct: contextual and interpersonal influences on the act of disposal 225
6.3.7 Features of electronic appliances and related act of disposal 229
6.3.8 Routines and practices: the performative role of past behaviours in waste disposal 230
6.3.9 Comparing e-waste recycler profiles in Paris and in Milan 233

6.3.10 E-waste disposal behaviour: conclusive and comparative insights 236
Chapter 7 243
7. Discussion 243
7.1 Testing the hypothesis: robust and provisional results 243
7.1.a Environmental concern and e-waste disposal 243
7.1.b The impact of social relations and past behaviours on e-waste disposal 245
7.1.c Problematising the link between collection scheme and e-waste disposal 248
7.2 Explorative insights for future deepenings 249
7.2.a (Im)proper recycling and trust in institutions 250
7.2.b EEE use and WEEE disposal 251
7.2.c Aware citizens and e-waste handling 253
7.3 Additional evidences: the act of disposal under an innovative spotlight 253
7.4 Pro-environmental and recycling behaviour: contributions of the research 255
7.5 From theory to practice: recommendations and insights for e-waste governance 257
7.6 Approaching the environmental question: the relevance of an integrative model 258
Chapter 8 260
8. Conclusions 260
Bibliography 266
1. Articles, books, reports 266
2. Websites 274
3. Institutional Sources: list of interviewed key-informants and related affiliation 276
Glossary 278
Appendices 280

List of Figures

Figure 2.1 - Theory of Planned Behaviour 12
Figure 2.2 - Norm Activation Theory 15
Figure 2.3 - Value-Belief-Norm Model 18
Figure 2.4 - Environmental script of objects 25
Figure 2.5 - Social practice scheme 27
Figure 2.6 - Components of practice 28
Figure 2.8 - Small e-waste features 31

Graph 3.1 - Municipal waste generation compared to Gross Domestic Product (GDP) and population weight in the European Union. 35

Figure 3.6 - EEE put on the market, from 1990 to 2015, by region 433

Graph 3.9 - EEE PoM compared to WEEE collected, reused and recycled in European countries 48

Diagram 3.10 - Life cycle of electrical and electronic equipment 49

Diagram 3.11 - Supply chain of management from EEE to WEEE and main actors involved 53

Figure 5.1 - The Clearing House Model in Italy. E-waste and monetary flows. 88

Figure 5.2 - E-waste and monetary flows in the Italian e-waste SC: official, informal and dispersed channels 91

Map 5.5 - Dissemination of municipal collection points in Italy: white areas indicate lack of municipal CP. 93

Map 5.6 - kg Volume of waste produced per capita per Italian Region (kg). 107

Map 5.7 - Percentage of separate collection upon the total rate of USW per Italian Region per year (2011) 107

Figure 5.9 - E-waste collected, demographic weight, number of CPs and RPs per Italian Region (2012). 109

Figure 5.10 - kg/day per capita of waste generate in Lombardy Provinces110

Map 5.11 - Percentage of separate collection in Lombardy 111

Map 5.12 - Production of waste per capita per city in the Province of Milan. 112

Map 5.13 - Percentage of separate collection per city in the Province of Milan. 112

Figure 5.16 - Distribution of municipal collection points in Milan 117

Diagram 5.17 - Institutional collection scheme per e-waste category in Milan 120

Diagram 5.19- Main channels of small WEEE disposal in Milan 129

Figure 6.1 - E-waste intercepted per eco-organism in France (2012) 164

Figure 6.3 - EEE put on market (tonnes) in France per category in the domestic sector (Trend 2009-2012) 172

Figure 6.4 - Tonnes of e-waste collected in France per category (Trend 2006-2012) 172

Map 6.7 - E-waste collection performances per region and department in France. 188

Figure 6.8 - E-waste collected in Île-de-France per category of collector compared to the national French average. 189

Map 6.9 - E-waste collection performances in Île-de-France per department (2013) 190

Map 6.10 - E-waste collected and contribution to e-waste collection by local authorities, retailers and SSE sector in the department of Paris in 2013 191

Map 6.14 - Localisation of landfills (red circles), “clean points”(green circles) and “focus point” (yellow circles) in Paris 199

List of tables

Table 2.7 - Four causal variables of recycling behaviour 30

Table 3.2 - Average Municipal Solid Waste (MSW) generation rates by income on a global scale. ... 35

Table 3.3 - EEE categories according to the EU Directive 2002/96/EC 38

Table 3.4 - WEEE categories according to the French and Italian legislative frames 40

Table 3.5 - Evolution of Global E-Waste Volumes 42

Table 3.7 - Some examples of hazardous substances contained in WEEE and the related impacts 44

Table 3.8 - Critical resource use in electronics and years of consumption remaining in global reserves 45

Table 4.1 - Variables here hypothesized to affect e-waste recycling conduct..... 64

Table 4.2 - Main sources consulted in the course of the study concerning e-waste..... 71

Table 4.3 - Interviewed key informants of e-waste SC and their institutional affiliation in Italy and France 75

Table 5.3 - Overall data referring to e-waste management in Italy: CDCR and alternative channels .. 92

Table 5.4 - Percentage of e-waste collected per category and related effectiveness rate (2012) 93

Table 5.8 - Separate collection matters per Italian region 108

Table 5.14 - Focus on MSW collection in Milan (2011) per typology of waste 113

Table 5.15 - Detail of e-waste collected per category in Milan (2011-2012) and related figure in Italy (2012) 114

Table 5.18 - Institutional channels of disposal of e-waste in Milan..... 120

Table 5.20 - The matter of practice: Images, skills and artefacts 150

Table 5.21 - Proper and improper handling: most often recalled impacting factors 155

Table 6.2 - Number of e-waste CPs in France in 2012 per category of collector: local authorities, retailers, SSE sector and others. 169

Table 6.5 - Summary of the main figures of the e-waste SC in France and in Italy 181

Table 6.6 - Waste treatment processes per French region 187

Table 6.11 - Waste collected by the Municipality of Paris in 2012 per waste category 192

Table 6.12 - Waste components found into the bin of unsorted waste in 2012 in Paris..... 192

Table 6.13 - Institutional disposal channel per e-waste category in Paris..... 198

Table 6.15 - Details of e-waste collected per category in Paris (2011-2012)..... 200

Table 6.16 - The Milan and Paris case-studies: key-figures about e-waste management on urban scale 210
Table 6.17 - Small WEEE disposal channels in Paris 211
Table 6.18 - A resuming picture about the profiles of waste and e-waste recyclers in Paris 241

Chapter 1

1. Introduction

Nowadays, scientists from different disciplines agree with considering that, after the so called *Thirty Glorious*,[1] a radical change occurred in Western countries in the way they consider the concept of *development*. In that phase, what had been until then positively referred to as *modernity*, revealed its dark side in the forms of societal, economic and political contradictions on a global scale, as well as negative impacts on the environment (Baumann, 2000; Beck, 1992). These effects were the inevitable consequences of a dominant model of growth believed *with no limits* and based on the overexploitation of natural resources. The emergent political and cultural awareness of the urgency to shift to alternative forms of societal organisation to persecute the concept of development, is today regarded as the transition from modernity to *postmodernity*.[2] New cultural movements have spread and new ways of conceiving the economic model, the environment, and the matters of policy and governance, have taken root. In particular, the *environmental question* –which was born as such in the 1970s– has increasingly attracted the attention of the international political agenda. 1972 marked a watershed for United Nations members, as they conducted, for the first time and under a programmatic and shared vision, a general reflection on the needs for countries to take into account environmental issues in their political and economic planning. This overall discourse has then been translated into a document called the Stockholm Declaration,[3] which represented the first step of a long institutional path in rethinking the relationships between nature and society. The year 1987 marked another important phase in the transition towards the full integration of environmental issues in mainstream politics at global scale. That year, the Brundtland Commission,[4] an organisation set up by the UN aiming to identify environmental problems worldwide, issued the notorious *The limits to the growth* report. This document for the first time clearly brought to light several critical issues of environmental governance, denouncing how eco-systems degradation was caused by the dominant economic model of growth in developed countries, and why this trend was no more *sustainable*.[5]

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[1] With this term we refer to the period between the end of the Second World War and the late Seventeens.
[2] The term *postmodernity* is adopted in several and different domains. It is here considered in the sense given by Lyotard (1981).
[3] The meeting took place in Stockolm and was titled *Stockolm Conference on the Human Environment*.
[4] World Commission on Environment and Development (WCED).
[5] This report also provides the first definition of "Sustainable Development, which notably is: Sustainable Development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (Bruntland Commission, 1987).

Today there is a substantial scientific consensus that the main global environmental threats are direct or indirect consequences of human actions –economic models, cultural forms, institutional arrangements, social practices, consumption patterns,…-, which drive the overexploitation of natural resources and consequently the disruption of the fragile balance of natural ecosystems. In this, the attention of researchers and policy makers has focused on *sustainability* from a variety fields: atmospheric pollution and climate change, land use, waste and water management, but also food security, social justice, urban ecology, etc. Therefore, the Eighties and Nineties have witnessed a proliferation of studies in many disciplines focusing on various environmental key topics. Pushed by governments' top priority to add environmental achievements to their political goals, natural scientists formulated numerous policy recommendations (Baker, 1996). Within this macro-societal framework, social and psychological sciences started, in the same years, to afford their scientific contribution to the debate on sustainability. In particular, scholars from sociology and psychology have provided a series of models and approaches that consider together human behaviours and environmental concerns. However, these works vary enormously in terms of topics and epistemological assumptions, and they have also witnessed a recent development in such a way that, today, environmental studies in social sciences represent a specific sub-discipline (Osti & Pellizzoni, 2008). In this branch,[6] waste management and recycling behaviour are among the most typically addressed issues. However, consumers' recycling behaviour as well as waste governance is not approached in the same manner, depending on different theoretical models, sub-disciplines and epistemological assumptions. Social sciences have indeed looked at waste issues from various angles: as an opportunity to conduct epistemological reflections on contemporary lifestyles (Bauman, 2005; Gregson, 2007), to draw insights on the cultural meaning that material goods represent for individuals (Hawkins, 2001a), to study citizenship and local participation (Pellegrino, 2010), to study social practices (Chappels & Shove, 2002; Spaargaren, 2011)to evaluate public environmental imaginaries and communication campaigns (Tipaldo, 2007), to deepen the study of environmental conflicts (Minervini, 2010), to provide insights on environmental governance (Winter, 2011). The present study pertains to this overall mainstream. In particular, the general research aim of this work is to draw insights on the act of waste disposal by citizens-consumers, by considering a double lens of analysis: psycho-attitudinal factors and socio-cultural practices from the one side, and from the other the macro dimension of

[6] In particular, it seek to understand a variety of topics, including agri-food systems, environmentalism as social movement, the ways in which societal members perceive environmental problems, the origins of human-induced environmental decline, the relationship between population dynamics, health, and the environment, and the role that elites play in harming the environment. The inequitable social distribution of environmental hazards is another central area of Environmental Sociological research, with scholars examining the processes by which socially disadvantaged populations come to experience greater exposures to myriad environmental hazards including natural disasters.

institutional and infrastructural provisions. The following section enters into the detail of the theoretical and policy implications related to the concern of waste recycling behaviour.

1.1 Theoretical and policy relevance of the research

The present work has a twofold aim. On the one hand it contributes to the scientific debate around the environmental and recycling behaviour of consumers; on the other it draws insights from such debate to offer useful operative tools for policy makers and other stakeholders. In particular we are interested in:

1. Deepening which variables impact the environmental behaviour of consumers in the case of waste handling. In this, we place our research in the stream of studies pertaining to environmental sociology, social psychology and management studies. Here, the general objective is to individuate where the key drivers of environmental change are situated, as well as the factors influencing the transition to new societal compromises that will better satisfy individuals' concerns. This in turn allows us to question the actual contribution that consumers can make to the transition towards sustainability goals in contemporary societies.

2. Bringing operative insights to policy makers on the issue of waste governance. Here the study shifts to a policy-oriented aim, which is consistent with the urgency that waste management topics increasingly pose to scientists and academic research (Lee, 1996).

Within this frame, a specific component of Municipal Solid Waste (MSW) systems is addressed by this research, namely waste deriving from electric and electronic equipments, commonly referred to by the acronym *WEEE* or *e-waste*. In recent years, the e-waste issue has indeed become a relevant field of analysis amongst several disciplines and research contexts, as it presents a series of features that make it a very challenging topic at political, societal and environmental levels. First, out of the whole rate of urban solid waste, it is comparatively the fastest rising, with an annual growth rate in the European Union around 3-5% (Gossart, 2011). Moreover, e-waste is composed of toxic and valuable matter and its dismantling is costly and highly demanding in terms of technology requirements. For these reasons, e-waste is sadly notorious for the phenomenon of international dumping: it is illegally shipped from developed to developing countries, where an Environmental Sound Management (ESM) can seldom be guaranteed, and where improper e-waste treatments cause severe impacts on human health and local ecosystems (Gossart & Huisman, 2011; Leung, Wei Cai, & Wong, 2006; Otsuka, Itai, Asante, Muto, & Tanabe, 2011). Parallel to this dramatic phenomenon, e-waste has begun to pose environmental problems also in Western countries, where relatively poor collection and recycling rates are commonly recorded (UNU - StEP, 2011). In this context, the forms of e-waste mismanagement are also numerous: deliberate interception of waste streams by illegal and informal waste operators, simple abandonment of appliances in public spaces by consumers, e-waste theft and damaging in landfills, and a more hidden and private form of *misbehaviour*, consisting of disposing of small devices together with unsorted refuses. Commonly, WEEE is also stored by households, to be used a

back-up equipment or because of poor disposal skills. All these phenomena represent a huge source of e-waste diversion from the official supply chain (SC), which indeed struggles to achieve the collection targets imposed by international regulations (UNU-StEP, 2009a). Within this frame, cities occupy a very peculiar and pivotal place in contemporary e-waste governance. Indeed, due to their *heterotrophic*[7] nature (Davico, Mela, & Staricco, 2008), urban spaces concentrate e-waste volumes. In this respect, the literature on e-waste management refers to the amount of WEEE accumulated in city-spaces by adopting the term *urban mines* (Hagelüken & Buchert, 2008; UNU-StEP, 2009a). Thus, studying e-waste handling practices provides interesting inputs under a double light. Firstly, it leads to deepen the theoretical reflection on what can be referred to as *sustainability from below*,[8] namely the actual opportunity to expect a global transition towards a more sustainable society starting from individuals' commitment. Secondly, addressing this issue means gaining knowledge and experience for urban governance purposes in the field of e-waste governance, which remains poorly investigated in social sciences. Thus, focusing on e-waste recycling policy and practice, environmental concern and action are here explored as sociological and management problems in a way that moves beyond the individualistic paradigms as well as structuralist approaches. In its respect, this thesis argues that better explanations of performances and variations of e-waste management may reside in the acknowledgement of a reciprocal interrelation between psycho-attitudinal factors, socio-cultural trends, and the wider institutional and infrastructural system of provision.

1.2 Research question and hypotheses

Starting from our theory and policy-oriented goal, this research questions:

1. Whatever environmental concern comes to have an impact on consumers' behaviour.
2. The extent to which individuals can contribute to sustainability transition in a contemporary world.
3. The main factors that need to be taken into consideration to alter environmental behaviours and public policies.

Considering the specific interest that the present study places in waste studies, in particular in the e-waste issue within the urban context, we formulated the following research question:

Q. What are the factors affecting the e-waste disposal behaviour of citizens-consumers?

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[7] By adopting this term the authors refer to urban ecosystems by intending an ecosystem which is highly depending on external sources -in terms of flows of material and immaterial goods- by being at the same time the biggest generator of external negative impacts on the other ecosystems on global scale.

[8] See http://www.g20g8.com/news_sustainability.html. (Last consulted on September 2014).

To respond to this question, an international urban comparison has been built, which frames the topic within the developed context of the European Union. In particular, the case-studies of Milan and Paris have been selected, because these two cities do implement the ad hoc European legislation, the WEEE Directive, via an identical supply chain on national scale, but recording very different collection rates. To conduct the research, the methodology follows an abductive path (Thietart, 2007), which consists of approaching the study via a hypothesis testing step together with an explorative phase. The choice to combine an inductive stage with a deductive one is required by the subject of study. In fact, with respect to the dense literature on waste recycling behaviour (Bortoleto, 2014; Hargreaves, 2008; Jackson, 2005; Osti, 2002), very few works have so far been conducted in the field of e-waste collection (Darby & Obara, 2005; European Commission, 2006; Gurauskiene, 2008; Song, Wang, & Li, 2012a), while it is here believed that this phenomenon in part deserves an autonomous theoretical consideration, due to the intrinsic features of the (W)EEE object –dangerous, valuable, apparently *clean*, subject to rapid technological innovation patterns, etc.- and to the specificities of the related supply chain –multi-stakeholders, multi-scale, subject to different and sometimes conflicting interests- as it will be largely illustrated. It implies for us to firstly approach the theme by drawing insights from the general literature on environmental and recycling behaviours, while secondly addressing the topic proceeding by exploration. It means that some hypotheses have been formulated at the beginning of the thesis, but a further part of the study does however approach the theme with an explorative attitude. Here, with respect to the vast literature on consumers' agency in the environmental field, are privileged multidisciplinarity, integrative and systemic approaches, which emphasize not only individual psychological features in impacting consumers' conduct, as well as socio-cultural and contextual approaches (Stern, 2000b). This methodological attitude is coherent with a general trend in environmental, management and social studies that have indeed witnessed a growing complexity of their theoretical paradigms which increasingly draw on different disciplines and scales to study phenomena in the domain of sustainable development (Hiroshi, Takeuchi, Shiroyama, & Mino, 2011). Nowadays, many works which focus on recycling behaviour do conduct their reflections at the boundary between sociology, social psychology, behavioural sciences, management and policy studies, which is here considered a quite pertinent way to address such a multifaceted phenomenon. Indeed, beginning with a historical overview and evaluation of current theoretical concern, this thesis re-imagines domestic recycling as a complex phenomenon involving the engagement of different actors, which are both individuals and institutions. Thus, starting from what has already been elaborated by other researchers on the matter of recycling behaviour, and crossing these reflections with the peculiarities of e-waste, some factors have been isolated as being the most influential when addressing the topic of e-waste disposal behaviour. The following hypotheses have then been formulated:

Hp1. Environmentally friendly attitudes are poorly associated with e-waste disposal behaviour.

Hp2. Social context and domestic habits[9] are strongly associated with e-waste disposal behaviour.

Hp3. Collection schemes and the overall system of provision offered to citizens are strongly associated with e-waste disposal behaviour.

Furthermore, the study explores the matter of e-waste disposal behaviour by using an explorative approach to investigate the role of the following factors:

E1. The trust of consumers in the institutional stakeholders involved in the e-waste supply chain.

E2. The relationships that consumers have with electrical and electronic equipments (EEE).

E3. Consumers' awareness and related disposal skills on e-waste.

E4. The potential impact of general waste disposal habits on e-waste disposal behaviour.

As far as methodology is concerned, the research is grounded on pragmatism and qualitative methods (Johnson, Onwuegbuzie, & Turner, 2007), exploiting two phases of analysis. Firstly, the Italian and French e-waste supply chains are deepened and their local implementation on urban scale is studied. This step implies in turn an ex ante analysis of secondary sources in the forms of existing data and works about e-waste governance in the two countries and urban contexts investigated. This step is also accompanied by interviews with institutional key informants belonging to e-waste supply chains in Italy and France as well as in Milan and Paris. This phase allows us to frame the institutional and infrastructural surrounding within which citizens-consumers' agency is situated. Secondarily, semi-structured interviews are conducted among a sample of university students in the two local contexts investigated, in order to question the impact of psychological and socio-cultural factors on the act of e-waste disposal.

1.3 Outline

This introduction is followed by the subsequent chapters and related contents:

Chapter 2 deals with the scientific literature on environmental and recycling behaviour. It recalls the main approaches which, starting from the Seventies, have addressed this matter. In particular, here are conventionally distinguished three streams of studies: the psycho-social individualistic perspectives, which draw on personal features (attitudes, values, awareness, socio-demographics, …) to explain the

[9] Operative definitions are contained in chapters 1 and 3.

propensity to act in a "green" way. Secondly, is illustrated the mainstream of studies, which stresses the role of contextual variables in overriding individuals' willingness to accomplish sustainable conducts. Within this stream, "contextual factors" are referred to not only as a form of political, economic and infrastructural constraints, but also as socio-cultural trends. Thirdly, the most recent literature known as *Social Practice Theory* (SPT) is presented, as it places the key-factor to read individuals' engagement in the matter of recursive behaviours and *habits*. Finally, we mention integrative, transdisciplinary and multistakeholder approaches which try to solve with a unique model and epistemological reflection the question of green agency. The last part of the chapter focuses on the specificities of e-waste handling, with particular attention paid to the case of small WEEE disposal: the e-waste category which is the object of our case-study. The works so far conducted in this field are thus presented, together with the theoretical and practical tools which are normally mobilised to address the topic. This section points out how e-waste disposal behaviour can partly draw on the general literature on green agency, as it deserves an autonomous theoretical treatment in view of its specific characteristics.

Chapter 3 introduces the e-waste topic. Here the issue is presented in its multifaceted characterisation, as a political, environmental, economic and socio-cultural question. The chapter begins with a general reminder on the issue of waste as a complex object, which is historically and geographically determined. Secondly, the e-waste component is illustrated with its definition and classifications useful to frame the case study. Furthermore, starting from a general view on e-waste as an international *hot* topic, the question is situated within its context, which is the European Union in general and the Italian and French contexts in particular. The urgency of addressing the e-waste problem is well explained and under different lights. We indeed see that the official e-waste supply chain is challenged by informal and illegal channels of e-waste management, which involves not only the organised crime, but also private individuals. Finally, the WEEE Directive, which is the legislative point of reference of EU members for e-waste management, is described, as well as its general transposition in Italy and France.

Chapter 4 provides methodological insights. It is here justified the adoption of an abductive proceeding whereby the study uses hypothesis testing as well as explorative phases. Secondly, the choice of our case study is justified: the two urban cases of Milan and Paris are illustrated, and the added value of the urban comparison underlined. We then explain the choice to focus the research by looking at the disposal of small WEEE. Again, on the basis of the theoretical insights presented in chapters 2 and 3, our hypotheses are formulated and the dimensions which are investigated in an

explorative fashion are presented. Furthermore, the chapter justifies the research strategy put in place to respond to the research question. Here, all the variables considered at stake do receive a precise definition, as well as the units of analysis on which the study is built. We then offer an in-depth view on the sampling strategy and the qualitative approach adopted. A final section provides useful insights concerning the limitations of the approach.

Chapter 5 illustrates the Italian case-study and consists of three sections.

Section 5.1 provides a global view on the implementation of the WEEE Directive in Italy. Here, the general logistics of the supply chain is presented, together with the financial scheme used in the chain. Then, the effective role of institutional stakeholders involved in e-waste management and their coordination is discussed. We further present the most important figures related to e-waste management and collection performances in Italy. A final part conducts a critical reflection about the actual transposition of the Directive in the Italian context, by emphasising the parts that are considered the most significant in impacting the act of disposal on a local scale.

Section 5.2 goes to the heart of e-waste governance on urban scale in Milan. It first presents the state of the art concerning waste and e-waste management per region in Italy, especially in Lombardy. It then proceeds by providing the most important figures about the separate collection and e-waste collection performances in Milan. Furthermore, the take-back scheme of ordinary refuses and e-waste is illustrated in detail by emphasising its implications from the point of view of users. We thus focus on small e-waste collection channels in the city. A critical discussion ends this section, by providing a debate about the effective implementation of the WEEE Directive on a local scale, and the actual role of the institutional stakeholders involved in contributing to the e-waste collection rate, with particular attention paid to the practical implications these have on the citizens-consumers standpoint.

Section 5.3 presents our findings with regard to the analysis of the interviews from the sample of students in Milan. Here, the disposal behaviour of respondents is presented according to the theoretical categories mentioned in chapter 4, and the link between the latter and local e-waste management policies is stressed. A further part of the section offers a conclusive reading of the results obtained per category of e-waste recycler profile. Finally, a critical discussion provides first provisional responses to our hypotheses and explorative assumptions.

Chapter 6 illustrates the French case study in comparison with the Italian one. It follows the same structure as the one defined in chapter 5, to which we make reference.

Chapter 7 consists of a final discussion about our findings. Here we offer a final debate concerning the acceptability of our three hypotheses, as well as the explorative assumptions we postulated at the beginning of the study. At this stage, we emphasize the link between our results and the theoretical and practical considerations from which we started. Furthermore, a third section illustrates additional insights which arose during the empirical study and which were not provided in the research design. Again, consistent with our double interest that is both theory- and policy-oriented, is described in detail an overall picture of the contributions that the thesis brings to the theoretical literature on environmental and recycling behaviours, as well as at the level of policy making in the field of waste and e-waste governance. A further reflection about the limitations of the research is offered, together with some considerations on the opportunity of the methodology and model adopted to approach the issue.

Chapter 8, after having briefly reminded the whole study and reconnected the research purposes to the actual findings and potential future developments, collects and stresses the main conclusions of the thesis. The thesis is then concluded by providing a synthetic and definitive response to the research question.

Chapter 2

2. Environmental behaviour: a theoretical framework

This chapter presents a theoretical rationale on the evolution of the scientific debate concerning the environmental behaviour of consumers. Starting from this review, the second part describes which, amongst those presented, are the theoretical tools considered the most appropriate for responding to the specific research aim of this proposal. However, before presenting such theoretical framework, it is necessary to mention some important related questions.

Commonly, manuals and bibliographic reviews in the field of environmental behaviour tend to classify different approaches according to the scale of analysis they present (Hargreaves, 2008; Jackson, 2005; Osti, 2002). Three main perspectives are recognized: the *micro*, the *macro* and the most recent *meso* proposal. Very briefly, the first corresponds to the psychologists' point of view, and it tends to stress the cognitive and mental pathways that consumers enforce in accommodating their choices (Icek Ajzen, 1991; Vining & Ebreo, 1990, 1992). Secondly, the macro perspective discerns a heterogeneous corpus of works that, in very different ways, emphasizes the role of the contextual frame[10] in performing individuals' conduct. These studies have several backgrounds, from the political sciences to cultural studies, but all of them share a top-down perspective regarding behavioural outcomes (Nicol & Thompson, 2007). Lastly, a more recent trend of studies individuates a meso scale of analysis as the most proper track for reading human agency (Reckwitz, 2002; Shove, 2010a, 2010b; Spaargaren & Van Vliet, 2000). This series of theories, far from uniform, focuses on the matter of habits and practices that individuals develop under specific conditions, both psychological and contextual. In this case, green agency is investigated and explained on the basis of recursive and adaptive behaviours.

The unquestionable value of this classification lies not only in its practical purposes of orientation within the enormous domain of human agency theories, but also on the different epistemological assumptions it recalls. In fact, each of these perspectives implies a different speculation concerning where the social change is believed to arise: from the willingness of individuals, from regulatory, technological and economic macro constraints, or from the matter of social practices. Compared to that, two reflections have to be conducted. Firstly we want to accentuate the always conventional nature of these distinctions. Indeed, as we account for the several models deriving from social and

[10] On the contents of *context* there will be provided a specific part further.

environmental psychology in more depth, we always find a more or less direct recall to the weight of contextual factors and past behaviour –habits notably- in giving stability and feasibility to many cognitive models (Icek Ajzen, 1991). Vice versa, contextual perspectives equally recognize the role of specific personality traits in disturbing the mono causal macro axiom. Equally, the reflection on *practices* borrows insights derived from previous considerations in the field of cognitive studies as well as contextual approaches (Warde, 2005). Coherent with the rising consensus about this acknowledgment, the most recent studies in the field of environmental and behavioural studies increasingly claim integrative and multi-disciplinary approaches to explain social phenomena, making an explicit effort in trying to overcome the boundaries imposed by any single discipline (Morin, 1990; Whitmarsh, O'Neill, & Lorenzoni, 2011). The second observation, linked to the previous, emphasizes the rising importance that the concept of *complexity* has reached in the field of environmental studies, and which is considered appropriate when addressing the theme of the present proposal. In fact, since the Seventies and Eighties, the concept of *nature* has ceased to be a purely scientific object of study for hard sciences and it began to spread as political, social and economic instance. This process was accompanied by a profound cultural transformation of how society considers itself in relation to the environment. The so called post-modern thought (Baumann, 2000; Beck, 1992; Lyotard, 1981) in vogue since that era, introduced and consolidated the concepts of uncertainty and complexity as something intrinsically constitutive of the relationship between humans and the environment, far from the previous modernist view of a nature external, under control and *at the service of*. This overall rethinking about the entangled interconnectedness between societal, economic and environmental phenomena, has also had as consequence a major openness of several disciplines to become mixed and work together in approaching the issues of sustainable development. Equally, this work approaches the matter of recycling behaviour renouncing behavioural models, but rather embracing explorative and multi-disciplinary proceedings.

Given these premises, the following theoretical rationale starts with the main important behavioural models deriving from economy and environmental psychology. Furthermore, the trend of studies of situational and quantitative sociologists is shown, and then it arrives at the most recent contextual and qualitative perspectives, passing through the contributions of the cultural approach and Science Studies (SS). A further part is dedicated to integrative and multi-disciplinary approaches, and the conclusive paragraph presents a specific view on e-waste recycling behaviour.

2.1 Modelling behaviour: the methodological individualism

The various models and conceptual frames that address the question of environmental conduct of individuals do not have an autonomous status, rather they borrow their theoretical tools from previous studies about consumption and social marketing, common and altruistic behaviour, and social and

cognitive psychology. The shared feature of all these approaches consists of an attempt to identify the driving forces that push people to express behavioural choices according to specific tastes, knowledge, moral norms, external pressures, available resources and so on. Thus, most of the models presented here have usually a wider value than simply being related to environmental and recycling concerns. However, each of them have been applied to the field of environmental agency (energy consumption, mobility, *green* shopping, recycling, etc.) and helps to compose the general frame necessary to the subject of the present research.

One of the most notorious arrays of models that confront the question of human agency derives from economy, which rests on the famous and disputed statement of *rational choice*. This concept assumes that individual agency is the outcome of linear thinking based on personal cost-benefit analysis. Work adopting this model are recognized in the literature under the label of Subjective Expected Utility (SEU) models (Jackson, 2005), and they postulate the utility-orientation of human conduct in terms of minimization of efforts and maximization of benefits. The individual-centred approach also implies an individual-centred methodology, which in literature is mentioned as *methodological individualism* (Stigler & Becker, 1977).

Despite the relatively lengthy success that this approach has had in the economy, it has been challenged by other orientations within the field of environmental studies, considering that:

> "Only a limited proportion of pro-environmental behaviour can be regarded as flowing from fundamentally self-interested value orientations […], and this is particularly the case where these incur net private costs to those who engage in them". (Jackson, 2005, p. 32)

And that is certainly the case of (e-)waste recycling conduct. Moreover, the rational choice model and its derivations have been strongly criticized as they simply consider individuals as *rational*, while on the contrary in decision-making processes they face uncertainty and loss of information. Finally, another common criticism is that these works miss consideration of the fact that rationality is a concept that is culturally, socially and contextually derived.

Shifting from this ground but still maintaining the crucial importance attributed to cognitive and *linear thinking* in intending human conduct, we can recall the Linear Model of Pro-Environmental Behaviour Change proposed by Finger (Finger, 1994), whose core idea is that an act resulting as environmentally *improper* depends on information deficit and a low level of awareness. Thus, filling an information gap is considered the most influential factor in redirecting consumers' behaviour.

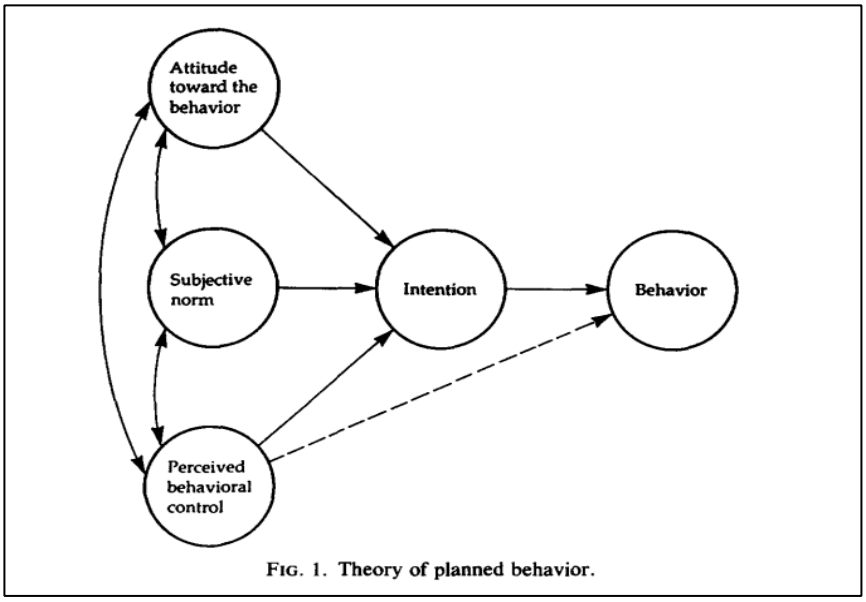
Again, other studies have maintained this idea of linear human thinking and goal-directed agency, but proposing more complex models that, to the extent they still relate to the methodological individualism, take the name of Adjusted Expectancy-Value Theories (AEVT) (Jackson, 2005). One of the most successfully established models belonging to this group of theories is the Theory of

Planned Behaviour (TPB) (Ajzen, 1991), which represents an adjustment of the previous Theory of Reasoned Action (TRA)(I. Ajzen & Fishbein, 1980). It worth recalling this model because it had great application through the introduction of some new elements. It states that (environmental) behaviour results from intentions that, in turn, are the outcome of the interactions between three factors:

1. Personal attitudes towards the conduct in question, which arise from the evaluation of and beliefs about the conduct and its outcomes.
2. Subjective norms, which are individuals' perception of what others would think of that behaviour.
3. Perceived behavioural control, namely the person's belief on its actual feasibility (see figure 2.1).

Thus, following the model, a proper recycling conduct derives from a positive attitude toward the issue of recycling, which in turn is influenced by the actual perception of the task's feasibility, and the assumed opinions of others regarding the act. It is evident that, even within a simplification, this model evolves in a direction of greater comprehension of elements. In fact, the introduction of subjective norms and perceived behavioural control opens up reflection on the role of *situatedness* and social pressure on individual agency.

Figure 2.1- Theory of Planned Behaviour



(Ajzen, 1991, p. 181)

Moreover, following Ajzen (1991):

> "If an important factor is missing in the theory being tested, this would be indicated by a significant residual effect of past on later behaviour. Such residual effects could reflect the influence of habit, if habit is not represented in the theory, but it could also be due to other factors that are missing […]. It can be seen that […] past behaviour retained a significant residual effect in the prediction of later behaviour". (P. 102)

This remark implies that, despite the substantial linearity of thinking that the model postulates, and even considering the general emphasis attributed to mere cognitive psychological factors, the TPB already admits the role of additional variables that only in a later phase will be explicitly addressed by the other approaches.

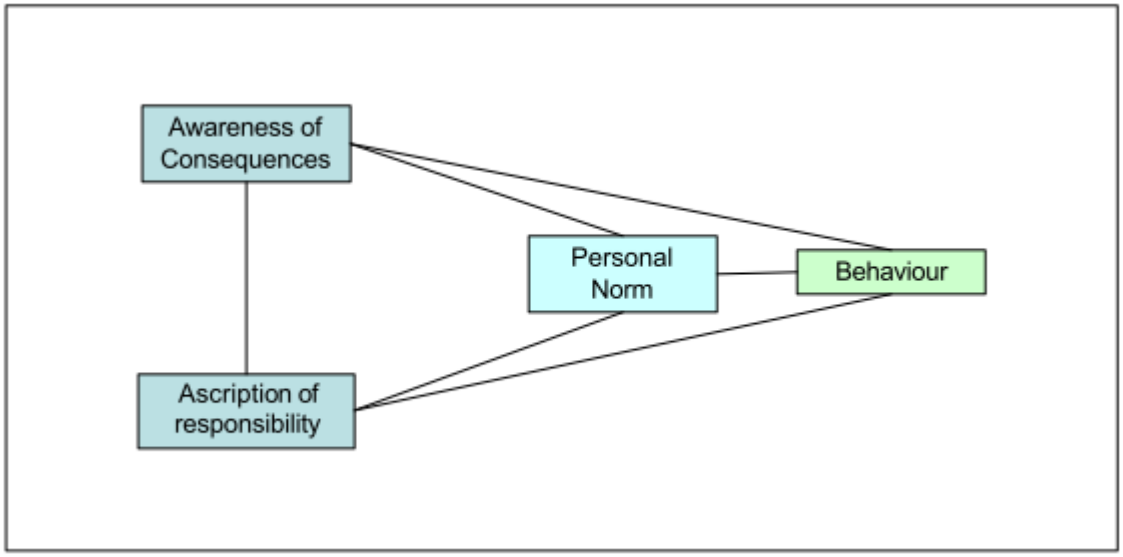
Because of its latent openness, this model has had great success, having been applied and revised in a vast range of different studies, including in recent times literature exploring recycling behaviour, with controversial results (Bamberg, 2003).

Still within the frame of methodological individualism, other approaches must be mentioned as the theories that emphasize the role of personal and ethical values as key to reading sustainable conducts. The basic idea is that pro-environmental behaviour flows directly from pro-social and moral values. Thus, a proper green conduct would result from a form of altruism. Considering the assumption of self-interest at the heart of the rational choice model, this orientation is supposed to offer an antithetical view. One of the most notorious models arising from this thinking is the New Environmental Paradigm (NEP) suggested by Dunlap and van Liere (Dunlap & Van Liere, 1978). The *New Paradigm* is seen by the authors as an emerging form of cultural opposition to the *Dominant Social Paradigm*. This last term refers to a vision of the relationship between society and the environment as typically anthropocentric and modernist. The dominant social paradigm, according to the two authors, would represent the ideological assumption of the overexploitation of natural resources' and environmental crisis. The new environmental paradigm argues that there is in act – between the Seventies and Eighties- a spread of a new political and cultural sensibility, which results in more responsible, concerned and respectful approaches to natural limits, and more oriented to a systemic view on the relationship between humans and nature. According to this, people adhering to respectful and altruistic values are expected to have a major correlation in performing green conduct. The undoubted value attributed to this model resides in the fact that it introduces personal values as cultural and social variables. Notwithstanding, it has been criticized for two main reasons. The first is the well-known existence of an attitude-behaviour gap (Steel, 1996), which normally disrupts the link between attitudinal and moral trends, and actual conduct. The second is a loss of acknowledgment that individuals' values suffer instability across different contexts and situations. Thus, even if this model represents a focal point in the scientific path on the theme of green behaviour, its heuristic power is

relatively weak given that no study up to date has been able to find a univocal recurrent relation between particular worldviews and pro-environmental agency.

Another value theory that is worth mentioning is the Norm Activation Theory (NAT) proposed by Schwartz (Schwartz, 1977). The core idea is the same of NEP, namely that individuals tend to commit to behave pro-socially (and pro-environmentally) because they feel personal moral obligation. However, in Schwartz the psychological normative sphere is activated by two other variables: the awareness of an action's consequences (AC) and a feeling of personal responsibility for them (AR), as showed in Figure 2.2. In the case of recycling, it would imply that a proper conduct derives from an ethical push to do *the right thing*, which in turn is in interaction with the consciousness of its consequences and the acknowledgment that recycling is a task rightly up to individuals. According to this model, the role of awareness and information is fundamental.

Figure 2.2 – Norm Activation Theory



(Schwartz, 1977, p. 247)

The explanatory power of value theory models is unstable, notwithstanding it does take a step forward to reflecting on green behaviour, since it introduces explicitly the link between personal values and external social constraints, in the forms of shared collective norms.

The following section will make a step forward, overcoming the models which focus on the mere individuals' psychology to deepening the theories which stress the situatedness nature of human agency.

2.2 Situational approaches: understanding the dynamics of contextual and social conditions

During the 1990s and the first few years of the new millennium, theoretical and empirical studies related to green conduct saw a spread and a rising complexification. This disciplinary maturation is due to the fact that, as mentioned above,[11] in those years the political and social narratives on sustainability issues transformed environmental rhetoric, impacting on its public acquisition and the scientific approaches aimed at reading it. Since that stage, the classical cognitive models were criticized for the relative simplicity attributed to human agency. However, it is even true that in the Eighteens, when environmental topics had not yet proliferated and the concept of sustainability was just emerging, they actually had more predictive power.

> "Studies conducted prior to the 1980s consistently find statistically significant relationships between beliefs and behaviour but not studies from the early 1990s. They hypothesize that motivations underlying recycling have become more complex with the growing popularity of recycling programs". (Saphores, Nixon, Ogunseitan, & Shapiro, 2006)

This statement is useful in pointing out the close relationship between historical development of the concept of environment, its political and cultural acquisition, and the need for psycho-social scientists to consider this evolution within their approaches. Thus, a lot of studies began to focus attention on a series of variables that, behind individuals (declared) attitudes and values, represent constraints or resources with respect to the action to be taken. Here, this heterogeneous array of works is referred to as a *situational approach*. The common treat shared by them is that they start from the same cognitivist model and methodological individualism, but deepening its heuristic power by questioning their variability with regard to individuals' external conditions. It is very hard to classify in this section the huge multitude of models, case-studies application and theoretical insights that the situational current has conducted. Notwithstanding, to make the exposure as simple as possible, we can say that these works have emphasized, to varying degrees, mainly on two types of situational factors, namely facilities system and socio-demographic features.[12] These two sets of variables have been defined, measured and combined with each other in different ways by different authors. What is necessary to emphasize here is that this laboratory does not arise antithetically with previous cognitive and psychological work, but on the contrary it is strongly in continuity. In fact, these more recent studies in some ways are nothing more than a complexification of the previous, from the same basic starting

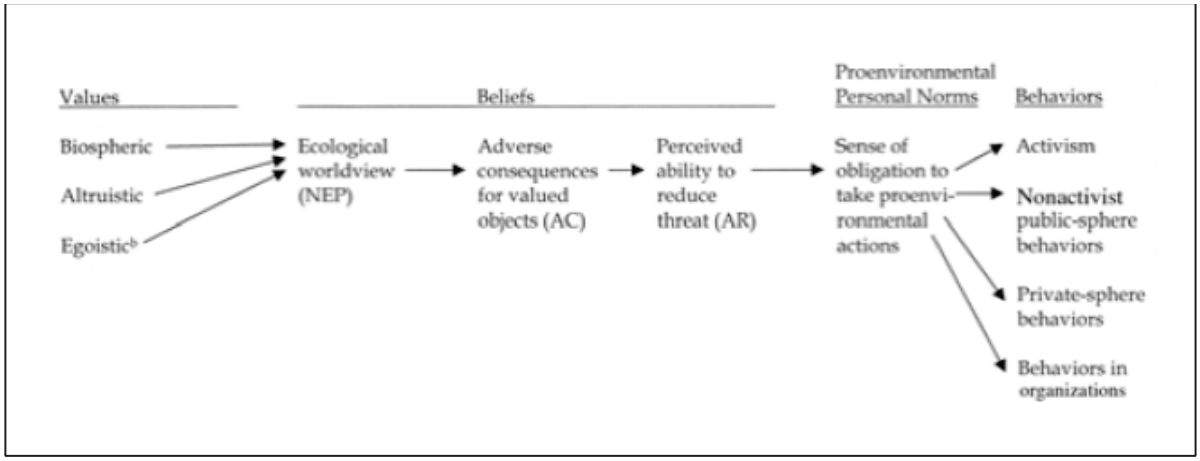
[11] See the Introduction.
[12] The most commonly considered are: age, gender, marital status, level of education, number of household components and income.

point: attitude-awareness-values-behaviour. A proof of this debt comes from the fact that the classical models such as TPB, NEP or NAT are often explicitly relayed, re-tested, and amplified in order to find further correlations useful to frame green agency. Among these studies, many have addressed the problem of recycling behaviour of consumers: this interest is theoretical but also strongly policy-oriented. Indeed, the 1990s represents a historical phase during which the *waste question* arose to the forefront of political agendas, since emerging consumerism patterns and consequent waste generation began to pose increasingly complex environmental, political and social problems.[13] Thus, in the wake of the models presented previously, but also following from the experiencing of new interpretations and approaches, the literature on recycling conduct has been widened by a proliferation of studies. In some cases recycling behaviours have been positioned in relation to socio-demographic features and levels of environmental concern (Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003). In others, the link between attitude-behaviour-socio-demographics has been problematised, taking into account the access and simplicity of recycling schemes (Derksen & Gartrell, 1993; Perrin & Barton, 2001; Steel, 1996), and in more recent studies it has been also the case for e-waste collection (Bouvier & Wagner, 2011; Darby & Obara, 2005; Nixon & Saphores, 2007; Saphores et al., 2006; Song, Wang, & Li, 2012b). Again, some works focus on the role of communication provision under certain collection schemes (Evison & Read, 2001; Thomas, 2001). Others problematise the relation between intentions and behaviour outcomes, highlighting how the same action can have completely different underlying motivations depending on individuals' background (Barr, Gilg, & Ford, 2001; Guagnano & Stern, 1995). In addition to these, further works purely stress the heuristic value of previous cognitive models, even comparing the related explanatory power on the same case-study or combining them in a complementary way (Bamberg & Schmidt, 2003; Bamberg, 2003).

Amongst the last array of works, it is significant to recall the Value-Belief-Norm (VBN) model illustrated by Stern (2000). In his article, the author presents a model that holds together the NEP, the NAT and some insights from the value theory and the extent that this sheds light on the role of altruistic values in contributing to green conduct. Briefly, Stern states that personal norms (PN) impacting on conduct are functions of: 1) A certain sensibility (culturally derived) in conceiving the relation human-nature (NEP). 2) Beliefs around the ascription of responsibility and awareness on consequences, in the sense attributed by Schwartz. Stern's model is showed in Figure 2.3

[13] Such historical phase is illustrated in Chapter 3.

Figure 2.3 – Value-Belief-Norm Model



(Stern, 2000a, p. 412)

In the case of recycling, this model postulates that an individual accomplishes a proper disposal act because he/she has a sense of obligation to act pro-environmentally. In turn, this sense derives from a general ecological and altruistic worldview, from the consciousness that self-conduct will have an effective positive impact on the environment, and finally from the self-attribution of responsibility with respect to the task. The model deepens the impact that external conditions can have on individuals' pure willingness. In particular, external cultural trends, the role of awareness, and the features of the task to accomplish are supposed to disturb (or it would be better to say to compose) a personal sense of obligation to act pro-environmentally. The complexity of the model helps explain a good percentage of behavioural variance, but this is so at the expense of parsimony.

Before addressing further approaches, the following section attempts to gather together all the scientific experience derived from the methodological individualism on green agency.

2.3 Psychological and external conditions: which lesson?

After having provided an overview on the psychological and situational approaches, it is important to point out two sets of questions. The first is which common lesson could be apprehended from the results. The second is which contribution these works have made in terms of policy acknowledgment (and its effectiveness). Starting from the first question, the following can be said.

From the Eighteens to the beginning of the new millennium, a wide range of studies were conducted in the field of environmental and recycling behaviours. The general trend in persecuting the ideal of an explanatory model became increasingly complex in adding in variables into theoretical frames that accrue from each other. In so doing, despite the fact that this subject is still highly contended by

different approaches and only partially *solved*, it is even possible to draw some conclusions that are recurrent and that can be considered as generally established.

1. In the last twenty years environmental issues became a cultural constant of public discourse. This fact has had a twofold consequence:

    a. This theme, perhaps more than others, suffers the bias that, occurring from a scientific inquiry, it descends from the mechanism of social desirability effects (Cardano, 2003). This is because the value of a respectful attitude towards nature has become a common public acquisition, which means that the expression of this attitude is subject to a relatively strong social normative perception. Thus, the response effectiveness of consumers in many studies has to be problematised.

    b. Consequently, values and attitudes are demonstrated to have an increasingly weak explanatory power with respect to green agency.

2. The relation between socio-demographic features and recycling behaviour is still quite contradictory

3. It is empirically and theoretically determined that individuals features, both in terms of psychological attitudes, values and awareness, that in terms of socio-demographics, cannot be treated in isolation, but collection agency is better explained if it is put in relation with access and simplicity of recycling scheme.

    In fact, generally:

    > "Results show that people with access to a structured recycling program have much higher levels of recycling than people lacking such access. Furthermore, individual attitudes toward the environment affect recycling behaviour only in the community with easy access to a structured recycling program. Individual concern about the environment enhances the effect of the recycling program, but does not overcome the barriers presented by lack of access". (Derksen and Gartrell, 1993, p. 434).

4. Several studies recognize also that, in addition to utility systems and personal factors, there are a series of other variables that more or less strongly intervene in disturbing the recycling conduct, among them the most recorded are: local level of pollution and, more in general, the perception of the state of local environment (Baldassarre & Katz, 1992), historical roots of the environmental legislation; a series of cultural and country-specific factors (Arbuthnot & Lingg, 1975); modes of communication and information provision (Evison & Read, 2001; Schultz, Oskamp, & Mainieri, 1995); public trust in local authority and satisfaction toward its work (Pellegrino, 2010); materials requested to recycle (Darby and Obara, 2005); political view (Guerin, Crete, & Mercier, 2001; Roberts & Bacon, 1997).

As it results evident, taking into consideration all these issues together is something quite impossible: a study should settle to choose and test those variables that are considered most pertinent to the case, while having in mind that there will always be a part of the subject whose explanation lies under categories of analysis considered (in that case) residual.

However, in general the methodological individualist approach has had great success in the field of policy making, which is well demonstrated by an outstanding example, that is the DEFRA[14] *Framework on Pro-Environmental Behaviour* (2008), most commonly known as Community-Based Social Marketing.[15] The aim of this social marketing approach is to allow policy makers to specifically tailor environmental messages and communication to different population targets, namely to individuate different tools to inform portions of the population that have different experiences and opinions about green. The core idea is finding a way to present sustainability issues - a somewhat vague and abstract concept - before the eyes of the consumer in the form of more practical everyday tasks. This approach, despite criticism of cultural and contextual studies which are further addressed, teaches that careful policy design of community-based communication can have a significant impact on consumer conduct, which is a final well-established consideration which enriches our reflection about recycling conduct.

The following section will address the matter of environmental behaviour by shifting the perspective from methodological individualism to a top-down reading of human agency.

2.4 Institutional framework: a macro contextualization of individuals' agency

This part addresses those approaches that underline the role of *institutions*[16] in framing environmental conduct, and which are here referred to as contextual perspectives. The difference between the situational framework and the contextual resides in the fact that the latter shifts the unit of analysis. Indeed, in research that stresses, for example, the role of facilities, the identification of situation has always been defined from the point of view of consumers, namely from their perception toward contingent constraints/facility. Conversely, in the *contextua*l approach, the starting point of analysis lies on the idea that people are locked into conditions that override their willingness to act. Thus, the situational approach looks at individuals, while the contextual carries out a reflection that is culture and society-oriented, meaning that human agency is read by a top-down perspective. According to this, the use of the word institutions has to be regarded in sociological terms (Douglas, 1990) rather than in normative ones.

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[14] Department for Environment, Food and Rural Affairs (UK).

[15] It is an approach to policy design that takes advantage mostly of the research in the field of psychology. It begins by identifying a set of twelve behavioural goals in the environmental field, among which are also recycling targets. After that, several psychometric tests and surveys have been carried out to assess public willingness and ability to accomplish them. During this explorative phase a series of motivators and barriers perceived by consumers have been identified. Finally, based on these large scale investigations, DEFRA has divided the UK population into seven distinct segments according to the different profiles consumers hold with respect to environmental behaviours addressed.

[16] To be intended in the wider sociological terms as established or standardized patterns of rule-governed behaviour. It includes factors such as political and economic institutions, but also macro socio-cultural trends.

In the field of sustainability and recycling studies, the contextual approach has developed in Europe in the last ten years across the fields of cultural geography, sociology, anthropology, political sciences and science and technology studies. A part of these disciplines questioned the effectiveness of previous works that read environmental conduct as an outcome of individual decision-making processes, while conversely they state the social construction of any psychological positions. Scientific considerations concerning the way individual agency is determined by macro constraints has a long and complex pedigree,[17] while here emphasis is placed only on more recent studies which have explicitly applied this approach in the field of environmental behaviour. Within this trend of studies are presented three key strands that exhibit:

1. The role of social norms and contemporary lifestyles in hampering the embracement of green conduct among consumers.
2. The role of *discourses* in giving rise to particular forms and understanding of (green) action.
3. The role of technologies and nonhuman agency in structuring behavioural opportunities.

2.4.a Social norms and *Throwaway Society*: recycling behaviour under a socio-cultural perspective

In this section the question of disposal will be treated from the assumption that macro socio-cultural trends do ultimately affect individuals' psychology and personal values. The basic idea of this approach is that the cognitive process of individuals depends on social institutions (Douglas 1990, p. 81). That is, in our case, that consumers tend to behave according to a series of social and cultural norms that are interiorized at a psychological level. This view is exactly opposite from the psychological paradigm which proposes that environmental changes do not arise from a set of personal choices, but are socially and collectively constructed on such a scale that individuals cannot override by themselves. Consistent with this assumption, two major considerations arise:

1. Individuals act not only in accordance with personal features, but also to accomplish *for* or *against* social identities.
2. Nowadays a certain hyper-consumerism culture strongly affects the actual opportunity for individuals to act pro-environmentally

The first consideration assumes that individual agency is coherent not only to personal values, but to specific contextual conditions. This means that individuals can vary their conduct because in some

[17] There is not enough room here to delve deeply into the vast amount of literature on structuralism and the determinist approach, while there is space enough to recall some illustrious examples in the thought of Durkheim, Foucault, Lévi-Strauss, and Douglas.

cases this change is perceived as more (socially) appropriate, or we can say more *polite*. This is the case highlighted in studies that focus on different green performances of the same person in different contexts (e.g. at home, at the office, on holiday,…). They reveal a form of situational adaptation that makes people respond coherently to different types of rationalities arising under a specific contextual understanding of the situation. In some circumstances, people simply do not believe they have cognitive alternatives to the existing social order (Jackson 2005, p. 81). Posed in psychological terms, there is evidence that behaviours themselves have a direct influence on attitude (*Ibid.*, p. 87) and not vice versa, as in fact individuals look for a legitimization of their actions not in general hetero-directed prescriptions, but more realistically in their specific space-time social backgrounds. For the purposes of the present research, this consideration highlights how recycling conduct can suffer instability from different social surroundings. Not only, it demonstrates that people act in synergy, and a mere cognitive-attitudinal view explains just a small part of the whole phenomenon.

Secondly, several authors (Baumann in Cooper, 2005; Hawkins, 2001; Hetherington, 2004; Rojek, 2004) refer to how the act of disposal has to be read as a phase of consumption. Following Veblen (Shove & Warde, 2002), the phase of purchase represents a form of *conspicuous consumption*, while the disposal should be read as a form of *inconspicuous consumption.* The first term refers to the role assigned to shopping in performing *social conversations* (Mead, 1964) among individuals, which is a sign of social identity. The second would reflect the same logic –socially constructed- but in a more private and hidden behavioural context. According to this, nowadays consumers are stressed under a double and contradictory push. From the one side the invocation of consumption, following Gregson (Gregson, 2009), is politically, economically and culturally supported and legitimized. From the other, the recommendation to recycle. But as long as contemporary society, relabelled by Gregson as *Throwaway Society* (Gregson, 2007), continue to deliver to individuals cultural norms oriented towards consumption, these will be basically dissociated from the political rhetoric of sustainability, and therefore people will be generally weakly engaged.

> "From this perspective the project of sustainable consumption can perhaps be seen as the goal of shifting the symbolic basis of social conversation from material stuff to some other kind of non-material resources. How this to be achieved is less obvious". (Jackson 2005, p.75)

If these reflections are important since they deliver fundamental theoretical tools on how nowadays individuals' personal engagement can be affected by socio-cultural variables, it is even true that this point of view is quite radical, since here the key solution to subvert improper conducts would require a subversion of the whole social order.

2.4.b The role of discourses

The discourses banally inscribed into most everyday social contexts militate against pro-environmental behaviour (Hargreaves, 2011)

This statement reprehends what was recalled in the previous paragraph. In effect, talking about the role of environmental discourses and narratives in impacting consumer conduct means once again deepening the role of social and cultural construction of such a discourse. But what has to be intended as *discourses*? In a wider sense they can be defined as sets of social, political and economic relations, forms of practice and power and epistemological positions (Hobson, 2002). According to this definition, discourses on sustainability contribute to convey specific ideas, imaginaries, meanings on environment –not necessarily scientifically supported- and it is in response to this (cultural) stimulus that individuals conceive how to behave. Coherently, the key to reading pro-environmental behaviour lies on a comprehension around which shape sustainability takes in any given time-space context, and how people relate to it. In other words, it comes to understanding how different social agents *construct* the environment, to have the key to comprehend how they treat it. In fact, there are many different *environments*, each connected to people's particular concerns, priorities, social relationships and responsibilities (Macnaghten, 2003).

The most important contribution of this perspective to the present work is the identification of a gap between how sustainability is communicated to consumers by political narratives, and what it actually means to them in everyday life. The idea of environmentalism through the astronaut perspective makes a good idea of this argument (*Ibid.*). Compared to that, the question is twofold. From the one side the institutional way to convey the green ideal often passes through an imaginary that is global, distant and irreversible. So, unless communication strategy changed to align more closely with public discourses, little would change apart from a growing sense of public distrust (Hargreaves, 2008). Supporting this, studies (Hobson, 2002, 2002; Macnaghten, 2003) show that people tend to have two types of reactions to the rhetoric of public discourse. Firstly, feeling a sense of impotence and a vague sense of guilt, that in turn brings about a lack of commitment and confidence in the possibility of any change resulting from individual agency. Alternatively, a more general sense of distance from sustainability issues and a low level of concern. Moreover, and this is the second argument, people perceive a continued lack of visible action also by political institutions, which consequently suffer a loss of credibility and trust, resulting in a practical neglect of the urgency of environmental problems.

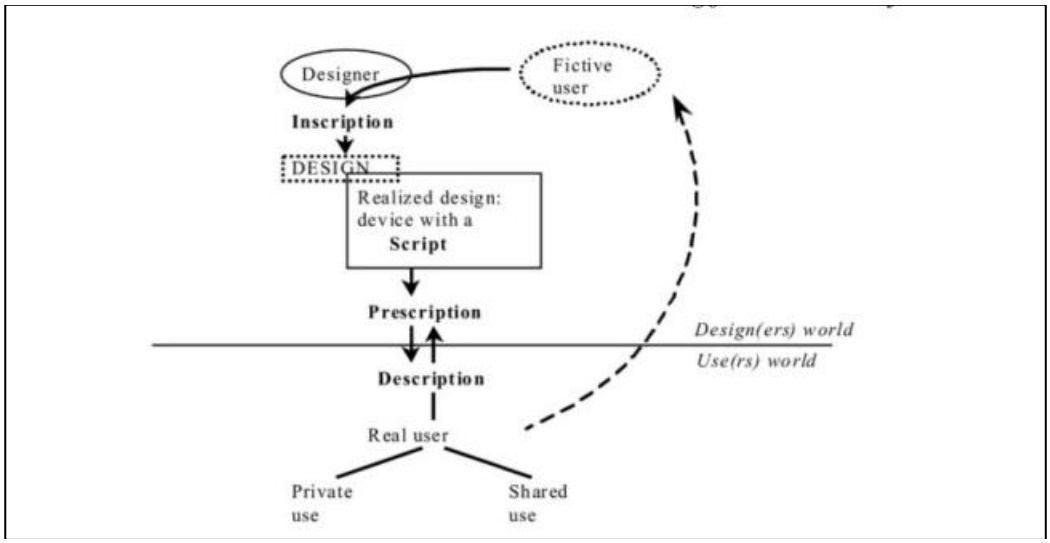
2.4.c The environmental scripting of objects and technology

Continuing along the line of studies that identifies the potential for sustainable change beyond individuals, this third strand within the contextual approach pays attention to how objects, technologies and infrastructures place the conditions to definitively orientate individual agency. The most illustrious series of works that addressed this question is known under the name of Actor Network Theory (ANT) (Latour, 1995, 1998, 2005) It is necessary to say that the reflections carried out by Latour and colleagues are deep and very articulated, and the ambition of this section is not to describe them. Nevertheless, this current of studies is recalled here because they, for the first time, introduced the successful idea of according equal ontological (and performing) status to society, nature, culture and nonhuman objects. This means that reality events people handle results from a series of *associations* between humans and nonhumans, a contingent configuration of *alliances* between the physic nature of the environment -in a broad sense- and other immaterial components of human life, such as culture, political system, social order, ideas, morality and so on. The most important contribution of this reasoning to the present research proposal is the exaltation of a hyper connectivity between social systems, technological provision and (environmental) culture. It develops the idea that the critically claimed *social green evolution*, does not depend merely on individuals willingness, neither on the impregnable coercive power of macro constraints, but is actually the outcome of a co-evolution of elements closely linked and substantiating each other. This reasoning is also relevant because it underlines that particular forms of behaviour become more or less possible and more or less appropriate depending upon the socio-technical context. In the same way that scientific knowledge is produced in the laboratory and becomes a *given reality*, social and technological contexts are the result of a historical combination and a mutual adaptation, such that individuals undergo a series of constraints which, by themselves, have little influence.

This discourse has a double significance. Firstly, it sheds light on the role of technology and utility systems in affecting individuals' abilities to accomplish certain choices. Of course this reflection is not new, but the novelty deriving from ANT is the radicalization of its address, since nonhuman is considered *agent* and not merely a variable external from actor. In this, the fundamental difference from psychology lies in the epistemological position on how to contemplate human agency and its potential impact. Furthermore, these works represent the starting point for subsequent studies on the role of object design in determining the conduct of users. Jelsma (Jesma, 2003) talks about the potential *environmental scripting* products would have, that is the actual potential they contain in positioning people in a condition to behave in a more or less sustainable way (see igure 2.4). This has to do with products' materials, design, life expectancy and life-span, recyclability, reusability, components' decomposability, and other physical features. All these elements are important because they imply what kind of *morality* objects support with respect to the market and consumer usage.

Following the author, morality is as much in the things we use as in the minds of people (Jesma 2003, p. 103).

Figure 2.4 – Environmental script of objects



(Jelsma, 2003, p. 106)

> "We connect processes of design and use by conceiving artefacts (device, machines, appliances, i.e. products) as carrying scripts. Scripts are the structural features of artefacts encouraging certain user actions while counteracting others. That is, a script has a prescriptive force, it steers user action in certain directions while counteracting it in other directions. Thus, as a concept, *script* comes close to *cue* and *affordanc*e as used in behavioural psychology". (Jelsma 2003, p. 107)

This reflection on the environmental script of objects is strongly pertinent in the case of Information and Communication Technology (ICT) devices and consequently on e-waste: these theoretical tools are recalled in the second part of the present chapter.

The following section shifts again the unit of analysis, showing the contribution that a meso perspective, between methodological individualism and the contextual approach, can give to the present research.

2.5 Claiming a meso perspective: the focus on habits and practices

This section presents an array of works which are commonly referred to under the label of Social Practice Theories (SPT). Within the diatribe on where the key for transition towards sustainability would lie, this trend finds a response in the matter of habits, or practices. The core idea is that individual behaviour is subject to two mental processes: controlled, those conducts that involve cognitive intention and awareness; and automatic, those that accommodate habits and recursive

actions. In this, three basic factors are believed to play a role in determining the balance between cognitive effort and automaticity:

1. The degree of involvement of the decision-maker in the process, that is the level of importance accorded to the decision.
2. The complexity of the task.
3. The type of constraint imposed by the decision itself (e.g. access to knowledge, actual ability of user, time,…).

This mechanism of the human brain is firmly recognized as a scientific establishment, and it is the theoretical key through which SPT have addressed the issue of environmental behaviour. What is described above has been translated and transposed in sociology by the work of Anthony Giddens. In *The Constitution of society* (Giddens, 1984) he introduces within the sociological literature the *structuration theory*, a perspective through which human agency and social processes are considered intertwined. To present his theory, Giddens makes the use of the terms *discursive consciousness* and *practical consciousness*. The first concept relays to the argumentative ability of individuals to represent to himself and to others the meaning of their acts. The second, on the contrary, recalls the idea of automaticity, namely a form of behavioural intelligence in performing established actions without addressing cognitive processes each time. The dimension of practices lies more on this second strand. The idea is that there is a middle level between *agency* (human cognitive engagement) and *structure* (the macro context in a broader sense), and this meso level is the seat of all social processes, both oriented to change that to self-conservation. This meso dimension is thus empirically represented by practices in the sense of habits and recursive actions people carry out, favouring in this tacit forms of knowledge and cultural views, rather than others.
Following Reckwitz (Reckwitz, 2002):

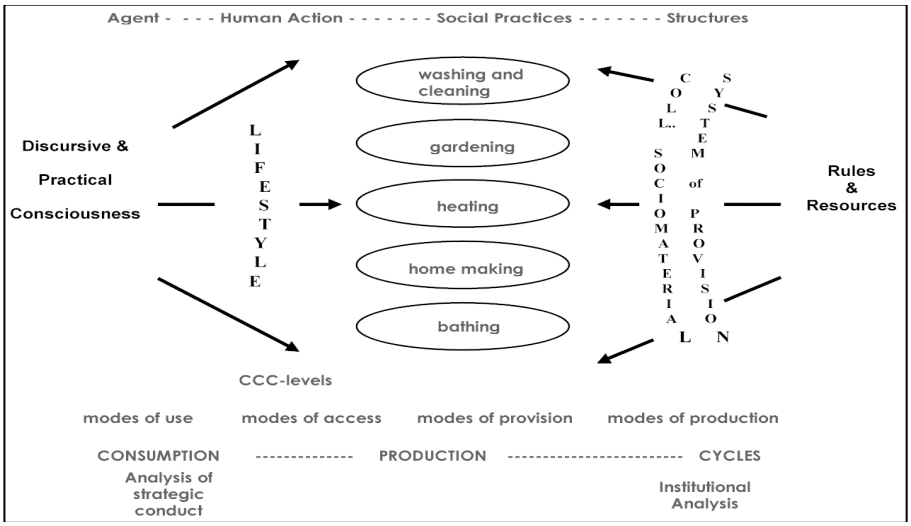
> "Social practices are a routinized type of behaviour which consist of several elements interconnected to one other: forms of bodily activities, forms of mental activities, things and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge". (p. 249)

Warde (Warde, 2005) introduced for the first time the idea of reading consumption behaviour according to the practice theory,[18] and consequently this approach began to be used also in the field of sustainability studies (Gregson, 2007; Hobson, 2002; Macnaghten, 2003; Shove & Pantzar, 2005; Spaargaren, 2011). However, beyond the common idea of habits as promoter of social change (or

[18] In the form reworked by Schatzky (2001).

social conservation), this array of works is far from being homogeneous: there are differences between authors both on the definition of practices than on their components. Notwithstanding, they all insist on the co-evolution of socio-technical systems and human agency. One of the most popular and exemplificative schemes within the current of SPT, is that proposed by Spaargaren and Val Vliet (2005), shown in Figure 2.5. Their model is based on two main levels: system of provision, and individual agency as the outcome of discursive and practical consciousness. From the one side an analysis on institutions is required, in order to investigate how the macro system is designed compared to the feasibility of environmental goals. From the other, a study on the consumption patterns and individual lifestyles is proposed. The match between these two dimensions is the matter of practice.

Figure 2.5 – Social practice scheme



(Spaargaren and Van Vliet, 2005, p. 53)

However, this is still not sufficient, since again the concept of practice has elusive contents, mostly difficult to operationalise. With respect to this difficulty to define and put such a theoretical tool into practice, Shove and Pantzar (2005) suggest a useful representation, which translates the practice into three interacting components that are:

1. Images and symbols.

2. Object and technology.

3. Individuals' skills and competences.

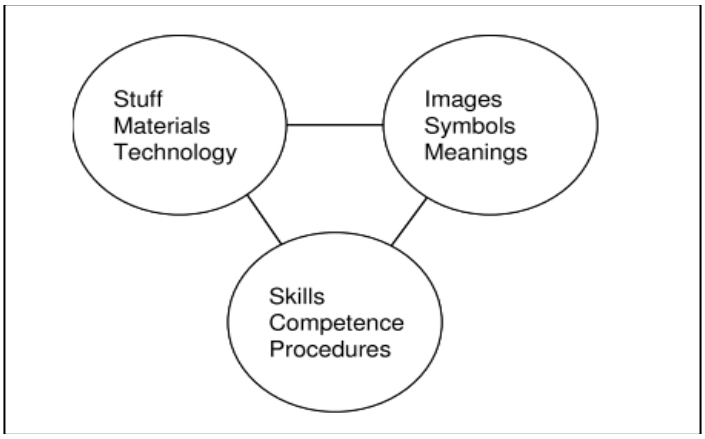
Consistent with that, and according to the scheme in Figure 2.6, to comprehend the role of habit in performing environmental conduct it is necessary to consider:

1. Cultural variables linked to the idea of *environment* and –in our case *waste*- people have in (domestic) context.

2. Material and infrastructural factors related to the features of (e-)waste and to the system of provision afforded for its disposal.

3. Individuals' level of knowledge and awareness of the issue at stake.

Figure 2.6 – Components of practice



(Shove and Pantzar in Heargreaves, 2008, p. 59)

Lastly, SPT postulates that as practices nourish the social processes by adhering to some behaviour in a path-dependency logic, in the same way they contribute to this path. Thus, a reconfiguration is possible: when one of the factors at stake (cultural, technological, social, etc.) changes, a general readjustment of the whole socio-technical system is implied. This view implicates that consumers are locked-in but, at the same time, they have the possibility of experiencing other configurations, when some rupture elements occur (a new cultural trend, a new policy or collection scheme, a technological innovation, etc.). Given that, until a rooted configuration remains as it is, people are led to consider it normal, at least in so far as they relate to it in everyday life. And this last idea is another useful tool descending from this trend of studies. In fact, in the present research, the category of *normality* (Shove 2010b) in performing recycling behaviour are considered as strongly heuristic, as will appear evident in the text analysis of the interviews later in this paper.

1.6 An integrative and multi-disciplinary view

This rationale has followed the criterion of a (rising) complexity of approaches to the theme of environmental and recycling behaviour. Starting from methodological individualism, which favours a cognitive optic in analysing human agency, the exposition has passed through the main contributions from the contextual perspective, to arrive at the theory of practices. With respect to this review, several works today are increasingly open to admitting integrative and multi-disciplinary proceedings,

and this is because the elements at stake in studying environmental behaviour are postulated in a relationship of mutual dialectic, and it is assumed that this subject should be looked into respecting (or even emphasising) this interconnection. This section will provide a general view on one such integrative approach, which opts to analyse the matter of recycling behaviour by adopting several units of analysis, under a pragmatist and explorative proceeding (Johnson et al., 2007; Whitmarsh et al., 2011). This address considers that while sociological and psychological approaches often provide very different insights, there are also important points of intersection where they converge. Many psychologists would indeed agree that habitual behaviour is not consciously driven but rather a product of (temporal, social, spatial) contextual cues; and that social norms and identities are powerful influences on behaviour. The sociological concept of *practices* similarly reminds us that action is largely due to norms and institutions, and that individuals in turn perpetuate these norms and *institutions* through their actions. The general conclusion is that it is possible (and desirable) to extract interesting lessons from both sides of the disciplinary lines. These insights are here recalled because they are considered the starting point to approach the subject of e-waste recycling behaviour. The present work lies indeed on the perspective that:

> "Sustainability is a complex and multi-layered problem – evident at the levels of both social structures and individual actions – which demand contributions from a range of perspectives, not one single worldview, theory or research methodology. Of course, different disciplines have different strengths and weaknesses, which is precisely why we need interdisciplinary approaches". (Whitmarsh, O'Neill, and Lorenzoni 2011, p. 259)

Coherent with this assumption, the reflection of Stern (2000b) reveals to provide useful tools to analyse the matter in study. His reflection prompts a multi-disciplinary and multi-comprehensive view, which draws concepts from different currents of study, in an effort to provide an overall reading of a complex phenomenon. In particular, the author states that, beyond any models, environmental conduct is explained starting from four categories of factors: attitudes (in the wider sense identified in the VBN model), contextual constraints, personal capabilities and habits, as showed in Table 2.7.

> "Studies that examine only attitudinal factors are likely to find effects only inconsistently, because the effects are contingent on capabilities and context. Similarly, studies that examine only contextual variables, such as material incentives, social norms, or the introduction of new technology, may find effects but fail to reveal their dependence on individuals' attitudes or beliefs. Single variable studies may demonstrate that a particular theoretical framework has explanatory power but may not contribute much to the comprehensive understanding of particular environmentally significant behaviours that is needed to change them". (*Ibid.*, p. 418)

Table 2.7 – Four causal variables of recycling behaviour

Attitudinal	General environmental predisposition Behaviour-specific norms and beliefs Perceived costs and benefits of action
Personal capabilities	Literacy Social status Financial resources Behaviour-specific knowledge and skills
Contextual factors	Material and costs rewards Laws and regulations Available technology Social norms and expectations Supportive policies Advertising
Habits and routine	Recurrent and past behaviour

(Authors own based on Stern, 2000b)

The considerations of Stern represent the starting point to approach the matter in study. The reason we take advantage of Stern's proposal resides in the specific features of the object in study, which indeed are considered as deserving a multi-comprehensive view. The following section presents such features.

2.7 E-waste recycling behaviour: insights and theoretical treatment

Upon the total number of studies that deal with green agency, only a very small portion is dedicated to e-waste collection (Darby & Obara, 2005; Gurauskiene, 2008; Nixon & Saphores, 2007). Indeed, as seen in the previous chapter, from a historical point of view e-waste topics made its first appearance in the scientific debate as issues of engineering, management, economics, chemistry etc. Only on second thought has it also been included in the reflection on social and human sciences. Here, studies addressing the matter of e-waste disposal behaviour normally adopt what we referred to as a psycho-attitudinal and situational model of analysis. So far no specific theories have been proposed to read e-waste related disposal behaviour, even if it is here considered that this matter deserves a specific view with respect to the overall works concerning general disposal behaviour.

The specificities that the subject of e-waste is believed to hold compared to more general literature on consumers' waste collection can be synthesised as follow:

1. E-waste dismantling implies a disposal act which is necessarily not as frequent and routine as the vast majority of other refuse disposal acts. This acknowledgment pushes us to re-evaluation of the relation between environmental concerns and actual engagement in e-waste disposal.

2. E-waste disposal is supposed to be influenced by other refuse disposal habits, although this assumption has still not been proven by univocal results (Darby and Obara 2005). It is important to understand in which direction this influences our case both for theoretical and policy-oriented purposes.

3. The legislation on WEEE management is very recent. Moreover, electronic components have recently been being incorporated into more products, but only as very small components of a larger overall product. It is thus worth questioning the topic of knowledge and awareness that households actually have regarding electronic disposal device and e-waste handling.

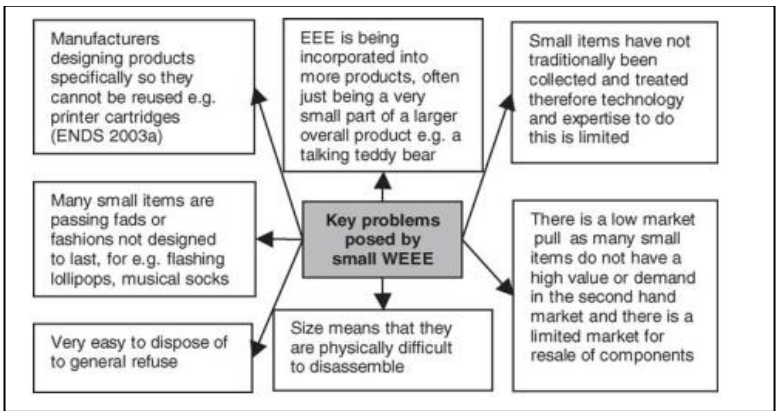
4. Individuals are essentially not subject to penalties for WEEE improper sorting, which means that various forms of convenience and norms are necessarily mobilized by proper recyclers. It is interesting to investigate what these are.

5. Small WEEE are easily storable and/or disposable together with unsorted refuse. It is verified that such conducts seriously impact e-waste collection performances in several developed countries (ADEME, 2012; Ecodom, United Nations University, IPSOS, & Politecnico of Milan, 2012). It is thus important to understand the factors that influence this very common type of behaviour.

6. The merchandise features of electric and electronic equipments (EEE) make them very often left unused, even when still functioning. This can be due to uneconomical repair costs when compared with new purchase, or due to factors of consumer fashion. This acknowledgment makes the act of e-waste disposal interesting also from the point of view of consumerism patterns.

The general features are synthesised in Figure 2.8.

Figure 2.8 - Small e-waste features



(Darby and Obara 2005, p. 22)

In absence of previous dedicated theories and consistent with the multifaceted aspects implied in e-waste disposal matter, a multi-comprehensive and multi-stakeholder approach is considered as the most useful starting point for our analysis, as it will be deeply illustrated in Chapter 4.

The following Chapter enters into the detail of e-waste topic.

Chapter 3

3. The challenge of e-waste for the lifestyle of Western society: environmental, economic and socio-cultural implications

This chapter will present a specific view on the theoretical and practical relevance of the e-waste issue from several perspectives. It will start with the problem of defining *waste*, since, if it is true that *refuse* is something that comes to be *refused*, it is evident that its nature depends highly on contextual and historical factors. As many researchers have already investigated (Bahers, 2012; Pinna, 2010; Viale, 1994), the question of waste management as the strategy of dealing with huge and growing amounts of more or less dangerous matter, is quite a modern issue. How to treat them and, mainly, where to store them, are relatively recent challenges, deriving from the evolution of consumption patterns in developed countries. Indeed, the history of goods production runs parallel to that of waste generation: a more widespread economic wellbeing in western societies has coincided, during the last fifty years, with the dramatic increase of refuse masses, which have quickly become problematic to manage not only for their quantity, but also for their intrinsic components, increasingly differentiating.

Starting from this acknowledgment, the chapter will present a more technical definition of *waste* in order to frame the object of the present study, and a brief description of different refuse categories will be provided, paying particular attention to the matter of e-waste. This category of refuse will be described according to its multiple characteristics: 1) Being hazardous waste; 2) Containing valuable matter; 3) Being the fastest rising element among the total rate of Municipal Solid Waste (MSW). This chapter shows how these features made the e-waste issue a *hot topic* worldwide and from several standpoints: as an international political question, as an issue of economic business, and as an environmental and societal problem. Moreover, the chapter illustrates how these characteristics make an e-waste safe management system a very challenging objective for policy makers. The section then proceeds circumscribing the analysis to the European context, which represents the macro framework of the overall analysis, and the WEEE Directive is thus exposed. Lastly, the chapter presents the overall configuration of e-waste supply chain in the two national contexts in study, namely Italy and France, bringing to light the institutional factors that make them similar and comparable, beyond the different collection performances.

This path follows from a theoretical view on consumption patterns and socio-cultural implications of the waste issue, to a more practical vision on the legislative framework about e-waste in the European Union, which is useful in highlighting the interconnections between the different aspects of this question, which are together cultural, economic, environmental and political.

3.1 Waste: historical and cultural trends

Defining the contents of the term *waste* requires reference to at least two different domains. The first is socio-cultural: what in a certain geo-historical context is considered so definitely undesirable or useless as to be removed once and for all? The second, which is (normally) a consequence, refers to the institutional corpus of norms which regulates and defines what an item of refuse is, and how it should be managed. These two ways to frame the waste issue, socio-cultural and regulatory-institutional, are equally important because they represent the two sides of the same coin. Analysing the waste question under a cultural perspective means indeed appreciating the changing content of this concept, as an interpretative key through which it is possible to read the evolution of an entire society. As the vast literature on waste studies widely recognizes (Hawkins, 2001b; Strasser, 2000; Thompson, 1979), having a huge amount of *refused* matter, whose dismantling poses complex environmental and logistical problems, is quite a recent development. The tricky question of waste governance is indeed a modern issue, which emerged together with that of public health and sanitisation not earlier than 150 years ago, in the new-born European urban *milieu*.

Previously, the trade-off between goods production and waste generation could be considered balanced, due to the nature of the vast majority of refuse - which was for the most part organic - and to the reuse and recovery of materials, which were common habits in rural pre-modern economies (Pinna, 2010).

So, even if in pre-modern age social groups had forms of refuse handling, these were characterized to be activities of reusing and repairing materials, normally undertaken by the lowest strata of society in order to save resources in a context of scarcity. In this, such agents employed in the service of *waste management*, have always been figures specialised in simple recovery activities, rather than in refuse processing in the modern sense. It can be indeed said that, at the pre-industrialised stage, the concept of *waste* had a social meaning very distant to that characterizing later periods, because the quantity and quality of matter to discard were less, and also because there was a strong culture of reuse and recovery, coherent with a circular agricultural economy (Vaile, 1994).

There were the urbanisation and industrialisation processes which laid the conditions to start rethinking the relation between human activities and the generation of related impacts. It was indeed in the first city-spaces that the concept of *hygiene* began to take hold as something to be pursued on the larger scale, in order to avoid public disease. This could be made possible just by operating the

first great removal with respect to waste: the creation of a public sewage system,[19] and the introduction of public systems of refuse collection (Davico et al., 2008; Geels, 2006; Kaika, Swyngedouw, & Heynen, 2006).[20] Furthermore, the modern age has seen the intensive exploitation of resources and the consequent growth of associated refuse (Gregson, 2009). Industries began to produce cheaper objects in series, in response to demand for easier accessibility to all. Within a couple of generations, from the early Twentieth Century to the 1960s, a vast amount of people had gone from a frugal and semi-agricultural lifestyle to one based on mass consumption (Cooper, 2005; Rojek, 2004). In the decades following this period, the culture of repairing and reusing was eclipsed, as goods could easily be replaced by new ones. The overall result was an excessive production of waste compared to the planet's ability to dispose of it, threatening the reproducibility of resources. During this phase, the industrial age, the nature of waste also changed, due to technological and chemical innovations in the field of materials' properties: there was the decline of the organic component compared to an increase in glass, metal and several types of other non-biodegradable matter like plastics. Furthermore, scientific progress contributed in another way to change the relationship between society and its waste: technical progress and the innovation of the recycling industry favoured postponing the solution to the problem of trash to the last stages of its treatment, rather than fostering its prevention. Graph 3.1 shows the trend in municipal waste generation compared to Gross Domestic Product (GDP) and population weight in the European Union between 1995 and 2010 (EEA, 2011). This figure, together with that contained in Table 3.2, confirms the positive historical correlation between the level of income and municipal waste generation.

Under this framework and bearing in mind the dramatic trend in trash generation, the question of resources' scarcity and waste governance became one of the central issues in the political and environmental debates worldwide. In particular, the potential pollutant power of bulk waste has posed for the first time the related question to the vast public, as the NIMBY[21] syndrome testifies. If the modern age had given the impression of potential endless growth whose collateral effects would never occur, post-modernism seems to have presented the bill. What for a long time had given the illusion to be removed, hidden, turned away or censored, has come back in the form of pollution and waste, with which governments and new socio-cultural movements[22] must try to cope with. In the

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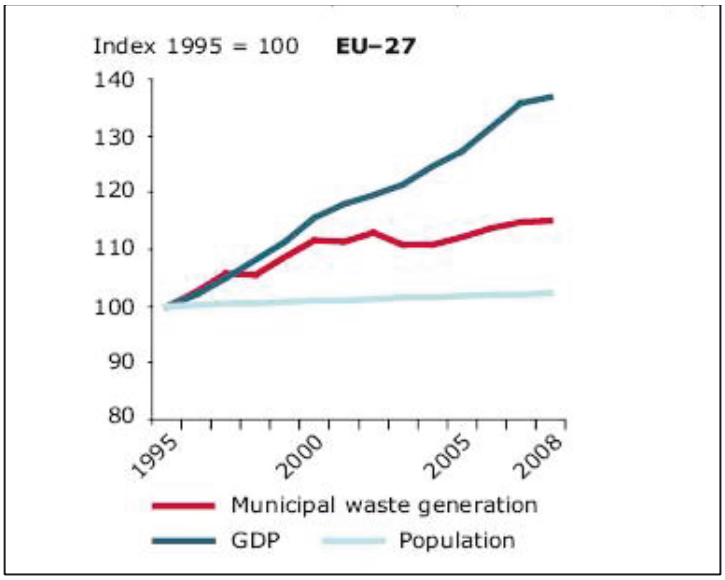
[19] Much earlier famous examples of sewerage systems are notorious to the vast public, such as those of the Roman Age. Notwithstanding, they represent an *unicum*, since after that period and until the modern age, there was no more evidence of large-scale complex sewer systems.

[20] The first Municipal Law imposing the provision of public collection bins was introduced in Paris in 1884. The remaining large European cities followed with similar decrees.

[21] *Not In My Back Yard*. It is an acronym which is very commonly used in the environmental debate to indicate (pejoratively) a common myopic attitude among the vast public of getting rid of the waste question simply pretending to remove it from their direct life experience and context.

[22] See for example the several interpretations of *degrowth* movements.

Graph 3.1 - Municipal waste generation compared to Gross Domestic Product (GDP) and population weight in the European Union.



(EEA, 2011, p. 72)

Table 3.2 – Average Municipal Solid Waste (MSW) generation rates by income on a global scale.

Income Level	Average MSW Generation (kg/cap/day)
Low-Income	0.6 - 1.0
Middle-Income	0.8 - 1.5
High-Income	1.1 - 4.5

(Perinaz & Hoornweg, 2012, p. 10)

most recent decades the values of materials' reuse and waste prevention are indeed back in vogue, at least as long-term institutional goals.[23]

The following paragraph proposes a more technical definition of *waste*, which will be useful in giving the normative terms to the matter in study.

3.2 Waste: normative framework in the European context

The economic and socio-cultural series of changes illustrated in the previous paragraph concerning the historical and cultural implication of *waste* matter in the last century, were paralleled with a dense

[23] See for example transition management policies in some North European countries like The Netherlands.

normative evolution aimed at managing in a more effective way the huge masses of waste continuing to accumulate in the age of mass consumption. This evolution came about in different ways:

1. Systematisation and harmonization of waste legislation on national and European scales.[24]
2. Introduction of separate collection schemes increasingly sophisticated in all developed countries.[25]
3. Development of specific legislations for special and hazardous waste management (Hazardous Waste Directive 91/689/EEC and following amendments).
4. International agreements aimed at preventing trans-boundary waste movement and dumping (Basel Convention in 1989).
5. Introduction of offences related to environmental damage in many national laws (Directive 2008/99/EC).
6. Projects and policies aimed at encouraging the culture of waste prevention, material reuse and recycling.[26]

Thus, it remains to be understood what is intended nowadays in the geographical context investigated, when talking about *waste*. In a very general sense, an item of refuse means "any substance or object which the holder discards or intends/is required to discard" (European Parliament and Council, 2008, Art. 1, Paragraph 2). Starting from this definition, the European normative context makes further classifications based on two main criteria: origin and intrinsic composition of refuse.

The first standard imposes the fundamental description of Municipal Solid Waste (MSW)[27] as a stream including waste from households, "as well as other waste which, because of its nature or composition, is similar to waste from households"(European Union, 2008). Conversely, refuse deriving from industrial activities that are not qualitatively similar to domestic waste, are considered Special (or industrial) Waste (SW).

On a global scale, municipal waste components vary greatly from country to country, even among European Member States. Notwithstanding, in Europe municipal waste is normally composed of refuse derived from households and domestic activities, namely materials from separate collection, organic waste, bulky items, etc. But it can also contain other heterogeneous typologies of waste, like those deriving from street sweeping and green garbage.

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[24] The first Waste Framework Directive in Europe dates back to 1975 (Directive 75/442/EEC).

[25] The separate collection together with the recycle and reuse values have been formally introduced in Europe with the Directive 75/442/EEC and following amendments (CE 91/156, 91/689 and 94/62). The European countries proceeded to transpose it into internal laws: in Italy in 1988 (Law n. 475/1988 and following Ronchi Decree in 1997); in France in 1975 (Law n. 75/633 and following amendments).

[26] E.g. the Zero Waste project (http://www.zerowastefuture.com/. Last consulted on September 2014); StEP initiative (http://step-initiative.org/index.php/Home.html. Last consulted on September 2014); Art and Recycle (http://www.recyclart.org/. Last consulted on September 2014).

[27] Also referred to as Urban Solid Waste (USW).

Again, waste is also defined according to chemical composition, and in this case can be separated into hazardous and non-hazardous refuse. This second distinction is transverse to that between industrial and household, so that the label of *hazardous* can be attributed to a domestic refuse as well as to an industrial one. Consistent with European Law, a "hazardous waste means waste which displays one or more hazardous properties" (*Ibid.*, Art. 2, Paragraph 3), among which are acknowledged: being explosive, oxidizing, flammable, irritant, corrosive, toxic (*Ibid.*, Annex III) and others generally refers to the potential damaging content of waste for human and environmental health. Conversely, all refuse that is not potentially damaging with respect to living beings is considered non-hazardous waste.

The object of this study, Waste from Electrical and Electronic Equipment (WEEE), is classified by law as hazardous waste, because it contains contaminant components such as lead, cadmium, beryllium, or brominated flame retardants, which can seriously affect human and environmental health if not properly processed. The following paragraph will go into the details of e-waste normative definitions (Robinson, 2009; Sepúlveda et al., 2010).

3.3 Defining E-waste

As in the case of waste, e-waste has no unique definition, since this varies according to different institutional contexts and to the technological evolution of electrical and electronic sectors (Widmer, Oswald-Krapf, Sinha-Khetriwal, Schnellmann, & Böni, 2005). Moreover, due to the specific features of hi-tech objects (e.g. fashion design and technological obsolescence) these come to be very often replaced by new appliances, beyond mere functionality reasons. Thus, again, defining e-waste means to imply not only legislative frames, but also consumption trends and socio-cultural circumstances. So, considering this twofold content and in very general terms, e-waste can be firstly described as a "broad and growing range of electronic devices (…) which have been discarded from their users" (Puckett & Smith, 2002).

Notwithstanding, this definition does not satisfy all the terms at stake, since in effect it does not explicitly clarify what is meant by an *electronic device*. According to the WEEE Directive, which is the European Directive concerning e-waste management, and the macro reference for the present study:

> "*Electrical and electronic equipment* or *EEE* means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields and designed for use with a voltage rating not exceeding 1'000 volts for alternating current and 1,500 volts for direct current". (*Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) - (Recast)*, 2012, p. 19)

In particular, the first WEEE Directive (2002) distinguishes between ten categories of EEE, which are summarized with some examples and related labels in Table 3.3. The products listed in the Directive are very heterogeneous, since they range from large household appliances, like refrigerators, to automatic dispensers and lighting equipment as well as other small devices (earphones, mobile phones, ...). To this list, the new WEEE Directive (2012) has brought two important changes, expected to be effective from 15 August 2018. Not only does this reduce the number of EEE categories from ten to six,[28] it also introduces a wider open scope for EEE categorisation. With the new open scope regime it is assumed that every EEE product is covered by the Directive, apart from a list of specifically excluded products. Consequently, from 2018, beyond the products included *ex lege* in the categories, any other electronic and electrical appliance is subjected to the WEEE discipline if not explicitly excluded. This evolution represents a step forward in the normative process of taking increasing responsibility for e-waste management, and at the same time it is coherent with the evolution of the EEE industry, whose products are witnessing a fast diversification and sophistication, for which a purely classificatory regime would not keep up with sectorial developments.

Table 3.3 - EEE categories according to the EU Directive 2002/96/EC

No.	Category of EEE	Label
1	Large household appliances (e.g. refrigerators, washing machines, …)	Large HH
2	Small household appliances (e.g. iron, toaster, …)	Small HH
3	IT and telecommunications equipment (e.g. notebook, printer, …)	ICT
4	Consumer equipment (e.g. radio, camera, TV, …)	CE
5	Lighting equipment	Lighting

[28] 1) Temperature exchange equipment; 2) Screens, monitors, and equipment containing screens having a surface greater than 100 cm2; 3) Lamps; 4) Large equipment; 5) Small equipment; 6) Small IT and telecommunication equipment (no external dimension more than 50 than 50 cm.
Moreover, the new WEEE Directive includes photovoltaic panels among EEE in the actual fourth category.

6	Electrical and electronic tools (with the exception of large-scale stationary industrial tools. E.g. drills, electric gardening equipment, …)	E & E tools
7	Toys, leisure and sports equipment (e.g. videogames and console)	Toys
8	Medical devices (with the exception of all implanted and infected products)	Medical equipment
9	Monitoring and control instruments (e.g. thermostat)	M & C
10	Automatic dispenser	Dispenser

(Authors' own based on WEEE Directive)

The heterogeneous array of electrical and electronic products listed above shares the same functioning mechanism which is electronic based, while for the rest they can have very different intrinsic features, level of contained hazards and they can also imply very diverse treatment processes. Moreover, also in terms of trade share, these ten categories invade the market according to different quotas, trends and consumers' attitudes depending on the country. Beyond the intrinsic heterogeneity of this series of products, a clearer definition of e-waste is now possible:

> "*Waste electrical and electronic equipment* or *WEEE* means electrical or electronic equipment which is waste (…), including all components, sub-assemblies and consumables which are part of the product at the time of discarding". (*Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) - (Recast)*, 2012, p. 19)

The policy approach in Europe has normally opted for grouping e-waste depending on different material composition and related treatment processes, as shown in Table 3.4. Consistent with this, in the vast majority of OECD countries, e-waste management is based on the following five[29] WEEE categories:

1. Refrigerating equipment

[29] Another more simply distinction made by the OCDE is that among the so-called *white* (Large and small domestic appliances), *grey* (ICT devices) and *black* equipment (audiovisual sector).

2. Other large household appliances
3. TVs and monitors
4. ICT, domestic devices and other consumable small hi-tech appliances
5. Lighting (linear and compact fluorescent tubes)

Table 3.4 - WEEE categories according to the French and Italian legislative frames

No	Category of WEEE	Description
1	Refrigerating equipment (e.g. refrigerators, freezer, …)	Due to Ozone-Depleting Substances (ODS) usage this category has to be separated from other WEEE
2	Other large household appliances (e.g. dishwasher, oven, …)	Because of their shredding with End-of-Life (EoL) vehicles and other light iron, they need to be separated from other waste
3	TVs and monitors	Equipment containing Cathode Rays Tubes (CRTs), which need to remain intact because of health and safety reasons, so that they need to be separated from other waste
4	ICT, domestic devices and other consumable small hi-tech appliances (e.g. phone, mobiles, camera, pc, …)	The most heterogeneous category, it contains variable matters. Normally these appliances can be collected in the same container due to recycling reasons and to their low health impact risk
5	Lighting (linear and compact fluorescent tubes) (e.g. neon lamps)	These devices need to be deposited in a special container (due to Mercury) to ensure it does not contaminate other waste and it can be recycled

(Authors' own based on WEEE Directive)

Moreover, according to the WEEE Directive, e-waste streams are also distinguished between household and professional. Professional e-waste is that deriving from:

> "Machines, equipment, and/or components, functioning together for a specific application, permanently installed and de-installed by professionals at a given place, and used and maintained by professionals in an industrial manufacturing facility or research and development facility". (*Ibid.*, Paragraph b).

Conversely household e-waste, which is the specific interest of this study, is defined as follows:

> "WEEE from private households' means WEEE which comes from private households and WEEE which comes from commercial, industrial, institutional and other sources which, because of its nature and quantity, is similar to that from private households. Waste from EEE likely to be used by both private households and users other than private households shall in any event be considered to be WEEE from private households". (*Ibid.*, Paragraph h)

Since the research aim of this thesis is to question the disposal habits of citizens-consumers with respect to small consumable products, the domestic e-waste category representing the focus of this

study is the fourth, which mainly includes mobile phones, PCs and other ICT goods, but also small domestic appliances for household cleaning and cooking.
After providing this normative frame useful to define the factors at stake in the context investigated, the following section presents a more general view on the e-waste issue as a global environmental, political and societal question.

3.4 E-waste: a multifaceted issue

This section addresses the issue of e-waste as it poses serious challenges not only at environmental level but also at societal and political ones. These perspectives are highly interconnected and depend on three features of EEE :

1. EEEs generate the fastest growing waste streams worldwide
2. They produce hazardous wastes
3. They contain valuable matters in an age of resources scarcity.

These three steps are addressed one by one in order to provide a complete picture of the e-waste issue, useful for the research aim of this proposal.

3.4.a The dramatic climb of e-waste

According to several studies (UNU-StEP, 2009b, 2011), whereas many forms of waste are declining globally, e-waste is one of the few that is steadily growing and shows no sign of abating. In particular, out of the whole rate of urban solid waste, the e-waste component is comparatively the fastest rising, with annual growth reaching around 3-5% in the EU (Gossart & Huisman, 2011). Moreover, in the developing world its rise is even more dramatic, as it is calculated that in some Asian and African countries WEEE volumes could grow by as much 500% over the next decade (McCann & Wittmann, 2013). The evolution of e-waste volumes is represented in Table 3.5, where the historical trends in WEEE production is presented in different world areas since 1992, together with a forecast projection up to 2017. As the results suggest, with respect to a growing tendency, developing countries exhibit the strongest increase.

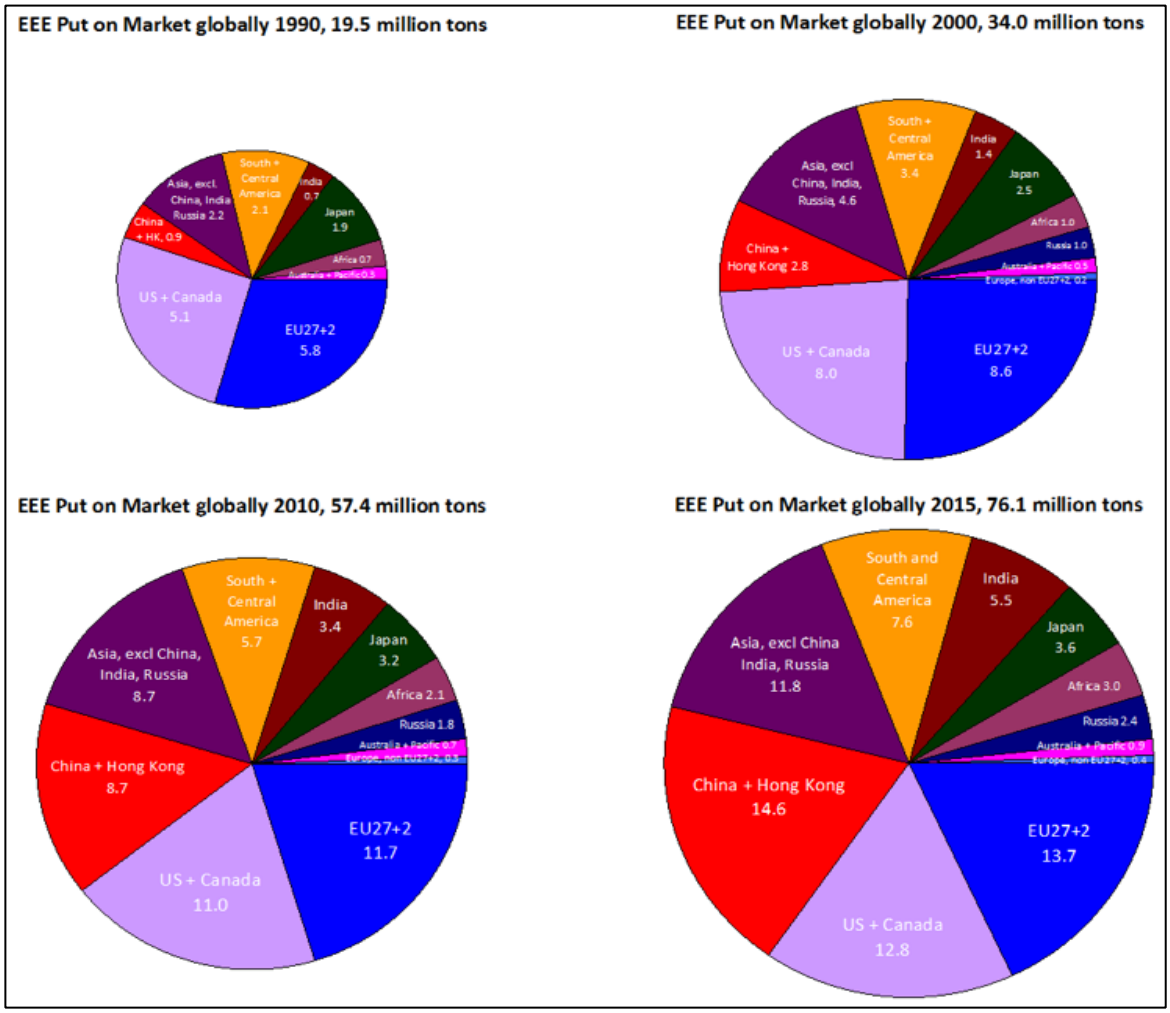
Table 3.5 - Evolution of Global E-Waste Volumes

Region	1992	1997	2002	2007	2012	2017
Asia, ex China, India & Japan	1,254	1,856	2,384	3,644	4,820	6,691
Australia/ Pacific	226	306	400	544	657	836
Eastern Europe + non EU27+2	946	761	1,051	1,743	2,072	2,732
EU 27+2	4,445	5,574	6,965	9,164	9,918	11,703
India	491	730	1,035	1,817	2,752	4,117
Japan	1,542	1,833	2,012	2,547	2,742	3,160
Latin America + Caribbean	1,459	1,939	2,285	3,322	4,226	5,590
Middle East and North Africa	872	1,148	1,447	2,362	2,994	3,990
Sub-Saharan Africa	343	441	598	919	1,240	1,763
US + Canada	4,079	5,367	6,895	9,126	10,221	12,918
China	702	1,334	2,161	4,286	7,253	11,864
Total	16,359	21,289	27,233	39,473	48,894	65,363

(McCann and Wittmann, 2013, p. 6)

This general growing trend is consistent with the consumerism pattern of a growing portion of world population in emerging markets, which has increasing access to consumable goods (Rossi, 2009). Moreover, the features of many hi-tech products (planned obsolescence, rapid technological innovation, relatively accessible prices, increasing functions sophistication, …) equally encourage a global trend of hyper-consumerism and waste generation. Therefore, the question of e-waste has started to pose serious management problems, due to its growth rate and to the progressive weight that EEE acquires from the market of global consumption. According to this, the series of graphs presented in Figure 3.6 confirm this trend, namely the increasing global amount of EEE released into the market since the Nineties, with rising forecasts for the future.

Figure 3.6 - EEE put on the market, from 1990 to 2015, by region



(UNU-StEP, 2011, p. 11)

Clearly, such dramatic growth in goods and waste generation detrimental to environmental resources, represents a significant challenge for policy-makers as well as for consumers.

3.4.b E-waste hazardous components and Environmentally Safe Management (ESM)

E-waste types imply treatment problems due to its hazards components which, to varying degrees, are contained in hi-tech products. In fact, as partly addressed in Table 3.7, EEE products are commonly built with hazardous substances, whose improper management can cause serious impacts on the environment and human health. The most widespread potentially dangerous chemicals contained in e-waste are heavy metals (e.g. Arsenic, Beryllium, Lithium, Mercury, …) and different types of flame retardants (CFC, PCB, TBBA, …). If e-waste processing after disposal is not accurately and safely conducted following practices which are known as Environmentally Sound Management (ESM)

(Widmer et al., 2005), these substances can affect the health of workers involved in their treatment as well as that of the environment, as further explained.

Table 3.7 – Some examples of hazardous substances contained in WEEE and the related impacts

Chemical	Occurrence in e-waste	Health and environmental concerns
Arsenic	Small quantities in the form of gallium arsenide within light emitting diodes	Arsenic is a poisonous metallic element which is present in dust and soluble substances. Chronic exposure to arsenic can lead to various diseases of the skin and a decrease in nerve conduction velocity. Chronic exposure to arsenic can also cause lung cancer and can often be fatal.
PCB (polychlorinated biphenyls)	Condensers, Transformers	Polychlorinated biphenyls (PCBs) are a class of organic compounds use in a variety of applications, including dielectric fluids for capacitors and transformers, heat transfer fluids and as additives in adhesives and plastics. PCBs have been shown to cause cancer in animals. PCBs have also been shown to cause a number of serious non-cancer health effects in animals, including effects on the immune system, reproductive system, nervous system, endocrine system and other health effects. PCBs are persistent contaminants in the environment. Due to the high lipid solubility and slow metabolism rate of these chemicals, PCBs accumulate in the fat-rich tissues of almost all organisms (bioaccumulation). The use of PCBs is prohibited in OECD countries, however, due to its wide use in the past, it still can be found in waste electrical and electronic equipment as well as in some other wastes.
Chlorofluorocarbon (CFC)	Cooling unit, Insulation foam	Chlorofluorocarbons are compounds composed of carbon, fluorine, chlorine, and sometimes hydrogen. Used mainly in cooling units and insulation foam, they have been phased out because when released into the atmosphere, they accumulate in the stratosphere and have a deleterious effect on the ozone layer. This results in increased incidence of skin cancer in humans and in genetic damage in many organisms.
Beryllium	Power supply boxes which contain silicon controlled rectifiers and x-ray lenses	Beryllium has recently been classified as a human carcinogen because exposure to it can cause lung cancer. The primary health concern is inhalation of beryllium dust, fume or mist. Workers who are constantly exposed to beryllium, even in small amounts, and who become sensitised to it can develop what is known as Chronic Beryllium Disease (beryllicosis), a disease which primarily affects the lungs. Exposure to beryllium also causes a form of skin disease that is characterised by poor wound healing and wart-like bumps. Studies have shown that people can still develop beryllium diseases even many years following the last exposure
TBBA (tetrabromo-bisphenol-A) PBB (polybrominated biphenyls) PBDE (polybrominated diphenyl ethers)	Fire retardants for plastics (thermoplastic components, cable insulation) TBBA is presently the most widely used flame retardant in printed wiring boards and casings.	Flame retardants make materials, especially plastics and textiles, more flame resistant. They have been found in indoor dust and air through migration and evaporation from plastics. Combustion of halogenated case material and printed wiring boards at lower temperatures releases toxic emissions including dioxins which can lead to severe hormonal disorders. Major electronics manufacturers have begun to phase out brominated flame retardants because of their toxicity.

Mercury	Fluorescent lamps that provide backlighting in LCDs, in some alkaline batteries and mercury wetted switches	Mercury is one of the most toxic yet widely used metals in the production of electrical and electronic applications. It is a toxic heavy metal that bioaccumulates causing brain and liver damage if ingested or inhaled. In electronics and electrical appliances, mercury is highly concentrated in batteries, some switches and thermostats, and fluorescent lamps

(Source: http://ewasteguide.info/node/219. Last consulted on September 2014)

3.4.c Urban mines: The monetary value of e-waste series

In addition to hazardous substances, EEEs contain also valuable matters like copper, gold, or silver, which are commonly referred to as Secondary Row Materials (SRM). This feature makes the e-waste issue particularly tricky due to three reasons.

Firstly, sub-standard treatment and recycling methods lead to a loss of key resources locked in e-waste, which could instead be recovered and reused, and this represents an economic loss. Secondly, the vast majority of valuable materials contained in e-waste are non-renewable, and in recent years have been witnessing a considerable decline. These substances are becoming increasingly rare, and the issue of their availability and extractability is posing ever greater economic, logistical and geopolitical problems. As long as row matter continues to disappear, related costs rise, together with the economic

Table 3.8 - Critical resource use in electronics and years of consumption remaining in global reserves

Metal	Use in Electronics	World mine production	Demand for EEE over production	Years of Reserves left at today's consumption	% of consumption met by recycled materials
Silver	Contacts, switches, lead-free solder, conductors, etc.	20,000 tonnes per year	30%	29	16%
Gold	Bonding wire, contacts, etc.	2,500 tonnes per year	12%	45	43%
Tin	Lead-free solder	275,000 tonnes per year	33%	40	26%
Copper	Cables, wires, connectors, PCBs, transformers	15,000,000 tonnes per year	30%	61	31%
Indium	Flat screen displays, semiconductors	480 tonnes per year	79%	13	0%

(UNEP, 2009, p. 9)

value of secondary matter. For these reasons, the great amounts of WEEE which are generated by urban communities have taken the name of *urban mines* (Hagelüken & Buchert, 2008; UNEP, 2009). Such a threat of resource depletion represents a crucial incentive that may ironically help to guarantee that e-waste management is done properly, since the fact that secondary row matters can alleviate the need for the mining of virgin materials. Table 3.8 gives a view on the critical resource use in EEE production, compared to the global pace of related consumption, the forecasted years of reserve left and the percentage of consumption met by recycled materials.

Again, it is precisely because they contain valuable matters that electronic waste is often subtracted from the institutional treatment processes, giving rise to the low collection rate that many official supply chains record worldwide: a low cost and improper, but rapid, extraction of valuable materials is still too often considered the most convenient way to manage e-waste. Consistent with that, in the past three years an opposite correlation occurred in many European Countries between the rising value of secondary row materials on the global market and poorer capacity of institutional supply chains to capture e-waste flows so as to treat them (Andec, 2012).

The following section will address the implications that derive from the features of e-waste described above, which make it a very challenging public problem. The political, environmental, and socio-cultural questions raised by this problem is subsequently addressed.

3.5 E-waste impact in the digital era: between Local and Global

Due to its growing trend compared to other types of municipal waste and to its particular components (hazardous and valuable), e-waste has gained increasing attention over the last 10 years in many fields of knowledge. In particular, five intertwined challenges arose from WEEE management: 1) Environmental; 2) Societal; 3) Political on a global scale and policy-related on local scale; 4) Socio-cultural; 5) Economic.

The environmental question refers to e-waste impacts when it comes to be mismanaged. This issue is related to the potential damage caused by WEEE through improper dismantling, landfilling and incineration. In fact, due to EEE contents, the recommended options for a sound management turn to very specifically dedicated facilities to avoid spills of toxic substances into the atmosphere, water and soil. Notwithstanding, given that these types of plants are normally technologically sophisticated and relatively expensive, they are not common in every country and are mostly concentrated in developed regions. This gives rise to a second important question, that of the societal impacts of e-waste mismanagement in developing countries. In fact, due to the lack of proper treatment facilities and given the potential economic value of secondary row matters contained in e-waste, in the Second and Third worlds (China, Ghana, India, Nigeria, ...) many informal sites of WEEE dismantling have mushroomed. In those sites, thousands of men, women, and children are employed with very limited

safety standards in refurbishing, repairing, and remanufacturing. Remaining e-waste is then incinerated, landfilled or open-air burned. Many studies have highlighted how these management options could affect both the environment and the human health of employees (Gossart and Huisman, 2011; UNEP, 2009; Widmer et al., 2005).

> "A research team has investigated on trace metals around the largest e-waste recycling site in Ghana, Agbogbloshie market in Accra. On this big informal market, used computers, monitors and televisions are dismantled and burnt or disposed of. Korle Lagoon in the nearby estuary has become one of the most polluted area on earth. The research team collected mixed soil and ash on the site and analysed it. They found out that concentrations of copper (50 to 22,000 mg/kg), zinc (200 to 160,000 mg/kg), lead (100 to 14,000 mg/kg) and tin (<50 to 1,000 mg/kg) were extremely high. They concluded that it is clear that soil/ash mixture has significant negative effects on human health. As a result, it is expected that recycler's health might be affected by accidental ingestion of toxic heavy metals through soil". (Otsuka et al., 2011, p. 165)

In fact, inhalation of open fire emissions can trigger asthma attacks, respiratory infections, and cause other problems such as coughing, wheezing, chest pain, and eye irritation. Chronic exposure to these emissions may also lead to diseases such as emphysema and cancer. For example, burning PVC[30] releases hydrogen chloride, which on inhalation mixes with water in the lungs to form hydrochloric acid. This can generate corrosion of the lung tissues and several respiratory complications.

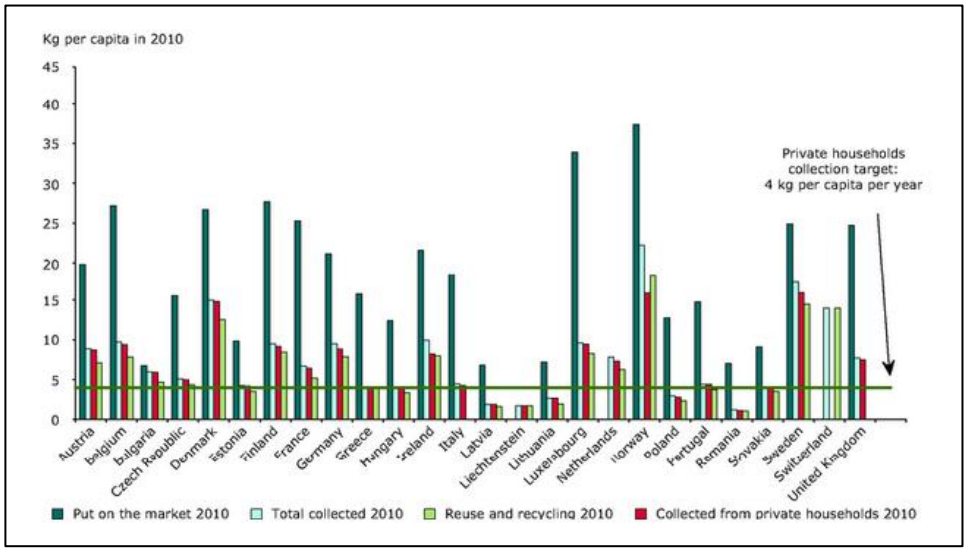
Related to these series of impacts is the economic value of e-waste. In fact, the huge volumes of waste informally treated in developing countries is not locally originated, since it is mostly imported from developed countries. Since there is no room here to go into depth regarding the e-waste dumping phenomenon, it is sufficient to recall the extent it brings to light how the potential value of e-waste, compared to the relatively high economic and technological cost of its safe treatment, has generated a series of trans-boundary trash shipments from developed countries to the developing. Under this process, the First world gets rid of volumes of refuse that are complicated and costly to manage, while the Second and Third worlds can exploit the economic value of secondary row matter contained in the waste, but at the expense of human and environmental local health. Thus, here e-waste becomes also a question of international politics, an object of increased attention in the relations between governments. In fact, due to the serious impacts of e-waste dumping, several international agreements and norms have been established in order to limit this phenomenon. Among them the most important to recall is the Basel Convention (1989),[31] with latter addendum in 2006 (Nairobi Declaration) and 2011 (Cartagena Decisions), which had the general aim to minimise the production of hazardous

[30] Polyvinyl chloride which is contained in cable insulation.
[31] Signed by 179 countries and entered in force in 1992.

waste, to encourage the local handling of it and to minimise its export. Similar to the Basel Convention is the OECD Waste Agreement (1992), which established a framework for OECD member countries to supervise and control transboundary movements of e-waste within their territories. Again, the RoHS Directive (2003)[32] and the European Waste Shipment Regulation (2006) contributed to formally transpose in the European context the contents of Basel Convention, together with further restrictions on the use of hazardous materials in the manufacture of various types of EEE.

Parallel to this concern, namely e-waste as a global political question, one has to consider its counterpart, which is e-waste as a local policy question, which is the specific object of this study. In fact, also in developed countries many governments are experiencing some difficulties with e-waste management, due to the relatively high percentages of waste streams which escape from official supply chains. In Europe, with some virtuous exceptions (such as Norway, Sweden, Denmark and Switzerland) (EEA, 2011), the vast majority of member states manage to collect e-waste corresponding to less than about 30-40% of EEE put on market, as shown in Graph 3.9. This depends on two main factors. First, the effectiveness of the local e-waste supply chain in avoiding the involvement of illegal and/or extra-institutional stakeholders in intercepting e-waste flows and making some profits by e-waste treatment or shipment. Secondly, citizen-consumers' practices regarding EEE consumption patterns and e-waste disposal habits.

Graph 3.9 – EEE PoM compared to WEEE collected, reused and recycled in European countries



(Source: http://www.eea.europa.eu/data-and-maps/figures/weee-put-on-the-market-2. Last consulted on September 2014)

[32] Restriction of Hazardous Substances Directive 2002/95/EC.

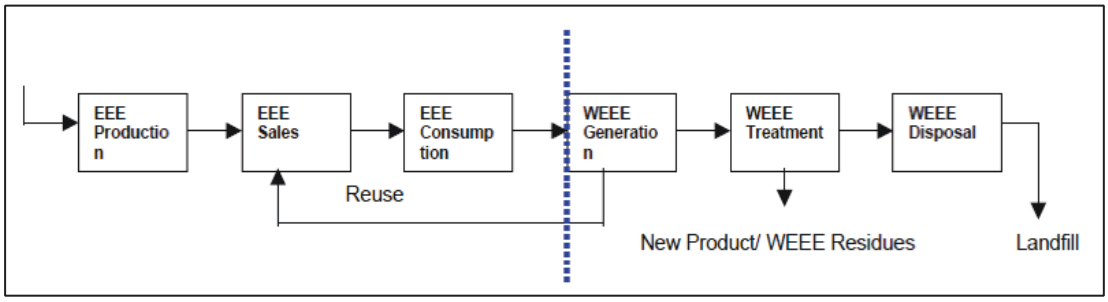
In turn, a more or less effective management supply chain comes from a combination of several factors: accurate legislation, monitoring and enforcement institutions, take-back system, collection and treatment schemes, internal consistency of the overall chain, relations among different stakeholders including consumers. Furthermore, the latter poses a series of other - more strictly sociological - queries on their awareness, habits, concern and willingness compared to e-waste dismantling issues. Their role is indeed officially recognised as one of the driving forces to reach the collection target imposed by the WEEE European Directives (Directive 2002/95/EC; 2012/19/EU).

3.6 E-waste management in the European Union: the WEEE Directive

The previous sections have provided a general view on e-waste as a multifaceted question, whose urgency refers to several fields and arises differently depending on the world region. In particular, it has been shown how in developing countries the issue appears more as a problem of international politics, human health and environmental impacts, while in developed contexts it looks rather a problem of local governance, supply chain effectiveness and citizens-consumers habits. Common to both is instead the economic question: a cost-benefits analysis between e-waste (im)proper handling and monetary value obtained, which brings about different treatment options depending on the national, regional and local contexts.

Given the specific objectives of this research, which is built as a comparative study between Milan and Paris with respect to the e-waste recycling behaviour of consumers, what is addressed here is the specific normative apparatus governing its management in the European context. Moreover, the attention is not be put on the overall life cycle from EEE to WEEE, as shown in Diagram 3.10, *from cradle-to-grave*, but on the so called primary collection phase (Andec, 2012), which is the stage between consumers' disposal and e-waste collection, with no further insights on the following steps – e-waste processing and treatment.

Diagram 3.10 – Life cycle of electrical and electronic equipment



(UNEP, 2007, p. 12)

Given this important notice, which allows us to better circumscribe the scope of this study, it is now possible to focus on the European regulation to have a macro framework of the two national contexts investigated, namely Italy and France, which in turn represent the starting point of urban scale local policies.

The first WEEE Directive, which is the 2002/96/CE and following amendments,[33] and the first European RoHS Directive (2002/95/EC) laid the foundations for the current regulatory framework concerning e-waste management. These two directives have been further recast by the new WEEE Directive (2012/19/EC) and the new RoHS Directive (2011/65/EC).

Since the WEEE Directives represent the major focus of this section, it is sufficient to recall that the RoHS regulation contributes to modifying EEE compositions in terms of bans or restriction of hazardous substances contained within.[34] This series of restrictions is aimed to upstream control and limit the impacts of e-waste treatment, coherently with the principle of prevention[35] and Life Cycle Assessment (LCA).[36]

Conversely, the core of e-waste management standards in Europe is represented by the first WEEE Directive, which is here recalled since its requirements are useful to frame our case study. The main important provisions laid down by this Directive are as follows.

1. A disposal hierarchy which consists in the three R: 1) Reduce EEE, namely e-waste prevention; 2) Reuse EEE in a secondary circuit; 3) Recycle WEEE, as last alternative. The Directive contains per each of these three R stage a series of recommendations and technical requirements concerning both the matter of recycling, recovery and refurbishment operations, and the topic of consumers' awareness and habits. Consistent with this scale, the European legislation aimed to carry forward the challenge of zero waste37 generation and turning around practices of consumerism . The attention is paid to two main questions: product concept and design, so that its disposal could easily allow second-hand practices, but also consumers' attitudes towards EEE consumption and the related end of life handling.

2. The application in e-waste management of the Extended Producer Responsibility (EPR) principle, which can be defined as follows:

> "[The EPR implies] the concept that manufacturers and importers of products bear a degree of responsibility for the environmental impacts of

[33] Directive 2003/108/CE and Directive 2008/104/CE.

[34] Thus, this is not directly mobilized to e-waste management, but rather on its presupposition, namely the quantity and quality of chemical substances it includes. In particular, limitations are imposed in the use of Lead, Mercury, Cadmium, Hexavalent Chromium, and flame retardants used in several plastics as PBB (polybrominated biphenyl) and PBDE (polybrominated biphenyl ether).

[35] "This principle allows action to be taken to protect the environment at an early stage. It is now not only a question of repairing damages after they have occurred, but to prevent those damages occurring at all. This principle is not as far-reaching as the precautionary principle. It means in short terms: it is better to prevent than repair" (Oskam, Vijftigschild, & Graveland, 1997).

[36] "Life Cycle Assessment (LCA) is a method developed to evaluate the mass balance of inputs and outputs of systems and to organize and convert those inputs and outputs into environmental themes or categories relative to resource use, human health and ecological areas. (…) LCA characterizes emissions and waste over a product's life cycle" (European Commission, 2008)

[37] http://www.zerowaste.org.

> their products throughout the products' life-cycles, including upstream impacts inherent in the selection of materials for the products, impacts from manufacturers' production process itself, and downstream impacts from the use and disposal of the products. Producers accept their responsibility when they design their products to minimize the lifecycle environmental impacts and when they accept legal, physical or economic responsibility for the environmental impacts that cannot be eliminated by design". (Davis and Gary, 1994 *in* (Sander et al., 2007)

ecodesign and low impact product conception. The Directive indeed specifies that it is up to producers to "provide at least for the financing of the collection, treatment, recovery and environmentally sound disposal of WEEE from private households deposited at collection facilities" (*Ibid.*, Art. 9). Moreover, it introduces dual regime options of EPR application: the Individual Producer Responsibility (IPR) for the management of new WEEE (those deriving from EEE put on the market after 13 August 2005), while the responsibility for *historical* (previous period EEE) and *orphan* WEEE (manufactured by producers that have ceased trading or that cannot be identified) is shared and not brand-related. This principle is important since the obligation to take in charge this latter portion of e-waste has brought about a system of producers' eco-organisms in several European countries, even including those studied in this thesis. In fact, producers can opt to individually take charge of their own products put on the market, thus historical WEEE producers are obliged to share both the economic responsibility of their management, via a visible fee, as well as the required logistics by joining a collective system.

In this respect, the Directive states that:

> "The responsibility for the financing of the management of historical waste should be shared by all existing producers in collective financing schemes to which all producers, existing on the market when the costs occur, contribute proportionately. (…) For a transitional period, producers should be allowed to show purchasers, on a voluntary basis at the time of sale of new products, the costs of collecting, treating and disposing in an environmentally sound way of historical waste. Producers making use of this provision should ensure that the costs mentioned do not exceed the actual costs incurred". (*Ibid.*)

From this principle derives the eco-contribution scheme, which is a monetary quota added to EEE prices specifically aimed at (historical) e-waste management, and that has to be clearly indicated as a separate cost from the simple product price. With respect to this, the new Directive has introduced the option, up to Member States, to making this fee invisible and directly internalized in the final product cost, from February 2013 onwards. This system, which brings consumers to economically participate in e-waste management, is coherent with the *polluter-pays* principle and it is differently applied depending on the Member State. The general result is that in Europe several types of financing models and compliance costs do actually exist, according to the differing degrees of economic implication among various stakeholders. The financing models applied in the two contexts investigated will therefore be analysed in the dedicated chapters.

3. E-waste collection target.

The existing collection target imposed by the first WEEE Directive was 4 kg of WEEE per capita, representing about 2 million tonnes per year out of 10 million tonnes of WEEE generated per year in the EU (UNU - StEP, 2011a). Article 7 of the new Directive has introduced significantly higher requirements in terms of collection rate, and the methodology for calculating them is also new. From January 2016 the minimum WEEE collection rate will be 45% of the average total weight of EEE placed on the market over the preceding three years. Further, from January 2019, it will be 65%. In addition, the opportunity is offered to achieve an alternative target of 85% based on a WEEE generated methodology, based on estimates of WEEE generated from data on product life cycles. With respect to that, the recast Directive requires the Commission to devise a common methodology for the calculation of WEEE generated by 14 August 2015. In the meantime, Member States are required to collect at least the 4 kg per inhabitant established by the first Directive, or a rate equal to the average collection rate achieved over the past three years, whichever is the greater. Considering that currently many countries have already struggled to collect the 4 kg per inhabitant, and also given that by 2020 it is estimated that the volume of WEEE will increase to 12 million tonnes,[38] these new targets are regarded as too ambitious or unrealistic by many Member States, including Italy and France, as is widely showed in the dedicated sections.

4. Active involvement of distributors in e-waste collection via a specific take-back scheme. Such a system is described in the first Directive as follows:

> "When supplying a new product, distributors shall be responsible for ensuring that such waste can be returned to the distributor at least free of charge on a one-to-one basis as long as the equipment is of equivalent type and has fulfilled the same functions as the supplied equipment". (Directive 2002/95/EC, 2004. Art. 3)

It means that retailers have the legally binding obligation to collect any WEEE disposed by households when there is a contextual purchase of an equivalent EEE. This principle has been translated by Article 6 of the new Directive in the one-to-zero scheme, which means that, from February 2014, distributors are expected to collect households' WEEE even without a contextual purchase, under certain conditions.[39]

5. Information and reporting standards.

Annually, Member States are requested to draw up a register of EEE producers and collection information, including substantiated estimates, quantities and categories of EEE put on the market and e-waste collected through all routes, even reused, recycled and recovered appliances. The report also has to contain exported e-waste. In this, a further improvement introduced by the new Directive is the goal of an overall harmonisation of national registration and reporting requirements: the European Commission will adopt a harmonised format to be used for the supply of information, so that administrative burdens are expected to decrease significantly.
Moreover, the new Directive forces exporters to test and provide documents on the nature of their shipments when these run the risk of being waste. The new provisions (Annex VI) will

[38] European Commission Website. Page available at http://ec.europa.eu/environment/waste/weee/index_en.htm (Last consulted on September 2014).
[39] According to the Article 6 of the Directive 2012/19/EU: "Distributors provide for the collection, at retail shops with sales areas relating to EEE of at least 400 m2, or in their immediate proximity, of very small WEEE (no external dimension more than 25 cm) free of charge to end-users and with no obligation to buy EEE of an equivalent type".

require used EEE destined for export to be properly tested, documented and packaged before it can be exported for reuse. In fact, illegal shipments of WEEE disguised as legal shipments of used equipment - in order to circumvent and undermine waste treatment rules - is a serious problem.

6. Inspection and monitoring of e-waste management supply chain.

   Member States are requested to ensure that inspection and monitoring activities are put in place to enable the proper implementation of the Directive.

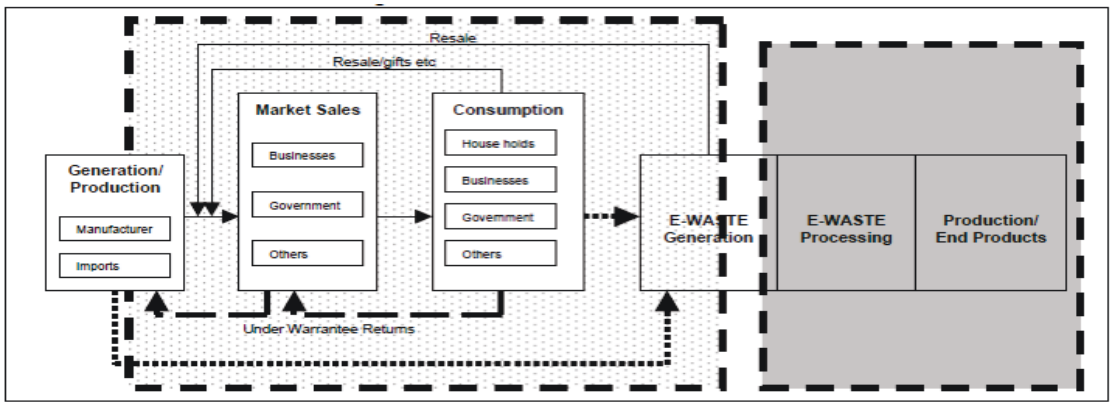
3.7 Multi-stakeholder approach and shared responsibility in e-waste management

In accordance with the WEEE Directives, European member states are expected to adopt a system of household e-waste management which implies the active participation of several different actors. In particular:

1. Producers, as they are requested to apply the EPR principle;
2. E-waste recycling and treatment operators;
3. Local authorities, as they are in charge of contributing to primary phase collection;
4. Citizens, as consumers and as equally involved in the primary collection stage;
5. Retailers, due to the one-to-one (and one-to-zero) requirement;
6. Various actors of reuse and second-hand channels, due to the need to meet greater reuse and recovery targets;
7. Public and governmental authorities in charge of monitoring and reporting about the overall functioning of the national e-waste chain.

This overall multi-stakeholder system is synthesised in Diagram 3.11, where all the stages of (W)EEE life cycle are shown, together with the institutional subjects implied.

Diagram 3.11 – Supply chain of management from EEE to WEEE and main actors involved



(UNEP, 2007, p. 18)

Referring to the recycling behaviour of consumers, which is the subject of this study, means considering the primary phase of collection. At this stage, the stakeholders mobilized are:

1. Producers and their collective systems;
2. Local authorities and local (e)waste governance;
3. Retailers;
4. Citizens-consumers;
5. Social and Solidarity Economy (SSE) sector;
6. Enforcement apparatus.

The following paragraph will afford a general view on this actors' configuration in the Italian and French contexts.

3.8 The WEEE Directive transposition: common patterns in Italy and France

The transposition of the WEEE Directives into the Italian and French national contexts brings about similar configurations of the e-waste supply chain, representing the starting point for the comparison. This paragraph offers a specific view on the common traits characterizing the two systems, while any specificity will be addressed in the corresponding chapter. The shared features considered here are: 1) Overall supply chain configuration; 2) Financing scheme; 3) Logistics.

Firstly, both countries implement the WEEE Directive via a scheme of collective systems, according to an overall configuration called the *clearing house model* (UNU-StEP, 2009). This model is defined as:

> "A national framework in which multiple partners (producers, recyclers, and waste organizations) can provide services. The government ensures that there is a register of producers and defines the allocation mechanisms, together with the reporting and monitoring systems. A central national coordination body determines the proper functioning of the entire system, according to criteria of cost and service optimization". (Adelphi Research & AREC, 2008)

The clearing house model is built conceiving e-waste management as a service, and it aims to guarantee it on the entire national territory, while simultaneously leaving producers free to compete in its provision. This means that producers join a collective system in order to take charge of e-waste deriving from their EEE put on market. Moreover, in both the countries, despite the option to join an individual producer responsibility for new WEEE, none of the producers chose an individual management system regarding household appliances.

The second similar trait is the financing scheme, as both countries apply a compliance cost model. Indeed, even if there are some differences in their actual applications, the general configuration is identical: collective systems are made up by producers who finance e-waste management depending on their EEE market share, while being in part reimbursed by consumers' eco-contribution. They also reimburse (differently in Italy and in France) local authorities and retailers for taking part in the primary collection phase. Lastly, it is always up to them to reimburse treatment operators and all transport activities related to e-waste management. Citizens may also provide some further form of economic participation to the system via the general waste tax paid to local authorities.

Thirdly, the logistics of the e-waste supply chain is the same in the two contexts. In fact, collective systems are normally responsible for e-waste withdrawal from the collection points of local authorities, and for their transport to treatment plants. Moreover, the primary collection stage is up to municipalities, via a local take-back system, and to retailers, via the one-to-one or one-to-zero application. In this regard, the new Directive has introduced the opportunity for producers to take direct charge of the primary collection phase. Notwithstanding, no such system has been set up so far.

These three elements represent the common starting point for both the Italian and French systems in e-waste management. Apparently, they show an almost identical configuration of the stakeholders involved in the supply chain, however, going in to depth with each national case, it is brought to light how they vary depending on a series of local specificities, with a strong effect on the whole collection performance on urban scale. the following chapter describes the methodological tools adopted to conduct our case study.

Chapter 4

4. Methodology

This chapter discusses the theoretical and practical assumptions underpinning this study, its questions and hypotheses, together with the design strategies put in place to provide some responses and acknowledgments to the following research questions: which factors intervene in encouraging individuals to act pro-environmentally? At what extent they can contribute to a broader changing towards "sustainable societies"? And in particular: what elements result as the most significant in orientating the act of e-waste disposal of citizens-consumers?

Firstly, the research approach implied in the study is illustrated. In order to respond to our inquiry, the starting point is represented by the literature on environmental behaviour and in particular by the pragmatist integrative model proposed by (Stern, 2000b). This model allows us to frame our issue via a multi-scalar view and to make a first selection of variables. Furthermore, the relative absence of work specifically conducted on e-waste in the field of social sciences supports the choice to conduct research by an explorative case-study (Yin, 1984). Thus, according to an *abductive* path (Scrab, 2013), the analysis is not only expected to provide responses to the research question, but also further cues, findings and insights, since it explores a seldom investigated topic. In this, the approach not embraces a single scale of analysis, as different units are considered. In fact, it is here supposed that only a multi-comprehensive and multidisciplinary view can provide the most complete picture of the phenomenon in study.

Consequently, the chapter discusses the choice to address the issue by using an urban comparative case-study between the cities of Milan and Paris. The two cities are subjected to the same institutional framework concerning e-waste management (the EU WEEE directive), while they display very different collection performances and show some difficulty in achieving the collection targets imposed by the directive. Comparing e-waste recycling behaviour in Milan and Paris fulfils two objectives:

1. It is expected to provide additional insights into the environmental behaviour literature and e-waste Supply Chain Management (SCM).

2. Results are also expected to provide some insights concerning waste governance in two contexts which struggle to achieve sustainability goals. This means meeting a practice and policy-oriented purpose, which is assumed to provide additional information with respect to pure theoretical reasoning.

The comparative approach is then expected to be helpful in weighting the factors at stake and comprehending whether local-specific factors affect social phenomena in an original way, and

conversely to what extent similar trends emerge. The following parts then illustrate the units of analysis considered here to conduct the research, which are individuals' standpoints and the e-waste SCM. According to these two units the variables considered are defined together with the research methodologies adopted to catch them, with particular attention paid to data collection phase and analysis methods. A focus on the sampling strategy is then provided. The conclusive section explores the limitations of the research, which refer to the possible bias in the sample chosen, data availability and data asymmetry during the comparison.

4.1 E-waste recycling behaviour: between theory-test and exploration

Referring to the global objective of sustainability and to the attempt to address a general transition towards a more environmentally friendly society (Kemp & Loorbach, 2003), the role of consumers is a widely investigated and questioned topic in many academic disciplines (Komiyama & Takeuchi, 2006). The scientific interest which is addressed by these studies consists of individuating a sort of match between individuals' dimension and other macro contextual forces in contributing to societal change towards green transition (regulatory framework, economic and socio-cultural trends, policy, available technology, etc.). The aim is trying to understand what factors result as being the most impacting on individuals' behaviour, with particular attention being posed to the matter of local policies, and what practical tools finally result as the most effective ways to encourage greener conduct , given that:

> "Policy intervenes continually in consumer behaviour both directly (e.g. through regulation and taxes) and more importantly through its extensive influence over the social context within which people act. This insight offers a far more creative vista for policy innovation than has hitherto been recognised". (Jackson, 2005, p. 2)

The present study follows in the wake of such work with scientific interest which is not only theory-oriented, but also practice and policy-oriented (Dul & Hak, 2008). In fact, on the one hand our research is in continuity with previous works concerning the matter of environmental friendly behaviour and consumers' conduct, and thus contributes to the evolution and consolidation of previous theoretical findings in this field. On the other hand the ultimate goal is also to elaborate practical insights useful for e-waste governance, which is supported by the environmental, societal and political urgency that this matter poses, as widely illustrated in chapter 3.

As already mentioned in chapter 2, so far the issue of e-waste has been poorly investigated in social sciences, which means that a strong corpus of work theorizing the behaviour of consumers related to that specific component of waste does not yet exist. Here, it is instead considered that the vast

literature on environmental and recycling behaviours is only partly useful for our case, as e-waste specific features make the issue worthy of a particular reading. These characteristics[40] are briefly reprehended as follows. Firstly, the category of interest in this study is small WEEE, to which we subsequently will refer to as *C4*,[41] that are composed of small ICT appliances (e.g. mobile phones, earphones, I-Pod, Mp3, etc.) and other domestic consumables (e.g. hear-dryers, mixers, electric shavers, etc.). Due to their size and intrinsic features, small WEEE are quite likely to generate improper conduct among users, informal handling and domestic stock, which in turn translates into a diversion of e-waste streams from the official e-waste SC. Secondly, the act of e-waste disposal is quite rare. Furthermore, common disposal schemes require personal engagement by users, since a door-to-door service is rarely provided for small WEEE. Thus, the act of e-waste dismantling requires a specific effort, which represents an extra cost compared to common waste generated daily. Thirdly, the increasing presence of electronic components in some small objects is not always perceived by consumers. This phenomenon, together with the implementation of an e-waste regulatory framework which is relatively recent, obliges to questioning the matter of awareness and behaviour-specific knowledge. Another point to make is that the localisation of collection points is not always (or not ubiquitously) decided in a *user-friendly* manner. This common perception poses further issues concerning utility system effectiveness in dense and populated cities with specific urban patterns in terms of settlements and mobility. Also, e-waste management by consumers strongly depends on their consumption patterns, which means interrogating this latter on whether they indirectly contribute to the generation of waste. Finally, e-waste collection is influenced by waste collection habits, but previous work has given contradictory results about the direction of such an influence(Darby & Obara, 2005; Nixon & Saphores, 2007). Further investigation of this is expected to contribute consolidating or evolving previous findings.

Thus, due to all these features, which mobilise several different behavioural categories, e-waste evidently deserves specific attention distinct from general literature on recycling conduct. Thus, even if the latter represents the starting point of the analysis and the basis from which to formulate our hypothesis, the outcome of the research is expected to generate new propositions and findings. According to this approach, which consists of a hypothesis-test at the first stage but also of an exploration (Yin, 1984), the present work can be defined as a *hybrid explorative case-study* (Thietart, 2007) involving an abductive approach. Indeed:

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[40] See section 2.7.

[41] As they compose the fourth e-waste category according to what illustrated in chapter 3. Equally, the first e-waste category will be subsequently referred to as *C1*, the second as *C2*, the third as *C3* and the fifth as *C5*.

> "It assumes a proceeding from empirical observations to theory throughout the study (…), this path allows to enrich and deepen previous forms of knowledge (…) thanks to the constant reciprocal dialogue between practical evidences and theoretical assumptions."[42] (Thietart, 2007, p. 60)

Common to explorative case-study, our work takes a holistic approach, which implies an integrative behavioural model (Jackson, 2005) and a multi-scalar perspective (Stern, 2000). The basic idea underpinning such a proceeding is that different types of causal variables – psychological, contextual, socio-cultural, etc.- which are normally mobilized in environmental studies, do actually interact, and diverge to generate social behaviours. Consequently, it is chosen here not to opt for a mono-causal perspective, but to approach our subject by establishing a process based on a dynamic and generative feedback loop between different units of analysis, even taken by different disciplinary fields, scales and domains. According to this multi-comprehensive view, the reflection of Stern results as appropriate, since he proposes to frame behaviour as a function of personal attitudes, but also of personal capabilities, contextual factors and habits. Following the author:

> "Different types of causal factors may interact, implying that interpretations based only on main effects can be seriously misleading. Studies that examine only attitudinal factors are likely to find effects only inconsistently, because the effects are contingent on capabilities and context. Similarly, studies that examine only contextual variables, such as material incentives, social norms, or the introduction of new technology, may find effects but fail to reveal their dependence on individuals' attitudes or beliefs. Single variable studies may demonstrate that a particular theoretical framework has explanatory power but may not contribute much to the comprehensive understanding of particular environmentally significant behaviours that is needed to change them. (…) New models taking into account personal capabilities, context, and habits, they are more suitable for explaining behaviours that have significant environmental impacts, which are often strongly influenced by such non-attitudinal factors. A dialogue among such models is needed to move the field toward synthesis." (*Ibid.*, p. 418)

Starting from this overall reflection, we proceeded further in selecting just those variables which were assumed to be of particular importance in the case of e-waste disposal behaviour. Borrowing insights from different works, the variables considered in this study have been extracted and some hypotheses have been built deductively. Furthermore, the possibility of new arising determinants has been inductively accommodated during the research itself, looking for new and original connections between factors (Albert, Laufer, & Hatchuel, 2012; Thietart, 2007).

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[42] "*Consiste à procéder entre des observations et des connaissances théoriques tout au long de la recherche (...), une voie qui permet d'enrichir ou d'approfondir des connaissances antérieures (...) en procédant par allers-retours fréquents entre le matériau empirique recueilli et la théorie".*

Consistent with that, the study considers the plans of various analyses and formulates the following hypotheses:

Hp1. Environmentally friendly attitudes are poorly associated with e-waste disposal behaviour.

Hp2. Social context and domestic habits43 are strongly associated with e-waste disposal behaviour.

Hp3. Collection schemes and the overall system of provision offered to citizens are strongly associated with e-waste disposal behaviour.

The study also explores the matter of e-waste disposal behaviour, calling into question:

E1. The trust of consumers on in the institutional stakeholders involved in the e-waste supply chain.

E2. The relationships that consumers have with electrical and electronic equipments (EEE).

E3. Consumers' awareness and related disposal skills on e-waste.

E4. The potential impact of general waste disposal habits on e-waste disposal behaviour.

4.2 Contextualising the case: an urban comparison

Chapter 3 has highlighted the multifaceted nature of the e-waste object, which lends itself to many kinds of considerations: ecological, political, socio-cultural, and economical. This has provided evidence that e-waste implies different challenges according to different geographical contexts and scale of analysis. In particular, we have illustrated how, in developed countries, this issue poses political and socio-cultural questions due to:

1. A high percentage (60/70%) of e-waste stream diversion from the official SC (EEA, 2013a).
2. Phenomena of e-waste theft and damage in landfills, along with walk-sides in city-spaces (AMSA: A.L., 2012; Mairie de Paris: M.P., 2013).
3. Several forms of e-waste mismanagement recorded among households (ADEME, 2012; AMSA: A.L., 2012; AMSA: V. D., 2012; Mairie de Paris: M.P., 2013; Remedia, 2012)
4. Hyper-consumerism patterns and the consequent generation of high volumes of e-waste (McCann and Wittmann 2013).

All of these factors call for reflection on both policy makers and on societal consumer lifestyles. Focusing on the recycling behaviour of individuals in developed contexts means contributing to the understanding of the extent to which their habits can be targeted for *ad hoc* policy aimed at mobilizing them towards more sustainable practices. Moreover, it is necessary to question and *weigh* their

[43] Operative definitions are contained in Chapters 1 and 3.

effective role (and potential contribution to change) within a multi-stakeholder and multi-scalar management chain.

Starting from these duel interests, we have chosen to situate the study in the context of the European Union, and to conduct a comparative analysis on an urban scale, considering two countries subjected to the same macro regulatory framework, namely the WEEE Directive and the clearing house model (see chapter 3). These two conditions are met by Italy and France, the cities chosen being Milan and Paris because:

1. They both struggle to reach the collection target imposed by the Directives;
2. They respond to the same macro regulatory framework but they implement a local policy for e-waste management which is different;
3. They record different collection performances, as the municipality of Paris shows 1 kg per capita compared to an average collection rate in France of 6.9 kg per capita (ADEME, 2012), while in Milan the municipality takes 3.15 kg per capita compared to an Italian national average of about 4 kg per capita (CDCRaee, 2013).

The comparative perspective is supposed to provide several advantages. First, it permits the comparison of how two countries subjected to the same international targets and rules translate them in an internal complex system of laws, infrastructures, local policies, economic flows and social behaviours, and how effective this system is revealed to be. Again, it allows us to comprehend in turn how this system is actually locally implemented, and whether local-specific factors can affect, in an original way, recycling practices among consumers. The cross-national comparison is adopted here as a tool for developing classifications of models of governance and social phenomena compared to e-waste management, and for establishing whether shared phenomena can be explained by the same causes. The comparison thus provides an analytical framework for examining (and explaining) socio-cultural differences and governing specificity.

The choice to opt for an urban scale of analysis is then explained by the particular relevance that is attributed to such territorial units in environmental studies (Kaika et al., 2006; McCann & Wittmann, 2013). This is due to the *heterotrophic*[44] nature of cities (Davico et al., 2008), which are strongly energy-demanding areas, while being the most important producers (and exporters) of externalities and pollution. Consistent with that, urban spaces are increasingly recognised as key sites and sources of sustainability policy and practice. In the words of Gordon (Gordon, 2014):

> "There is a clear need to understand not only how cities are planning for sustainability, but also how they are, or are not, converting such plans into practice. Implementation, or the lack of it, is the elephant in the room, (…). Addressing it

[44] See the Introduction.

> requires careful investigation of actual practices of urban sustainability in order to identify and learn from instances of success and failure". (p. 854)

Data consulted (EEA 2013) confirm that urban regions are the most problematic in terms of waste generation and related governance, mainly due to reasons of consumption patterns, demographic weight and density, type and intensity of households settlements, cost of land, cost of infrastructure processes, and high socio-cultural heterogeneity. In the words of the World Bank:

> "Today, more than 50 percent of the world's population lives in cities, and the rate of urbanization is increasing quickly. By 2050, as many people will live in cities as the population of the whole world in 2000. This will add challenges to waste disposal. Citizens and corporations will likely need to assume more responsibility for waste generation and disposal, specifically, product design and waste separation. Also likely to emerge will be a greater emphasis on 'urban mining' as the largest source of materials like metal and paper may be found in cities". (The World Bank, 2012)

More specifically, regarding the case of e-waste, this hyper-generation of trash volume implies also a huge accumulation of secondary row matters in city spaces, which started to be commonly referred to as *urban mines* (see chapter 3), given the potential concentration of resources contained in municipal WEEE. Following McCann and Wittmann (2013):

> "The threat of resource depletion also represents one of the great incentives that may help to ensure that e-waste management is done properly. The valuable materials in e-waste and recovery of these materials can alleviate the need for the mining of virgin materials. This contributes not only to mitigate the destruction caused by the mining of many of the elements but also reduces the quantities of greenhouse gas emissions associated with extracting and refining virgin raw materials. For example, it has been stated that urban mining of e-waste could provide 40 to 50 times greater concentrations of valuable materials than from mined ore extraction. The increased price of commodities generally means that there are greater incentives to invest in the appropriate combination of manual separation techniques and technological infrastructure to ensure that the greatest amount of valuable material is extracted from the e-waste". (p. 8)

Thus, low return rate of e-waste such as those recorded in Milan and Paris means not only a potential signal of mismanagement and pollution, but also an alarming loss of resources. Subsequent sections give further insights into the variables chosen to respond to the research question, the units of analysis considered and the data collection strategy.

4.3 Research design and concepts

This section provides a series of practical definitions of the factors considered at stake in the study, starting from defining the dependent variable, which is *disposal behaviour*. In fact, not only is this

concept still quite vague, but it also alludes to *proper* or *improper* conduct, terms that will be widely used during the analysis. In fact, such concepts run the risk of appearing fraught with moralizing content - far from the purpose of this work - if not adequately contextualized. Here the boundary line separating the definitions of *proper* or *improper* conduct refers to possible impacts. Stern (2000) has provided a useful definition of *environmental significant behaviour* as a conduct which can "reasonably be defined by its impact: the extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere itself" (p. 408). This logic corresponds to that applied by the European legislator, which indeed is aimed at preventing all institutional and private behaviours which are potential sources of environmental (and societal) negative impacts. Thus, here the recycling conduct will be evaluated according to its compliance to the normative provisions in terms of e-waste disposal. So, *proper disposal* is here recalled in case of conformity between individuals' e-waste collection behaviour and disposal channels provided by law that would guarantee a safe treatment. *Improper conduct* is used in reference to those who have discarded small WEEE in the general bin, or who have hazardously abandoned them in a public space or in other situations beyond the control of the appropriate authority. Furthermore, an intermediate category is considered, consisting of domestic stock and other informal handling choices that do not necessarily imply potential pollution (re-sale, gift, exchange, etc.). This category is considered a sort of *transient* category (Hawkins, 2001), as in this case hi-tech appliances are still treated as a product, a resource, or something stored to use *just in case*. Lastly, another category of recycling behaviour is taken into account, which is represented by a *mixed conduct*. This is typical of those who, for example, stock some appliances, while throwing away others and/or properly managing others too. The most interesting point here is precisely the reasons why these consumers opt for different disposal choices with respect to the same waste category.

The category *e-waste disposal behaviour* is investigated by selecting a series of other independent variables which, drawn on the integrative model adopted by Stern (2000), refer to three main domains: 1) Psycho-attitudinal; 2) Socio-cultural; and 3) Contextual and institutional. In turn, these dimensions are investigated according to two units of analysis: individuals and the e-waste supply chain. In particular, psycho-attitudinal and socio-cultural issues have been investigated using individuals as a unit of analysis, while contextual factors have enabled us to view e-waste SC and its local implementation urban scale. This overall design is resumed in Table 4.1.

Table 4.1 – Variables here hypothesized to affect e-waste recycling conduct

Unit of analysis	Categories of variables impacting environmental behaviour	Variables	Research strategy
Individuals	**Psychological and attitudinal**	Personal attitudes towards environmental, waste and e-waste issue (concern and values) Environmental significant behaviour Awareness concerning environmental, waste and e-waste issue Behaviour-specific knowledge and skills compared to waste and e-waste handling Opinion on institutional stakeholders involved in e-waste management (municipality, retailers, actors of Social and Solidarity Economy – SSE)	A literature review on academic works concerning environmental and recycling behaviour (see chapter 2) A literature review of reports and works concerning e-waste data and e-waste recycling behaviour in the two national and local contexts investigated (see chapter 2 and 3) In-depth semi-structured interviews to a student population
	Socio-cultural	Social norms Relation with EEE product Habits in the sense attributed by Shove and Pantzar (2005)	
E-waste management supply chain	**Contextual factors**	Laws and regulations Local supportive policies Utility system	Collection and analysis of archival data concerning e-waste issue in Europe and in the two contexts investigated (see chapter 3) Interviews to key-informants of the e-waste SC in Italy and France, in Milan and Paris

The integrative and multi-scalar approach adopted here has been coherently declined by a qualitative methodology, oriented towards the identification, description and holistic understanding of individual behaviours and social processes. Such a qualitative proceeding assumes that e-waste recycling is a whole complex phenomenon, which cannot be meaningfully reduced to linear causal relationships. Indeed, the aim of the research is to understand the process by which behavioural events and actions take place, the impact that contextual variables have on these, identifying unanticipated phenomena and influences, comprehending complex institutional configurations and their relationships with the

micro scale of individuals' standpoints, and generating new insights with respect to a poorly explored issue. Consequently, the strategy adopted has developed in the following phases:

1. A review of the academic literature concerning environmental and recycling behaviour.
2. A literature review of reports and work concerning e-waste management and e-waste recycling behaviour in the two national and local contexts investigated.
3. In depth semi-structured interviews to a sample of consumers.
4. Interviews with key-informants of the e-waste SC in Italy and France, and in Milan and Paris.

Given that the literature review on environmental behaviour and the specific focus on the e-waste issue are already provided in chapters 2 and 3, the following section addresses the methodology adopted to conduct the interviews with consumers and key informants. For what concerns the first target, a sample of students is questioned by face-to-face semi-structured interviews,[45] which have an average duration of one hour. The testimonies were recorded and subsequently transcribed and analysed according to the analytical processes of open coding, axial coding and selective coding (Cardano 2003). In this, every single interview has been categorized, compared to the others, and finally identified along the four behaviour typologies mentioned above: proper, improper, transient and mixed conduct. Moreover, the semi-structured design of the interview, consistently with the partially explorative proceeding, was conceived to leave respondents with the opportunity to recall new arguments not provided by the interview track, and which have been taken into account according to a *grounded* path (Corbetta, Gasperoni, & Pisati, 2001). A total number of 41 interviews were collected, recorded and analysed. Conversely, for what concerns the witnesses of institutional key informants, a semi-structured interview is proposed as well, while the declarations made by respondents were considered and treated as institutional standpoints, and their analyses were based on a realist interpretation of the text (*Ibid.*).

4.3.a The individuals' unit of analysis

The factors considered at stake in impacting e-waste recycling behaviour and which have been brought to the fore by questioning individuals are as follows:

1. Personal attitudes towards environmental, waste and e-waste issues;
2. Environmentally significant behaviour;
3. Awareness concerning environmental, waste and e-waste issue;

[45] Interview outline in Appendix 1.

4. Behaviour-specific knowledge and skills regarding waste and e-waste handling;
5. Relationships with institutional stakeholders involved in e-waste management: municipality, retailers and Social and Solidarity Economy (SSE);
6. Social norms and interpersonal influences;
7. Relationships with EEE products (and WEEE object);
8. Past behaviours and habits.

This section aims to provide insights regarding these variables and the related collection strategy.

1. For what concerns the matter of *attitudes*, the core definition is once again borrowed and extended starting from Stern's statement. Within his proposal, attitudes are a function of a general personal sensitivity toward an issue, which in our case is revealed through questioning the environmental concern of individuals together with their values and compared to waste and e-waste recycling. Knowledge of consumers' attitudes means providing a basic insight into the general personal predisposition they might have towards *green* themes. According to the knowledge derived from previous work, the relationship between environmental attitude and environmentally friendly behaviour is normally expected to be weak. However, the outcome is supposed worthy of further testing, because the practice of e-waste recycling is believed to be a sort of cutting-edge issue compared to the vast majority of environmental behaviours commonly addressed in the literature (mobility, alimentary consumption, general recycling, energy usage, sustainable tourism, etc.). Thus, even if under a hypothesis of weak correlation, the link between environmental concern and e-waste recycling conduct is worth exploring.

2. The second factor investigated and put in relation to e-waste recycling conduct is respondents' environmental friendly behaviour. Following Jensen (Jensen, 2002), the latter can be defined as a set of conscious actions taken by an individual so as to minimize the negative impact of human activities on the environment or to improve the environment. Questioning common habits and conducts regarding not only general recycling but also mobility, consumerism patterns, energy and resources usage, is a necessary step in furthering and enriching the matter of attitudes. This information helps to provide insights on the personal engagement of users regarding green issues, and to compare it with what has been declared about e-waste handling.

3. Awareness concerning environmental, waste and the e-waste issue is investigated here. This concept is referred to as the perception of the issue and related arguing capabilities: are respondents able to argue about the main common environmental issues (e.g. resource scarcity, pollution, biodiversity, waste production, etc.)? Are they aware of e-waste issues as well? Are they able to clearly define what a WEEE is? Can we notice any gap in the level of awareness showed concerning general environmental topics and the matter of e-waste?

4. After having shed light on the extent to which respondents are aware of environmental, waste and e-waste issues, a further step consists of understanding whether e-waste and waste disposal channels are known to them or not. Here, the lack of behaviour-specific knowledge and skills is indeed supposed as one of the key factors impacting e-waste recycling conduct. It is also assumed that waste collection schemes are better known compared to e-waste ones. A series of questions are thus addressed in order to bring to light these two dimensions, and to draw insights on the informative channels that candidates favour when collecting instructions about waste handling, and more generally on what contexts they recall as being the most educative. What disposal channels of general waste can respondents recall? And compared to e-waste? In which ways do they retrieve information to learn about recycling schemes? When do they apprehend to separate their waste?

5. A specific series of questions was also aimed at exploring the relations between respondents and other institutional stakeholders involved in the e-waste SC: municipalities, retailers and SSE operators. A double track *opinion on-experience of* the system of provision afforded by institutional stakeholders involved in the e-waste SC is considered interesting as previous researches have already highlighted that a link between personal environmental engagement and trust in institutions may occur (Pellegrino, 2010). Furthermore, this focus provides further insights into behaviour-specific knowledge. What do respondents know about the system of provision afforded to them by municipality, retailers and SSE actors to discard e-waste? Which opinion do they express on the work done by these institutional actors regarding e-waste disposal? What disposal channels did they directly experience?

6. Social norms are here considered as potential impacting factors on waste and e-waste recycling (Schneider, 1988). Focusing on this means questioning if and how individuals feel affected in their waste and e-waste disposal by the conduct of others living in the same domestic context, condominium and more in general present in the same context where respondents find to manage some waste. It implies exploring the perceived social normativity of disposal conduct, and the role of generic *others* in impacting personal engagement. It means for example trying to comprehend if users record a behavioural variability depending on different contexts and situations, and, if this is the case, why some contexts are perceived by them as more or less compelling in terms of waste handling, and what factors bring about a shared perception on *what to do*. Does the recycling behaviour of waste and e-waste vary across different contexts? Do flatmates, family members, and neighbours' disposal conduct impact individuals' behaviour? Is the separate collection ubiquitously perpetrated in everyday life contexts (domestic and public)? What do respondents think about very attentive disposal conduct with respect to general waste and e-waste? What about improper and poorly engaged conduct?

7. Relationships with EEE objects are also considered a relevant issue to address. It is supposed here that intrinsic features of small WEEE (e.g. size, lifespan, fashion design, private data, new technology requirement, etc.) contribute to impact disposal behaviour: the shape and direction that this relation

takes is thus explored. What are the reasons why WEEE objects are normally left apart (fashionable design, functionality, technological obsolescence, etc.)? For how long has the object been used prior to its disposal? Was there an attempt at recovery before disposal? What pushes respondents to replace ICT objects by new devices?

8. The role of past behaviour and habits is finally stressed. To reprehend the term briefly, a *practice* is an entity that individuals accommodate by acting in order to conduct their everyday life, and that is coherent with a series of cultural, social, economic and material constraints and resources in which they are embedded (see chapter 2). Moreover, a practice is not necessarily some kind of conscious behaviour, rather it is more usually an unconscious and routine flows of actions that people perpetrate as forms of adaptation and expression of *habitual* – indeed practical - knowledge of the context. In particular, the conceptualization elaborated by Shove and Pantzar (2005) proves to be a good theoretical tool to look at the topic. They propose studying the matter of practice by deconstructing it into three components, namely 1) Images and cultural meanings. 2) Objects and material possessions. 3) Personal skills and competences. After investigating these components separately, a synthetic reading *a posteriori* provides the overall sense of a particular habit. Following this operative conceptualisation, the matter of respondents' habits of waste handling has been rebuilt. Thus, the relation between (W)EEE objects and to the utility system provided to citizens to discard small WEEE was recast. It resulted as beneficial to rebuild the concept of practice, together with the matter of behaviour-specific knowledge and skills. Secondarily we tried to fix respondents' images which emerged when discussing environmental and waste topics, together with the cultural meanings attributed by them to the object *waste* and the related act of disposal. What images give rise to the word *waste*? And to the word *e-waste*? Which are the reasons why respondents opt to dispose of an object? What are the boundaries beyond which an EEE begins to be considered a WEEE? The interconnections between these three dimensions –images, objects, skills - were thus inspected in order to achieve practice profiling.

Two other theoretical concepts are also mobilized and made operative: the idea of *normality*, and that of *discursive* and *practical consciousness* (see chapter 2). The first term still refers to the work of Shove (2010), who in the book "Comfort, cleanliness and convenience: the social organization of normality" investigates the cultural and practical contents of *normality* in households' home management with respect to a set of environmentally significant behaviours. Interestingly, she brought to light that the concept of *normal*, for example regarding the act of washing clothes using the washing machine, varies enormously depending on different households' contexts. Disposal behaviour, as well as the usage of water or energy-using appliances, is thus here read to understand what respondents consider *normal* with respect to waste management, for what reasons and depending on what factors. It is to comprehend how consumers come to incorporate waste handling into their every-day life,

whether they integrate this task among others, which solutions (habits) they elaborate in doing so, by what *tacit knowledge* (Lippuner & Werlen, 2009) and internal consistency is their behaviour inspired, and what type of convenience they accomplish when acting as they do.

Furthermore, in addressing the matter of practices the concepts of practical and discursive consciousness ware also mobilized. To recall them briefly: practical consciousness "consists of all things which actors know tacitly about how to *go on* in the contexts of social life without being able to give them discursive expression" (Giddens, 1984, p. xxiii). Conversely, discursive consciousness indicates an arguing capability with regard to personal conduct, which is easily verbalized and/or considered intellectually, so that it can manifest in purposeful and intentional behaviour (*ibid.*). The extent to which these two dimensions result as distant reveals a gap which deserves a deepening of the intrinsic logic of recurrent behaviour with respect to declared intentions.

4.3.b Sampling strategy

The intrinsic limits of the research pose some restrictions upon the possibility to choose a representative sample of consumers to interview, due to the lack of access capabilities to a whole urban population. While a statistically significant random sample could not be drawn, the sampling strategy was defined according to the goal of reaching a young population target. The reasons why a young population has been chosen lies on the fact that youth are recognized as strong consumers of hi-tech products (Wilska, 2003), with particular attention to small consumable device:

> "The United Nations recognizes young people as avid and creative users of ICT. (…) Young people are rising to the challenge by pioneering the use of ICT, and driving trends in what is a dynamic and major growth industry". (United Nations, 2013)

Thus, a young sample was interviewed to ensure that respondents were familiar with electronic appliances, allowing further exploration of the relationship between hi-tech consumption and e-waste production, passing through a competent relationship with the object in question.

With this goal in mind, the study has finally been conducted on a sample of youth population, aged between 18 and 30 years who have been residing in Milan or Paris for at least one year. A control group of non-residents[46] were interviewed in order to understand how urban dimensions are actually crucial with respect to the phenomenon examined. The research population has been sorted by

[46] A sub-group of 4 residents in small towns of the hinterland of Paris and Milan were included in the research in addition to Milanese and Parisian residents.

targeting university students from the major universities of the two cities,[47] and the recruitment strategy was developed in three main ways:

1. With flyers and posters about the project, which were circulated in several universities in the two cities;
2. By creating a Facebook page dedicated to the project and diffusing it via *snowballing*;
3. By asking academic employers to collect respondents.

By proceeding in such a way, the final number of candidates collected was 41.

4.3.c The supply chain of e-waste management

Factors considered *contextual* have been addressed by deepening the implementation of the e-waste SC in the two contexts investigated, since it was supposed to impact on the e-waste recycling behaviour of individuals. This influence was expected to reveal in three main ways:

1. Via the macro normative framework on a national scale which represents the point of departure of local policies;
2. Via the waste policy implemented on an urban scale;
3. Via the utility system afforded to consumers in order to accomplish legal provisions for e-waste disposal.

These dimensions are translated into the following set of three variables.

1. E-waste SC in Italy and France.

The clearing house model (see chapter 3) in Italy and France is explained. This description consists of illustrating the configuration of institutional stakeholders of the e-waste SC in the two national contexts: normative framework, relationships between the various institutional stakeholders, internal consistency of the supply chain, monitoring system, logistics and financial chain.

2. Local implementation of e-waste SC in Milan and Paris: collection scheme and the role played by local authorities, retailers and SSE.

We then consider the actual *state of the art* on waste and e-waste governance in the two urban contexts, stressing in particular the implementation of the WEEE Directive on an urban scale, with particular attention paid to the role of municipalities, retailers and SSE operators. Focusing on local collection schemes means exploring the channels that consumers are actually empowered to adopt in order to handle their small WEEE: which acts are requested and with which stakeholders they interact.

[47] In Milan: University of Milan-Bicocca; Statale University of Milan; Politecnico of Milan; Bocconi University. In Paris: the network Mines Télécom-ParisTech; Sorbonne University; SciencesPo University.

3. Supportive infrastructures provided in urban space

Thirdly, the infrastructural apparatus is considered: systems of provision, utility systems, localisation of collection points and their accessibility. To understand these dimensions, two strategies are applied. Firstly, an archival work was conducted in order to frame as complete as possible the national and local frameworks and figures with regard to e-waste management. This consists of reports, statistics, and other general data and studies already conducted on the subject by public and private companies in the two contexts investigated (see resume of the main sources investigated in table 4.2). This step was necessary in providing a solid background to the research focus.

Table 4.2 Main sources consulted in the course of the study concerning e-waste

International context	**Italy**	**France**
• United Nations University (StEP initiative)[48] • Basel Actor Network[49] • European Environmental Agency[50] • WEEE Forum[51] • WEEE Directive (2002 and 2012) • RoHS Directive	• National Law en e-waste management (Decree n° 151/2005) • National coordinator of eco-organisms • Eco-organisms • Research institutes (*Osservatorio Nazionale sui Rifiuti*,[52] *ISTAT*,[53] *ISPRA*,[54] *CNR*[55]) • Federation of producers-retailers of hi-tech products (*AIRES*)[56] • Local data on Milan (*AMSA*-A2A)[57]	• National Law en e-waste management (Decree n° 829/2005) • National coordinator of eco-organisms • Eco-organisms • Research institutes (*ADEME*,[58] *SINOE*,[59] *ORDIF*,[60] *ÉcoInfo*[61]) • Federation of producers-retailers of hi-tech products (*FIEEC*)[62] • Local data on Paris (Municipality, *Syctom*)[63]

[48] http://ias.unu.edu/en/research/solving-the-e-waste-problem-step-initiative.html#outline. (Last consulted on September 2014).
[49] http://www.ban.org/. (Last consulted on September 2014).
[50] http://www.eea.europa.eu/. (Last consulted on September 2014).
[51] http://weeeforum.org/. (Last consulted on September 2014).
[52] http://www.osservatorionazionalerifiuti.it/. (Last consulted on September 2014).
[53] http://www.istat.it/en/. (Last consulted on September 2014).
[54] http://isprambiente.gov.it/. (Last consulted on September 2014).
[55] http://cnr.it/. (Last consulted on September 2014).
[56] http://www.airesitalia.it/. (Last consulted on September 2014).
[57] http://www.a2a.eu/it/index.html. (Last consulted on September 2014).
[58] http://ademe.fr/. (Last consulted on September 2014).

Secondly, the point of view of institutional actors implied in e-waste SC in Italy and France was explored via a series of interviews with key-informants. The institutional stakeholders questioned in the two national contexts are as follows:

1. Eco-organisms in charge of e-waste management.
2. Environmental metropolitan agencies.
3. The municipalities of Milan and Paris.
4. Retailers.
5. Operators of the SSE and refurbishment sector.
6. E-waste experts (academic professors, environmental lawyers, various insiders of the e-waste sector).

1. Eco-organisms represent the scaffolding of the entire e-waste sector, so their voice is fundamental in posing the basis for a deeper comprehension of e-waste MSP. The overall functioning of the national supply chain is the starting point for any further consideration on collection performance and on the effectiveness of local waste governance. In Italy key informants from the eco-organism Ecor'It[64] and from the Steering Committee of Italian eco-organisms[65] were interviewed, and from the eco-organism EcoLogic in France.[66] The questions cover the following issues:[67]

- A general description of the clearing house model implementation and the role of eco-organisms within this scheme.
- E-waste flows analysis from consumers to treatment plants and other destinations.
- Financial flows analysis implied in the e-waste SC.
- Relations with the other institutional stakeholders of the e-waste SC: municipalities, retailers, SSE.
- Informal and illegal channels of e-waste management.
- Focus on C4 and opinion on consumers' recycling behaviour.

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[59] http://sinoe.org/. (Last consulted on September 2014).
[60] http://ordif.fr/. (Last consulted on September 2014).
[61] http://ecoinfo.cnrs.fr/. (Last consulted on September 2014).
[62] http://www.fieec.fr/. (Last consulted on September 2014).
[63] http://paris.fr/ and http://www.syctom-paris.fr/. (Last consulted on September 2014).
[64] http://www.ecorit.it/. (Last consulted on September 2014).
[65] Steering Committee on WEEE Management (*CDCR – Centro di Coordinamento Rifiuti da Apparecchiature Elettriche ed Elettroniche)*.
[66] http://www.ecologic-france.com/. (Last consulted on September 2014).
[67] Interview outline in Appendix 2.

- Strengths and weaknesses of the national e-waste SC and future perspectives.

2. Environmental metropolitan agencies are then interviewed, since they provide a particular view on the specific issues regarding the urban areas studied with respect to waste and e-waste governance. In Italy the voice of A2A is collected, while in France a key-informant of Syctom is interviewed. The core questions of the interview concerned the following issues:[68]

- A general description of the work of the metropolitan agency and its role in e-waste management regarding the two urban areas under scrutiny.
- Relations between the e-waste SC stakeholders in the two urban areas of interest: Eco-organisms, retailers, municipality, SSE, logistics service providers.
- A general description of the situation over the whole metropolitan areas concerning the matter of waste and e-waste governance, with a specific focus on the peculiarities of Milan and Paris compared to their hinterland.
- Some statistics concerning waste and e-waste collection performances on the two urban areas studied.
- Focus on C4 and opinions on consumers' recycling behaviour.
- Strengths and weaknesses of the e-waste management system in the metropolitan area and future perspectives.

3. The voice of the two municipalities of Milan and Paris is collected as a point of departure of the analysis of local collection schemes and waste policy on an urban scale. Two key-informants of the municipality of Milan were heard, as well as from the municipality of Paris. The interview copes with the following contents:[69]

- General description of the role of municipality in e-waste management: collection scheme, utility system, communication with citizens.
- Waste and e-waste governance: local policy.
- Local implementation on an urban scale of the e-waste SC: effectiveness, collection and recycling performances, local constraints and strengths.
- Relations with the following stakeholders: eco-organisms, retailers, SSE, metropolitan agency.
- Local questions with respect to e-waste management: consumers' recycling behaviour, e-waste theft and damage, informal and illegal channels.
- Focus on C4 and opinion on recycling behaviour of consumers.

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[68] Interview outline in Appendix 3.
[69] Interview outline in Appendix 4.

- Future perspectives.

4. Retailers of EEE were also interviewed, as in charge of providing to consumers points of collection contextual to the shops, under the one-to-one (and one-to-zero) scheme. Furthermore, they are responsible for communication campaigns on e-waste disposal directed at consumers. Thus, in the two countries the accounts of the two Federations of Producers and Retailers of EEE[70] were collected; they were questioned concerning:[71]

- The role of retailers in the e-waste SC.
- The effectiveness of their role in the e-waste SC: statistics, points of collection, communication campaigns.
- The one-to-one scheme and the one-to-zero scheme: issues, concern, strengths.
- The focus on C4 and opinions on the recycling behaviours of consumers.
- The relation to the other stakeholders of the e-waste SC: eco-organisms, municipalities, logistics service provider, SSE, consumers.
- The role of retailers in the two urban contexts under scrutiny: points of collection, statistics, insights.

5. The SSE circuit together with the refurbishment sector were also evaluated since they rely on consumers, providing them with an alternative channel of e-waste disposal for reuse and prevention of waste. In Italy the testimony of a key-informant from *Semantic*, a company dedicated to (W)EEE refurbishment and second-hand resale, was collected.[72] In France an equivalent account by the association *Tic-Ethic*[73] is collected. In this case questions relate to:[74]

- A general description of the work of the company and its role compared to e-waste SC.
- Relation to the other stakeholders involved in the e-waste SC.
- Implementation of the initiatives: main constraints and relevant questions.
- Feedback of consumers and Institutions: success of the initiative (statistics and trends)
- Future perspectives.

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[70] In Italy it was the Italian Association of Retailers Electronic Appliances (*Associazione Italiana Retailers Elettrodomestici Specializzati – AIRES*: http://www.airesitalia.it/. Last consulted on September 2014). In France it was the Association of Electrical and Electronic Industries and Communication (*Fédération des Industries Electriques et Electroniques et de Communication – FIEEC*: http://www.fieec.fr/. Last consulted on September 2014).
[71] Interview outline in Appendix 5.
[72] http://semantic.it/. (Last consulted on September 2014).
[73] http://www.ticethic.com/. (Last consulted on September 2014).
[74] Interview outline in Appendix 6.

6. Given the level of technical detail that we encountered in some cases, for example approaching normative items and local regulatory processes, the support of experts was needed. In this case, the voice of insiders in the environmental juridical sector, academic professors and other stakeholders skilled in e-waste SC, treatment and policy were heard. Here, the questions coped with the peculiarities of the two contexts in question, and in particular to:[75]

- E-waste legislation.
- Formal and informal financial flows concerning e-waste management.
- Informal and illegal channels of e-waste management and e-waste flows.
- Theoretical insights on the clearing house implementation.
- Future perspectives in Europe and in the two contexts examined.

The details of the interviews can be found in the appendix, while table 4.3 resumes the institutional key informants interviewed in their premises.

Table 4.3 Interviewed key informants[76] of e-waste SC and their institutional affiliation in Italy and France

	Italy - Milan	**France - Paris**
Local authority	L.A. and D.V. - Municipality of Milan	M.P. - Municipality of Paris N.M. - Municipality of Paris
Environmental metropolitan agency	D.V. - A2A	N.F. - Syctom
Eco-organism	L.T. - Ecor'It F. L. - Eco-organisms Steering Committee - (*CDCR*)	B.R. – EcoLogic C.R – EcoLogic P.G. – EcoLogic R.V. – Eco-systèmes
Producers - retailers	D.R. - Association of Retailers of Electronic Industries	AC.W. - Association of Electrical and Electronic Industries and Communication
SSE and refurbishment sector	A.M. - Semantic	V.B. - TIC Ethic' N.M. – Ateliers du Boccage

[75] Interview oultine in Appendix 7.
[76] We here use the related name initial letters.

Experts	M.C. - Environmental Lawyer M.M. - Academic expert of waste issue F.M. – Lawyer	E.F. - Agency for Environment and Energy - *ADEME*

The following section provides conclusive considerations on the methodology adopted in the study, with particular attention paid to the difficulties sometimes met in collecting data and the consequent limitations of the research.

4.4 Conclusive methodological considerations

This conclusive section provides some insights into the limitations of the study, together with the strategies enacted to minimise their effects. Four main limitations are recognised:

1. The difficulty of understanding psycho-social phenomena by directly questioning respondents.
2. The intrinsic limitations arising from *snowball* sampling strategy: poor variability in the sample and self-selection bias.
3. Data availability with respect to e-waste SC and its implementation on an urban scale.
4. Data sources' asymmetry.
5. Managing a three years study in a period of change for the e-waste sector.

1. The social desirability response effect (Cardano 2003) is a well-known and long debated phenomenon often occurring in social research when collection data is based on self-reported behaviour (Ganster, Hennessey, & Luthans, 1983). Indeed, when a personal conduct is discussed in an interview, responses run the risk of being biased due to the perception of candidates that the object in study is morally pregnant and that the interview is a sort of performance. Here, three sets of observations arise. Firstly, the psycho-social factors of interest in this study are investigated through a series of questions, which recursively recall the same object in different ways, directly and indirectly. This process aims precisely to minimise the effect of responses' social desirability, and allows us to figure out any variables after having questioned in multiple ways. This approach was proven to be successful, as indeed many contradictions arose during the interview, and these forced respondents to return to previous statements and to better clarify them. Secondly, choosing face-to-face interviews, with an average length of about one hour, allowed us to generate a climate of trust between respondent and researcher, so that over time students tended to feel more confident. Thirdly, as mentioned in chapter 2, the matter of e-waste is still considered not widely acquired among the vast public, so that it

is here assumed that also the perception of social norms of recycling specific-behaviour are relatively low. Following Darby and Obara (2005):

> "It is argued here that the limitations of self-reported research is unlikely to apply to small electrical goods since small WEEE is not really perceived to be a problem as illustrated with the face to face interviews, therefore the tendency to exaggerate may be less". (p. 27)

Thus, it is here believed that the effects deriving from the social desirability responses are reduced.

2. The second limitation of the research refers to the effects that can be derived from snowball sampling, which is the recruitment strategy adopted to reach potential interviewees. In fact, using personal networks can limit the variability of respondents in terms of socio-cultural and economic background. Moreover, this sort of selection, which works basically only thanks to personal voluntary engagement, can bring about a strongly self-selected sample, which for example accepts participation due to personal interest towards environmental and waste issues.

For what concerns the possible poor variability in the sample chosen, two arguments are supported. The first is that an effort was made to differentiate by several sources the *call for candidates*. Indeed, different professors from different departments and universities were involved in order to diffuse the launch of the research among their professional and personal contacts. This allowed us to reach a minimum of differentiation in the sample recruited. Secondarily, the exploratory nature of the present case-study implies that the first goal is achieving additional information with respect to a seldom addressed issue: it aims to suggest possible tracks for future studies. Thus, the statistical significance of the results is not our primary goal. In coherence with an explorative case-study approach: "the distinctive need for the strategy arises out of the desire to understand complex social phenomena (…) and to retain the holistic and meaningful characteristics of real-life events" (Yin 1984, p. 14).

For what concerns the possible bias of self-selected samples, it is sufficient to recall two arguments. The first is that, to minimise such an effect, the research was promoted by a general remind to the issue *waste and society*, with no explicit reference to the matter of e-waste. This could however retrieve candidates environmentally concerned, but preventing specific interests and skills compared to the matter in study. Secondly, in many cases candidates were asked to participate in the research by their professors, which resized the concept of *auto-selection*.

3. The third limitation of the research concerns data availability on e-waste generation, collection and treatment. Indeed, rebuilding e-waste collection performances on an urban scale was revealed to be difficult both for the Italian and the French case. This is because e-waste statistics are normally based on national, regional and provincial scales, and not on an urban scale; and because e-waste SC suffers from a strong pervasiveness of several informal and illegal management alternatives, even including private-to-private (P2P) and second-hand practices, which are basically untracked. Rebuilding these

channels means necessarily referring to uncertain and proxy figures. Thus, to obtain a picture as complete as possible on the overall performances of e-waste SC in the cities of Milan and Paris, a strong collaboration of urban municipalities and other local institutional actors was required. This collaboration allowed the acquisition of more fair-grained data, even if sometimes we had to use a proxy or general and conjectural figures.

4. Another question arises on the side of e-waste data availability with respect to the comparison. In fact, even if Italy and France have an identical reporting system regarding e-waste collection, recycling and treatment, it is even true that, on an urban scale, the accounting methods are not always perfectly overlapping, and in some cases we came across an asymmetry of sources and data availability. Again in this case we partly solved the problem by combining different sources of information in order to rebuild the missing data, and to make it comparable. When impossible, as was the case for what concerns data by the SSE sector in Milan, this limitation was explicitly underlined, and we tried our best to find proxy information indirectly or through other institutional actors.

Further, data asymmetry also concerns statistics' dating in the two national and local contexts examined. Indeed, with regard to some aspects of the e-waste SC, we can recall data referring to the same year, while other aspects (e.g. e-waste generation forecast) relate to different years. Here, we normally opted to cite the most recent available figures per each context, as we considered that no strong changes occurred in the sector. Conversely, when it is supposed that this was the case –as for the C3 hyper-production or the contraction in consumption due to the economic crisis- it is indicated.

Again, when consulting international, national and local data on waste and e-waste management, we often found some divergences even with regard to the same topics (e.g percentage of separate collection on the total rate of waste collected per country). This is explained by the fact that the way statistical indices are estimated on different scales and by the fact that different institutions do not always match. Here, we opted to cite international sources (the Environmental European Agency) when international comparison was useful to introduce the Italian and the French cases within the European context. Therefore, such data are normally older than those provided by internal national statistics in the two countries. Thus, we choose to hold national and local data when examining with greater detail the two case studies on national and urban scales.

5. We finally want to point out the fact that the present work started at the beginning of 2012 and was concluded in 2014, when new arrangements occurred in both the Italian and the French e-waste SC due to the transposition of the most recent version of the WEEE Directive. For the sake of completeness, we largely included in the analysis the implications hold by the new Directive as well as the related new horizons it imposes. However, during the research, the effects of such change cannot yet be appreciated, except for the design of the internal decrees which, in the two countries, apply the

European law. Finally, in general and if not explicitly pointed out, we can say that the year of reference of the thesis is 2012 for the vast majority of the data presented.

Chapter 5

5. E-waste supply chain and consumer disposal: the Italian case-study

This fifth chapter addresses the topic of small hi-tech disposal in the city of Milan. The study will be carried out based on two units of analysis: e-waste supply chain (SC) at national and local scales, and individual standpoints. Three parts are proposed.

1. A delineation of the WEEE Directive transposition in Italy, with a specific focus on:

- General logistics
- Effective roles of institutional stakeholders involved and their coordination.
- Financing scheme.
- E-waste collection and recycling performances and main explicative figures of the Italian SC.
- A critical view on the strengths and weaknesses of the e-waste SC in Italy and their potential impacts on local policy and individuals' disposal options.

2. E-waste SC implementation on an urban scale in the city of Milan: this second part enters the hearth of e-waste governance on a local scale. The section is composed of:

- A previous general view on waste generation and separate collection performances on a national and regional level.
- A specific focus on Lombardy and the province of Milan concerning waste generation, waste and e-waste separate collection rate.
- The state of the art in the city of Milan regarding waste generation figures and e-waste collection performances per e-waste category.
- Waste and e-waste management policy in the city of Milan.
- Small WEEE disposal channels in the city of Milan and related system of provision.
- A critical discussion concerning the implementation of the WEEE Directive in Milan and the effective role of institutional stakeholders involved, with particular attention paid to the practical implications these have on the citizens-consumers' standpoint.

3. E-waste recycling behaviour of individuals: this third part illustrates the outcomes deriving from the analysis of the interviews with students in Milan. Here, their points of view are analysed according to

the theoretical and practical categories mentioned in Chapter 4, and their disposal behaviour is put in dialogue with local policy and systems of provision. The section consists of:

- An multiple analysis of interviews where the most recurrent items found during the interviews are presented.
- An analysis per profile of the recycler.
- A critical discussion concerning the main results and some first considerations of our hypothesis.

Part I

5.1 The Italian supply chain of e-waste management

The WEEE Directive and following integrations[77] represent the normative reference with regard to e-waste management for European members. In Italy, this has been transposed into internal Law through the Legislative Decree n. 151/2005.[78] Consistent with European requirements, the Decree contains provisions related to the following issues:

1. Reduction of toxic and hazardous substances contained in EEE.
2. Prevention and reduction of e-waste upstream.
3. Promotion of reuse and recycling of EEE and WEEE.
4. E-waste collection and recycling targets.
5. Identification and definition of roles and responsibilities of the institutional stakeholders involved in e-waste management, which are: producers in the form of eco-organisms, retailers, municipalities, citizen-consumers, and operators of e-waste transport, processing and treatment.

Decree 151 provides also that the e-waste SC in Italy accomplishes the criterion of Extended Producer Responsibility (EPR) via the clearing house model, as already described in chapter 3. This system implies that producers take financial responsibility for WEEE deriving from their EEE Put on Market (PoM), and they do that by associating in collective forms which are the eco-organisms.[79] The latter act in a context of free concurrence and they work under a coordinating committee (CC) that is called, as seen in section 4.3.c, Coordinating Centre for E-waste Management, subsequently referred to by the Italian acronym *CDCR*.

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[77] See section 3.6, 3.7 and 3.8.
However, some measures on e-waste management had already been provided by a previous National Law (Legislative Decree n. 22/1997 and subsequent amendments) that introduced for the first time on the whole national territory the matter of separate collection, also containing mention of e-waste under the label of *durable goods* (including only bulky items). So, in general it can be said that the clearing house model for e-waste management has been put in place on a national scale with the WEEE Directive implementation, while some municipalities, including the city of Milan, started to collect e-waste prior to that date.

[78] The new WEEE Directive has been transposed in Italy via the Legislative Decree n. 49/2014.

[79] It depends on the typology of e-waste treated. For the so-called *historical e-waste* (POM before the 31st of December 2010) producers must take the shape of collective systems. For the other, they can decide to apply for an individual schema of management. Despite this option, in Italy there are not individual supply chains promoted by any producer for domestic e-waste.

Consistent with the WEEE Directive, Decree 151 also states that it is up to retailers to afford a collection scheme for household WEEE according to the one-to-one (and the more recent one-to-zero) principle (see section 3.6). Equally, municipalities are requested by the Decree to make e-waste collection points available to retailers and citizens, the latter being committed to ensure an adequate e-waste disposal according to the institutional channels.

Starting from the CDCR establishment, the following paragraphs explain in more detail the overall functioning and logistics of the Italian e-waste SC, with particular emphasis on the nature and features of the relations developing between the different institutional stakeholders involved.

5.1.1 The clearing house model in Italy

Legislative Decree 151 required the disclosure of another 12 decrees in order to make completely operative the overall e-waste SC, which started in 2007. Three of them are considered here as having particular relevance in framing the e-waste sector in Italy:

1. The Ministerial Decree n. 185/2007, which establishes the CDCR, a national registry of producers and an e-waste sector Steering Committee (SC). It also represents the juridical basis for further agreements between the CDCR and municipalities, as well as with e-waste treatment operators.

2. The Ministerial Decree of 25 September 2007, which endorses the setting-up of a Committee of Vigilance and Control (CVC) of the e-waste sector.

3. Ministerial Decree n. 65/2010, which manages the role of retailers.

We now present the Italian e-waste management scheme, starting from the broader institutional context to the lower level of individuals.

5.1.1.a The coordinating centre and the system of eco-organisms

Since the issue of Decree 151, seventeen eco-organisms[80] have been created in Italy by producers with the task to manage the phases of transport, treatment and recovery of household e-waste across the whole national territory. In this, some of them are specialized in specific categories, while others, called *multi-sector*,[81] treat different appliances. Their legal status varies, since they can be consortia, societies, corporations, or other, according to budget management,[82] and they are also very different

[80] Apiraee; CCR Italia; Cobat; Dataserv Italia; Ecodom; Ecoelit; Ecoem; EcoLamp; EcoLight; EcoPed; Ecor'It; ERP Italia; Esageraee; Raecycle; Remedia; RENE; Ridomus.

[81] *Multifiliera.*

The cost of the service provided by the eco-organisms derives from the sum of two components: a) fee for the service itself (which in effect is a down payment, based on a forecasting model that can be also sufficient to cover the overall costs); b) a consortium fund (which is a venture fund, virtually unlimited, that each member is required to re-establish at every budget planning, in case of covering losses or extra allocation costs). Thus, a *pure* consortium is expected to operate with a zero rate

from each other in terms of market quotas with respect to the EEEs PoM by their associates. Within this frame, the percentage of free-rider producers is relatively low, since about 95%[83] of EEEs producers in Italy are subscribed to an eco-organism, if excluding on-line market.[84] The operations of eco-organisms are supervised and coordinated by the CDCR, a coordinating centre created ex Ministerial Decree 185/2007. It consists of the seventeen eco-organisms and it represents the pivot of the entire clearing house system in Italy, as it ensures its proper functioning. Its status, vocations and aims can be synthesised as follows:

- From a juridical point of view, the coordinating centre is a consortium of private nature, managed and governed by the eco-organisms under the supervision of the committee of vigilance and control (CVC).

- Its operations are financed by producers of EEEs.

- It relates to the optimization of the activities pertaining to producers deriving from the EPR application. In particular, it ensures uniform operating conditions for all of them, together with the guarantee of an uniform e-waste management service across the entire national territory. In particular, thanks to a special logarithm that optimizes a series of conditions,[85] it is up to the CDCR to annually assign to each eco-organism[86] a certain number of collection points (CP) from which the latter are requested to ensure that e-waste is transported to treatment plants for the recycling phase. Within this frame, the CDCR also has the right to financially sanction eco-organisms in case of misconduct, as, for example, e-waste loads are not promptly withdrawn by them from the CP.

- It guarantees the coordination within the e-waste SC between the eco-organisms and the other institutional stakeholders involved in its management, it is up to the CDCR to conclude an agreement with two interlocutors:[87]1) Treatment operators.[88]2) Municipalities, in their associative form (National Association of Italian Municipalities – NAIM).[89]

The first agreement has the aim of guaranteeing the quality of e-waste treatment, by binding involved operators of accrediting plants to the CDCR after having ensured its functioning via quality audit

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final budget, since the fee costs would be zero and the other costs are shared proportionally by each member. Conversely, in the case of a collective systems or other corporation systems, the operating model combines the institutional purposes to offering a not-for profit-public service (e-waste management) with those of an enterprise, which offers to members a service *pay for use*.

[82]In Italy there is just one system acting as consortium, while the others have other budget status according to what above.

[83] Interview to F.L., CDCR, 2012.

[84] The quota of free-riders dramatically rises with respect to the on-line market, and this is true not only for foreign companies and long-distance trade, but also for domestic brands (*Ibid*.).

[85] Historical e-waste generated from each CP, demographic weight of municipalities, cost-benefits analysis in terms of logistics and transport, territorial features, etc. The mechanism of assignment is shown to be very efficient, since the percentage of assignments results confirmed every year is about 92%. This means that each collection point designated by the CDCR has a normally effective quota of e-waste collected by it, with a marginal error of assignments to about 8%.

[86] The volumes of e-waste treated by each eco-organism is proportional to the volumes of EEEs PoM by the producers enrolled in it.

[87] Normally these agreements are updated and annually discussed by the actors involved.

[88] The main Italian associations of recovery operators, that are AssoRaee, Assofermet, Ancorae, Cna, Assoqualit, UnoRaee.

[89] *Associazione Nazionale Comuni Italiani – ANCI* (http://www.anci.it/. Last consulted on September 2014).

made by a third neutral certifier. Thus, to treat e-waste in Italy implied workers have to obtain a standard certification from the CDCR.

The second agreement defines the competences of municipalities in e-waste management, and their coordination with the eco-organisms. It is here established that municipalities are in charge of managing the phase of primary collection[90] that is the logistics inherent in e-waste take-back, transportation and collection from households to municipal Collection Points (CP).[91] Moreover, their task includes the implementation of communication and information campaigns to citizens concerning the availability of e-waste disposal channels.

It is finally up to the CDCR to establish further agreements with the sector of distributors and to set in part their coordination with municipalities, but this matter deserves specific attention in a later section.

5.1.1.b Monitoring and accounting: the tracked part of e-waste streams

To ensure that producers are active in applying the EPR, in addition to monitoring the overall good functioning of the e-waste SC and also calculating the volume of e-waste in charge of each eco-organism, different institutions are in place: 1) The Committee of Vigilance and Control (CVC). 2) The Steering Committee (SC). 3) The register of producers.

The CVC is established by the Ministry of the Environment and for the Protection of Land and Sea.[92] It is responsible for monitoring the effective implementation of Decree 151, and in doing so operates in close collaboration with the steering committee, which also contributes to monitoring the good functioning of the overall system in terms of logistics, economics and operations. In this it plays a supportive role with respect to the work of the CVC. These two actors represent the first reference as an enforcement and inspection system with regards to compliance with the law by the institutional stakeholders involved in e-waste management.

Decree 185 also provides the creation of a register of producers. The register is prepared, maintained and updated by the CVC on the basis of data collected through the Chambers of Commerce, and referring to the EEE declared PoM by producers every year. All manufacturers which introduce EEE released for sale in the Italian market must subscribe to the register.[93]

These actors should also indicate the eco-organisms through which they intend to accomplish their obligations in financing the management of *historical e-waste* (see footnote 79). Eco-organisms are required to subscribe to the register as well, as the information provided by them, namely e-waste

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[90] See Chapter 3.

[91] This phase is (logistically) up to the municipalities for what concerns domestic e-waste, while the professionals have to be taken in charge directly by producers.

[92] *Ministero dell'Ambiente e della Tutela del Territorio e del Mare – MATTM.*

[93] As defined in Article 3 , paragraph 1, letter m) of Legislative Decree no . 25 July 2005 n . 151.

collected and recycled every year, is used to verify the consistency with the volume of EEE declared PoM by manufacturers. The register covers the important function of ensuring the traceability of EEE and WEEE which transits to the Italian e-waste SC, and also provides identification of involved actors.

5.1.1.c The role of retailers[94] in the Italian e-waste SC

According to Ministerial Decree 65/2010, retailers are statutorily obliged to contribute to the e-waste primary collection phase by applying the one-to-one (or one-to-zero) mechanism. Furthermore, it is also up to them to provide advertising and information to consumers concerning such a service. In this, they are expected to equip themselves with a CP inside or next to the shop or, alternatively, to collect e-waste at the collection point of the closest municipality. In particular, they have two noteworthy options.

First, according to an agreement signed by the CDCR, the municipalities (NIAM) and the Trade Association of Retailers (TAR), retailers can deliver e-waste collected to a collection point made available by the municipality. This is just an option and it strongly depends on the specific conditions of each municipal CP. It means that, if there are not municipal CPs open to distributors, these have to organise themselves in order to provide their own. They are consequently responsible for logistics, transportation and monetary support accompanying e-waste stock and e-waste delivery to the collection point.

Secondly and alternatively, in order to storage collected e-waste retailers can provide their own CP, which in this case takes the name of Regrouping Point (RP). The management of e-waste by distributors within the RP is subjected to a simplified regime: after they have registered the RP to the CDCR system, e-waste volumes are delivered to treatment plants by the eco-organisms. This option represents for retailers a remission of monetary and logistic tasks.

5.1.1.d Citizens and primary disposal channels

For their part, citizen-consumers are the first ring of the entire chain of e-waste management, since they represent the first collector of household waste. In this, they are statutorily bound to comply with the rules regarding waste separation and collection by a municipal regulation. Infringement of such a regulation normally implies the payment of a fine, which is usually issued on condominium basis. They are also individually responsible for any potentially polluting behaviour related to waste mismanagement: when this occurs a financial administrative penalty is issued. Citizens are then statutorily requested to properly dispose of e-waste adopting the official dismantling channels made

[94] According to the Directive, the retailer, or distributor, "Means any person who provides electrical or electronic equipment on a commercial basis to the party who is going to use it". (Article 3, Letter J)

available by the municipality, retailers and, when present, by other stakeholders involved in e-waste management as ONG, charity associations, refurbishment sector and second-hand market, whose specific roles in the Italian chain will be addressed further.

In the case of retailers, as seen, consumers have the option of using the one-to-one mechanism to dispose of their appliances. In the case of municipal channels: these greatly vary depending on different municipalities, as the take-back design and utility system afforded to citizens are strongly rooted in the local area. In this, local policy and availability of infrastructures can strongly impact e-waste collection performances, beyond the common macro regulatory framework on the national scale.

5.1.2 The Reimbursed Compliance Cost

According to the EPR principle, the e-waste supply chain is financed by producers, but this is not always the case, since the EPR mechanism is often implemented via a series of reimbursement schemes and co-contributions from other stakeholders, which do reduce the overall costs incurred by producers. In particular, in Italy, a Reimbursed Compliance Cost (RCC) is applied (UNU-StEP, 2009a). This mechanism implies that consumers are requested to contribute to e-waste management via a fee, called eco-contribution (see chapter 3). This represents the cost of e-waste dismantling and is included in the price of hi-tech goods. It also aims to cover e-waste collection costs, especially for orphan and historic used EEEs (see section 3.6).

So, according to the literature,[95] the reimbursed compliance cost consists of:

> "A direct involvement of producers as stakeholders in the financing of the system, but only via an up-front payment made when appliances are placed on the market. In the end consumers are financing the entire system by paying a fee". (p. 12)

The eco-contribution transits identically from consumers to retailers and from retailers to producers, without any change in its amount. Furthermore, in Italy this scheme may be subject to additional contributions by citizens since, depending on municipalities, they can be asked to pay for e-waste management also via local waste tax, which normally covers the costs incurred for handling bulky items, even including large household appliances. So, at the time of any EEE purchase, consumers pay an eco-contribution, which is lastly paid to producers. Equally, at the time of any WEEE disposal, they contribute to its management via the municipal waste tax, which is in turn paid to municipalities.[96] The

[95] *Ibid.*

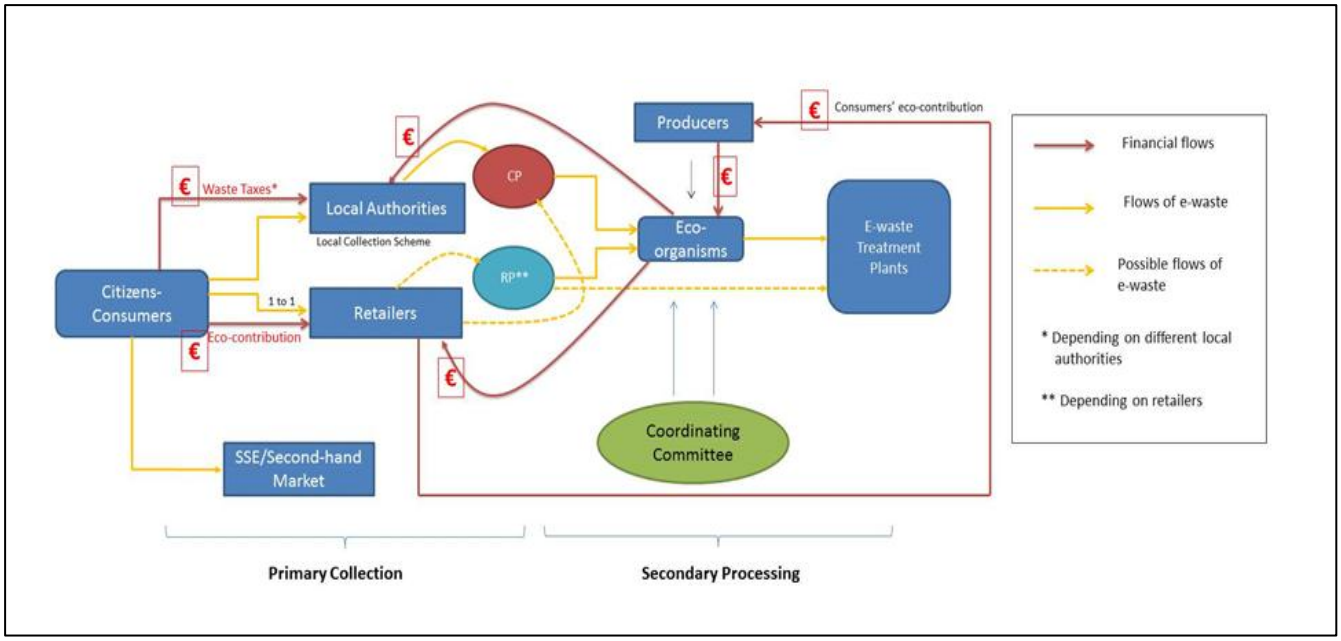
[96] It strongly depends on local authorities. In Milan it has been applied just for bulky electronic appliances.

latter are in turn partly financed by the eco-organisms, which, via a mechanism of efficiency rewards, foster their collection in case of *goods cargoes.*[97]

Retailers are also subject to the same mechanism of refunds by the eco-organisms in case of *goods cargoes* when they provide a regrouping point, otherwise they are not included within the mechanism of reimbursement. Moreover, both municipalities and retailers are not repaid if they record an e-waste collection rate which does not reach a certain threshold established via the agreement CDCR-NAIM. Furthermore, if e-waste cargoes provided by retailers and municipalities result as damaged, they are financially sanctioned by the eco-organisms.[98]In turn, eco-organisms are monetarily sanctioned by the CDCR in case of non-servicing or inadequate servicing. Finally, it is up to producers to pay for the work undertaken by the eco-organisms, the CDCR, the steering committee and the committee of vigilance and control.

This overall system is synthesised according to Figure 5.1, which illustrates e-waste and financial streams among the different institutional stakeholders involved in Italian e-waste SC.

Figure 5.1 - The Clearing House Model in Italy. E-waste and monetary flows.



(Authors' own)

[97] It is calculated on the basis of quantity and quality of e-waste collected by the municipality: above certain thresholds – which depend on the agreement between CDCR and NAIM- municipalities are repaid by monetary rewards for the work done. Before crossing such a thresholds, e-waste cargoes are considered *bad cargoes*, and municipalities are not refunded.

[98] The mechanism of sanction and reward works by a system of credits and debits which is annually calculated and updated, and not by an effective transit of money between the actors.

5.1.3 The paradox of an efficient supply chain with a poor collection rate

To give an idea of the actual efficacy of the Italian e-waste SC it is necessary to provide its figures, together with some scenarios concerning the alternative channels in which WEEE streams can end up. Firstly, the target imposed by the first WEEE Directive of 4 kg per capita of e-waste collected was achieved on a national scale in 2010. This data, although it conceals a strong regional inhomogeneity, can be considered a first satisfactory goal accomplished by the clearing house system in Italy. Notwithstanding, to better read this data it is necessary to provide further details. Nowadays, 4 kg/year per capita represents about 260,000 tonnes of e-waste intercepted with respect to an estimated volume of EEE PoM of about 900,000 tonnes (CDCRaee, 2012, 2013). To elaborate, a revealing report by Remedia (Remedia, 2012) highlights that in addition to the above recorded PoM it has to consider a further volume of EEEs held by *free riders* producers, which is calculated as around 300,000 tonnes, for a total amount of equipments PoM equivalent to 1,200,000 tonnes (2011). Thus, the rate between e-waste managed by the CDCR and EEEs PoM is quite low at around little more than 20%.

However, this ratio is still not sufficient, since the relationship between PoM and e-waste generated each year is rarely linear.[99]Thus, it is useful to also consider the ratio between e-waste generated[100] and e-waste recorded by the CDCR system. This relationship, known as *effectiveness rate* (*Idem*), is about 29% (2012). Within this picture small appliances, what we defined as *C4,*[101]record a lower[102]percentage of return, with about 13.5% of e-waste treated compared to that generated.[103]

These figures remained largely constant over the period 2010-2013 with some slight fluctuations.[104] The overall picture that they deliver is that there still is a vast amount of e-waste[105] which, in a more or less known manner, is subtracted from the management, reporting and control system established *ex Lege* 151. The report made by Remedia proposes to distinguish, within the e-waste flows that do not transit through the system of eco-organisms, between informal channel and unidentified channel.

1. The informal channel refers to a series of operators acting legally in e-waste management but out of the system of eco-organisms. It is composed by private companies of brokers, recyclers, treatment operators and refurbishers. This flow is estimated to intercept about 35% of the total

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[99] It depends, amongst others, on the span of life of appliances and on consumption patterns and habits by consumers.
[100] A priori it is just an estimation based on equipments' span of life, consumers attitutes, and other intervening factors which affect the disposal of WEEE.
[101] See section 4.1.
[102] Excluding the C5 category that is considered apart.
[103] Remedia, Op. Cit.
CDCRaee, 2011, 2012, Op. Cit.
[104]Three intervening factors occurred to disturbing the general trend: the economic crisis, the meant a minor amount of POM (2011>2012); the increasing value of secondary row matters, that meant a major pressure of the informal channel on the CDCR system (2011>2012); the transition to digital for the R3 category, that meant an extraordinary overall dismantling of tvs with consequent over-reception by the CDCR (2010>2011). The result has been a +6% of e-waste collected from 2010 to 2011, and a -8,5% of e-waste collected passing from 2011 to 2012.
[105] That can be estimated around 700,000 tonnes per year.

rate of e-waste generated, that means more or less 300,000 tonnes: even more than what is intercepted by the CDCR system.

2. The unidentified path would instead produce the so-called *dispersed e-waste*: the quota of hi-tech refuse whose destiny is merely estimated. This destiny illustrates consumers' misbehaviour but also reveals a series of other practices that normally represent the antechamber of dumping and other illegal local forms of mismanagement.

Thus, the e-waste flows which escape from the official supply chain can be categorised into the following alternative forms of management.

- WEEE improperly disposed of by consumers, that is those discarded into a bin without waste-type designation, and also those abandoned in public places. The first practice brings about the pollution of the waste bin, the incineration of e-waste together with other generic refuse, or abandonment in landfills. The latter end up in improvised and extemporaneous landfills, causing pollution and other potential dangers. This waste flow, due to citizens improper handling, is estimated between 1.6 kg and 2.3 kg/year per capita[106](2011) and it is composed mostly by small hi-tech devices, for about 62% of the total rate recorded.[107]"Albeit generated by consumers, these flows cannot be intercepted by the CDCR system neither by other complementary channels, and in this they disturb the overall national performance".[108]

- Another point to consider is the practice of domestic stock also impact the overall performance of the e-waste SC. This is a figure very hard to extract since its detection is surrounded by great uncertainty: Ecodom (2012) calculated a proxy figure between 17 and 24 kg per capita o e-waste storaged at home by households, which means that such practice is widely common. The reports also reveals that it is recurrent also with regard to broken appliances Again, the C4 category is a particular catalyst of such practices.

In Italy:

> "A hibernation period exists for appliances falling into the category of *potential WEEE* (EEE not working or no longer in use, but which has not yet been discarded). This phenomenon may be attributable to consumer behaviour dynamics, such as lack of awareness of how to properly dispose of WEEE (especially small ones), perceptions of residual product value, emotional attachment, or organizational or logistical factors linked to WEEE disposal. (*Ibid.*, p. 39)

Their study shows that over 13% of household EEE stock is made up of equipment no longer in use, including both functional and no-longer-functioning equipment. Such an amount of WEEE hibernated as stock in Italian households represents a significant volume, especially in terms of the potential re-entry of their raw materials into the economic cycle.

- Another percentage, about 13% of e-waste generated, is intercepted by the channel of reuse and second-hand market which is not accounted within the official e-waste SC (*Ibid.*)

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[106] Ecodom, 2012.
[107] *Idem.*
[108] "*Tali flussi, seppur generati dai consumatori, non possono essere intercettati né dal Sistema RAEE né da altri sistemi complementari, andando a minare le performance complessive dell'Italia*". (*Ibid.*, p. 48)

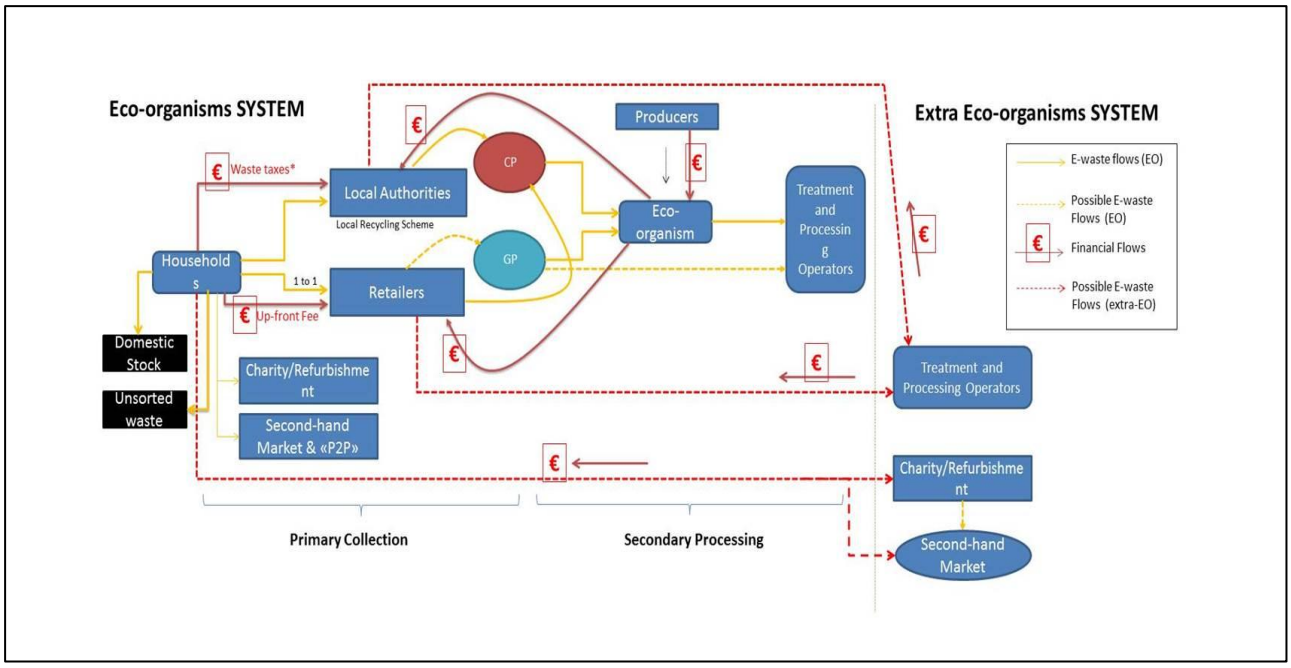
- The vast majority of e-waste collected from retailers do not pass through the CDCR system. In fact it is calculated that just over 37% collected by them is transited via the system of eco-organisms: the rest is sold to waste operators external to the supply chain established *ex Lege* 151/2005.

- Similarly, municipalities often opt to sell their e-waste cargoes (or part of them) to treatment operators external to the official e-waste SC. Consequently this flow is also hidden with respect to the official statistics.

- A tangled jungle of very heterogeneous subjects – operators of waste sector, private citizens, gypsies, environmental criminals, brokers,… - that intervene at different stages of the e-waste chain, in order to obtain economic returns by extracting and treating the renewable matter and the secondary row matter contained in WEEE. This vast array of practices includes different phenomena, to cite the most common: theft or damage of appliances within the collection points, e-waste dismantling by scrap metal dealers, a traffic of sale and purchase of e-waste from the CP to treatment plants not subscribed to the system of eco-organisms. Interestingly, within this scenario, due to the increased price of raw materials occurring in the last few years, the market of secondary row matters has received increasing attention from many different stakeholders, including those involved in illegal operations. This historical juncture, that makes e-waste very attractive from an economic point of view, has meant an inflection of e-waste volumes intercepted by the official supply chains in 2011 with respect to 2010, in several European countries (ANDEC, 2012)

Figure 5.2 shows the Italian e-waste SC, integrating the financial and logistic flows with those held by the informal and dispersed channels.

Figure 5.2 - E-waste and monetary flows in the Italian e-waste SC: official, informal and dispersed channels



(Authors' own)

Finally for the French and Italian e-waste schemes, two tables are proposed. Table 5.3 synthesises all the figures concerning e-waste flows in Italy both from the official supply chain and from alternative channels.

Table 5.3 - Overall data referring to e-waste management in Italy: CDCR and alternative channels

	Tonnes	**kg/year per capita (2012)**
PoM	900,000	16
PoM + free riders producers (estimate)	1,200,000	20
E-waste generated (estimate)	700,000	14.6
E-waste intercepted by the CDCR system	260,000 (among which 39,000 by retailers, that is the 6% of the total collection)	4.3
E-waste intercepted extra CDCR system (informal channel – estimate)	300,000	5
E-waste intercepted extra CDCR system (dispersed channel – estimate)	315,000 (among which 108,000 tonnes due to households improper disposal, mostly referring to R4 and R5)	5.2

(Author's own, based on Remedia, 2012, and Ecodom, 2012)

Table 5.4 instead refers to the effectiveness rate that the system of eco-organisms records per each e-waste category. As illustrated, if excluding the C5 -which has particular features- the C4 is the less intercepted, with an effectiveness rate about 13.5 % (270,000 tonnes). Comparing this figure to e-waste generated for the same category, the results show that a little more than 4 kg/year per capita of small WEEE are escaping from the official statistics, mostly ending up into the generic waste bin. Similarly C2 records a relatively low capacity of the e-waste SC to intercept e-waste. Conversely, the C3 and C1 record better performances.[109]

[109] As already mentioned in section 5.1.3, high percentage of C3 returns are due to the shift to digital technology which brought about, in 2011-2012, a general discarding of TVs and monitors.

Table 5.4 - Percentage of e-waste collected per category and related effectiveness rate (2012)

E-waste category	% (Upon the total rate of e-waste intercepted)	Effectiveness Rate with respect to what generated per each category (%)
C1	26.31	44
C2	25.43	22.8
C3	32.40	74.1
C4	15.49	13.5
C5	0.37	6.9
Tot.	100	29.6

(Remedia, 2012)

But how is such a discrepancy possible? What are the reasons why the Italian SC records such a relatively poor collection rate of e-waste? Where are the shortcomings in the chain? We discussed all these questions with the institution stakeholders involved in e-waste management and tried to isolate the key points which allow the provision of responses. Individuating the weaknesses of the e-waste sector at this stage is crucial to going further into its implications on the local scale in the urban context in question.

5.1.4 The partial success of the clearing house model in Italy

The performances recorded by the e-waste SC in Italy reveals that its implementation struggles to be upheld, and this is due not only to the pressures of the illegal sector which pushes to obtain economic returns through e-waste processing, but also to some weaknesses which are internal to the supply chain itself. In fact, as the following sections illustrate, today the clearing house model in Italy coexists with an *all actors* system that actually brings about unfair competition between the institutional stakeholders subscribed to the system of eco-organisms, and those that continue to manage e-waste outside such a system, albeit legally. The further sections develop these arguments in details showing the stages at which the e-waste SC in Italy suffers from certain normative, organisational and economic constraints.

5.1.4.a In or out of the clearing house system: the discretionary power of municipalities

In Italy municipalities have the option of joining the official SC but not the obligation. Moreover, it pertains to them the possibility of delivering some e-waste categories to the eco-organisms while selling others to alternative waste operators. Thus, it is true that in general municipalities find a series of economic advantages to subscribing to an agreement with the CDCR in case of good collection

performances, notwithstanding some municipalities finding it more suitable to manage e-waste through alternative channels, especially when they offer even more advantageous economic returns.

> "Normally, it happens that municipalities deliver certain e-waste categories to the CDCR system, while selling the rest to other operators. (…) It has to be noticed that waste operators working for the informal channel of e-waste management can make monetary offers ten times greater than those provided by the CDCR. In particular, what can happen is that municipalities give to the eco-organisms just certain e-waste categories (normally large appliances), and they sell to alternative operators e-waste categories containing the most valuable categories –notably C2 and C4. This is perfectly legal".[110](Ecor'It: L.T., 2012)

In terms of final destinations and accountability, a great uncertainty surrounds the e-waste flows managed by alternative channels: they can be processed by waste operators which respect the normative treatment protocols imposed on e-waste dismantling, or e-waste can be passed through a series of brokers with an uncertain status before finally being shipped abroad or locally mismanaged. In fact:

> "The final holder of e-waste cargoes (defined as a municipality or who collected e-waste) directs its destinies by being more or less tempted by *alternative* offers other than the CDCR, and which may be more or less legal".[111](CDCRaee: F.L., 2012)

Thus, the discretionary power held by municipalities in orientating the destiny of household e-waste flows can already be interpreted as a fundamental ambiguity in the e-waste sector, as it rests on municipalities to subscribe to the official chain or not. Within this frame, the number of municipal collection points registered in the CDCR system today is about 3,672 across a total number of 8,092 municipalities, which means less than 50%.[112] The following map illustrates the dissemination of municipal collection points on the national territory: it is shown here how their presence is far from ubiquitous.

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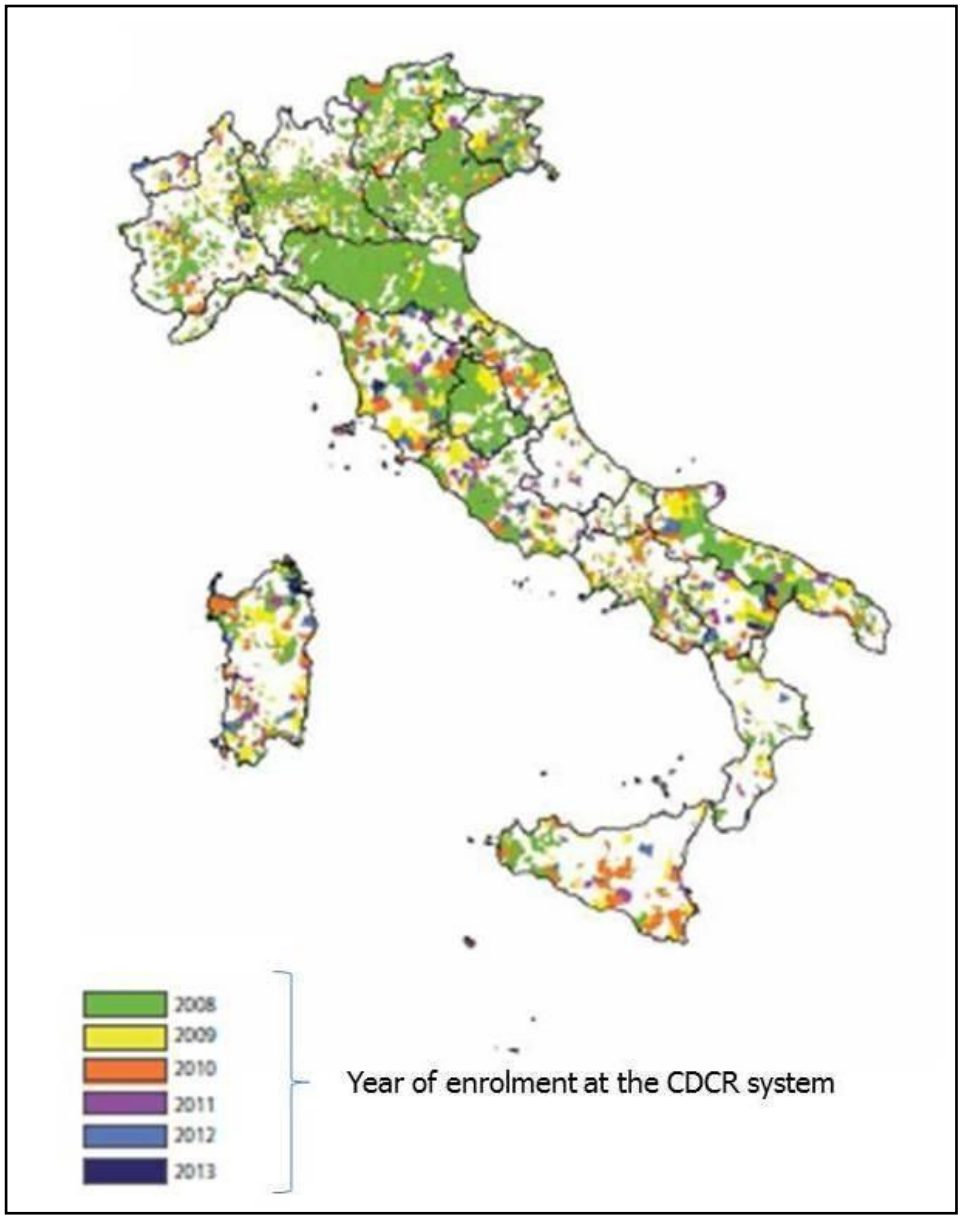
[110] "*Normalmente accade che i Comuni danno al CDCR alcune categorie di RAEE, mentre altre le vendono ad attori terzi. Questo avviene nel momento in cui le offerte che loro ricevono sono molto più vantaggiose da un punto di vista economico rispetto al sistema di rimborsi e compensazioni previsto dal CDCR. Devi sapere che un attore della filiera extra CDCR è capace di pagare un carico di e-waste per un valore dieci volte superiore a quello attribuito dal sistema degli eco-organismi. In particolare può succedere che le municipalità diano a un sistema collettivo una certa selezione di carichi (normalmente gli R1), continuando però a vendere ad altri operatori extra filiera le alter categorie di RAEE, in particolare gli R2 e R4. Questo è perfettamente legale*".

[111] "*E' il detentore del rifiuto (inteso come Comune o chi lo raccoglie) che ne orienta i destini, facendosi più o meno allettare da offerte di enti vari, diversi dal CDC, e che possono essere più o meno illeciti*".

[112] To notice that a collection point does not necessarily corresponds to a municipality. Indeed, several CPs can correspond to just one municipality as well as several municipalities can share the same CP. Thus, this figure has to be intended just as a proxy given the lack of more detailed data.

Map 5.5 – Dissemination of municipal collection points in Italy: white areas indicate lack of municipal CP.



(CDCR, 2013, p. 21)

5.1.4.b Retailers and the e-waste SC: A difficult match

This section provides a closer view of the role of retailers in the Italian e-waste supply chain. As previously seen, Ministerial Decree 65/2012 establishes for them the statutory obligation to contribute to the primary collection of e-waste by applying the one-to-one mechanism. Notwithstanding, in line with the declarations of key-informants and the official statistics on e-waste collection, it emerged that in Italy the distribution has poorly respected its legal mandate. In this case Decree 65/2010 is clear: retailers must join the system of eco-organisms. Notwithstanding -with few exceptions- they do not:

they finally result as uncooperative. This is because they do not apply the one-to-one mechanism, or because they sell collected e-waste to alternative operators.[113]

In explaining such a surprising finding, several issues have emerged. As seen in section 5.1.2, in Italy retailers have two options of storing household e-waste collected via the one-to-one. The first is exploiting the collection points made available by the municipality –if indeed it does so- following authorisation and via a specific agreement. In this case, the costs and logistics of e-waste collection and transport from stores to the CP are entirely up to retailers, while they do not perceive any refunds. The streams of e-waste held by retailers and which transit via the municipal CPs are not separately accounted for, as they are mixed together with the e-waste cargoes already stocked in the CP As a consequence, the contribution of retailers in this case is uncertain and in any case not traceable. Alternatively, they can opt to open their own regrouping point, which has to be approved by the CDCR and that can be served by the eco-organisms in the same way as a municipal collection point, which means that e-waste cargoes are transited to the plants by the latter, and for free. Moreover, RPs are subject to the mechanism of rewards and penalties as well as municipal collection points. To be approved by the CDCR, RPs have to carry certain specific technical characteristics in terms of dimensions, environmental conditions and safety measures, which ensure the safe storage of e-waste. In addition, the permanence of WEEE in the RP is conditional to volume and time constraints. All these logistical restraints have made the establishment of retailers' own RP relatively difficult, and indeed the total number of RP in Italy is about 100, compared to a proxy number of retailers enrolled into the CDCR system which is around 2,100, plus an unknown number of retailers not enrolled (CDCR: S.M., 2013). This flow is the only contribution made by retailers which is accounted for by the CDCR.

However, whatever the way e-waste collected by retailers is stored, the following constraints also occur:

1. Within the shop itself the phase of collection and temporary stock is subject to specific conditions in terms of space, time of permanence, volumes of e-waste to be storaged, safety conditions of the environment, etc. Which are not always guaranteed in shops.

2. To manage e-waste retailers must also enrol in the Register of Environmental Managers (REM) which is an institution normally reserved to employers of the environmental utility sector, and which implies further bureaucratic and financial constraints.

3. The normative provides that per each WEEE disposed of in the shop, a corresponding file is filled in by the retailer affording data on the typology of e-waste and the personal information of the consumer who deposed of it.

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[113] "*In questo caso il Decreto 65/2010 parla chiaro: la distribuzione deve iscriversi al sistema del CDCR. Cionostante, con poche eccezioni, questo non è avvenuto e il suo contributo è rimasto inconsistente. Questo avviene sia perchè i negozi non applicano la ripresa uno-contro-uno, sia perchè vendono i RAEE raccolti a soggetti terzi*". (Interview to L.T., Op. Cit.)

4. In general, retailers have been left behind the system of financial refunds, with the exception of those having their own RP. But even in this case, rewards are considered "substantially not at all compensative, which means that actually distribution has been cut off the reimbursements mechanism".[114]"Municipalities are refunded by citizens and by the eco-organisms and producers are refunded by consumers. The only party expected to accomplish its task without having any compensative return back is the distributor". (AIRES: D.R., 2012)

5. In case of non-compliance with such obligations retailers are subjected to a sanctioning regime. The side-effects of these stringent measures resulted in the widespread abstention of distributors from contributing to the e-waste supply chain established *ex Lege* 151. In particular, from the one side they simply avoid joining the chain of e-waste management, from the other they actually apply the one-to-one mechanism, but they sell e-waste to alternative operators in the same way municipalities do, as seen in the previous paragraph. In this, a recurrent issue recalled by institutional stakeholders regards the unfair competition that necessarily attained between retailers and municipalities with respect to their legal mandate in the SC. In fact, as municipalities exercise a discretionary power in managing e-waste within or external to the system of eco-organisms, the distribution is statutorily requested to join such a system: "why are municipalities allowed to sell their e-waste to alternative operators, obtaining economic returns, while retailers are not?" (*Ibid*.).

This reflection is often linked to a more general argument, namely the contention between those who claim an *all actors system*, where waste operators acting outside the system of eco-organisms are fully recognized as institutional interlocutors of e-waste SC *ex lege* 151, and those who instead support the clearing house system in which eco-organisms are the only institutional interlocutor in charge of e-waste management. Indeed, the way that the clearing house model is currently implemented in Italy makes room for alternative management options which forcedly bring about a situation of unfair competition between those subscribed to the system and those outside it.

> "Retailers should have the possibility to sell their e-waste to operators external to the CDC system [as municipalities do]. (…) We strongly support the idea that these operators 'out of chain' should be formalized and recognized as valid interlocutors in e-waste management. (…) Often they are operators which have worked in the field of waste management for thirty years before Decree 151 was approved: there should be valid interlocutors of the e-waste SC also for retailers". (M.C., 2014)

The general consequence of the widespread lack of participation of distributors in e-waste management is that the total rate of e-waste collected by the total number of RP enrolled in the CDCR is around 11,000 tonnes (2012), which means over 4% compared to the total tonnes intercepted in Italy by CDCR. And even trying to present a more complete picture calculating also a proxy figure corresponding to e-waste hold in municipal CP by retailers which do not have their own RP, the

[114] "*I premi previsti per la distribuzione sono inconsistenti: in pratica è stata tagliata fuori dal sistema dei rimborsi*".

overall percentage rises to about 6% of the total rate intercepted by the whole system of eco-organisms, which is still rather marginal. (Remedia 2012)

> "A macro aspect of the e-waste SC in Italy is that regarding the collection made by retailers: (…) The results have been zero. This is because the big distribution has applied the one-to-one without making any advertisement, while middle and small-sized retailers (that should have been the engine of consumers' collection) have not enrolled into the CDCR system at all". [115]

In this context, in an effort to foster the role of distribution in contributing to the Italian e-waste SC and also with a view to the application of the one-to-zero mechanism –which at that stage seems a very hard goal- the implementation of the new Directive[116] provides some simplifications to retailers' tasks. In particular, some bureaucratic and logistical restrictions have been lightened, and the amount of financial refunds has increased.

5.1.4.c The committee of vigilance and control

Regarding the poor engagement of retailers in the e-waste SC one could say that, beyond the bureaucratic and monetary provisions which do not facilitate the role, there is still a statutory mandate up to them which would represent an effective constraint *per se*. Here, another sore point emerged, and this concerns the role of the committee of vigilance and control within the Italian supply chain. In fact, even if its establishment is provided by law, its operations need further complementary decrees in order to make it operative. In particular, it needs the issue of the so called *Tariff Decree* in order to be able to work effectively. This decree would establish the tariff for covering the costs concerning:

> "The correct functioning of the committee of vigilance and control, the adjustment and maintenance of the national register of institutional actors in charge of e-waste management, the monitoring on the overall system, the inspections made by the National Environmental Protection Agency (NEPA)[117]and the financial police". (Baronio, 2013)

But such decree has not been issued, and the delay in its enactment generates some problems concerning the functioning of the committee and its effective monitoring: to date no sanction has ever been imposed. Necessarily, in a sector which is likely to suffer from market pressure, the lack of an effective enforcement apparatus strongly affects the performance of the overall system.

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[115] "*Un altro aspetto macro è che l'impulso vero di semplificazione –perché di questo stiamo parlando- della gestione dei RAEE dei consumatori, doveva venire dalla grande distribuzione, dal 1 to 1. (...) E questo perché le grandi insegne della distribuzione hanno fatto 1 to 1 senza pubblicizzarlo, mentre la piccola e media distribuzione, che in ultima istanza ci rende più comodo lasciare i RAEE, non si è iscritto nessuno: zero*". (Interview to L.T., Op. Cit).
[116] It has been transposed via the Legislative Decree 29/2014.
[117] *Instituto Superiore Protezione e Ricerca Ambientale – ISPRA.*

5.1.4.d The second life of disposed appliances: A marginal fate

The actors of the Social and Solidarity Economy (SSE) sector as well as of refurbishment are not explicitly implied in the e-waste SC *ex Lege* 151. Notwithstanding, their activities carry a strong potential contribution to the prevention of e-waste, as they provide a second life circuit for used appliances. This section illustrates the state of the art of the second-hand sector in Italy and its implications with respect to the e-waste SC. To doing so a distinction is made between 1) The social and solidarity economy, and 2) the sector of refurbishment.

1. Since the ESS is not statutorily regarded as among the primary institutional stakeholders involved in e-waste management, its role is not accounted for within the system of eco-organisms as it is considered as belonging to the informal and parallel chain. For these reasons its impact is overall quite uncertain, even if there is a broad agreement that its contribution "is just residual" and limited to local initiatives.[118]However, the Italian law is very strict in terms of second-hand market opportunity for hazardous waste, which indeed are subjected to a special treatment regime.[119]In particular, when an appliance (even still working) is disposed of in a collection point, its juridical status shifts from *good* to *refuse*, whatever its recovery conditions. But in empirical terms the line of distinction between *goods* and *refuse* in the case of (W)EEE is often very fine and the opportunities of exploiting a second-hand market are considerable. It is thus a large-scale debate between e-waste collectors and SSE operators at the extent that the latter could contribute to recovering volumes of EEEs for second life purposes.

> "We often talk about the possible initiatives that could be implemented in order to recover more small appliances, and several ideas emerge, such as *let's make a collection point in the schools!!* But this is not allowed in Italy! Italy is penalized by a mixture of weak civics and bureaucratic constraints. We cannot implement the e-waste separate collection, we cannot make widespread collection points in the schools… The result? We collect 15% of small devices!
> If I want to put a collection point in a school I must have an agreement with the local authority that is the only body in charge of waste management. Otherwise, the director of the school results as an illegal manager of hazardous waste, and he goes to jail".[120]

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[118] Interview to S.M., Op. Cit.
[119] Legislative Decree 22/1997.
[120] "*Si parla spesso di quali possono essere le iniziative da implementare per intercettare gli R4, e vengono fuori le idee più varie (es. mettiamo un contenitore nelle scuole…Eh no! In Italia non si può fare!...). L'Italia è penalizzata dal combinato della poca educazione civica della gente insieme con un irrigidimento burocratico-amministrativo: riserva sulle municipalizzate, non posso fare il porta a porta, non posso mettere il raccoglitore nelle scuole,… Totale: raccogliamo il 15%. In Italia va così… Se voglio mettere un cassonetto nelle scuole non lo posso fare: o mi accordo con la municipalizzata che è l'unica che ne ha il titolo o sennò il preside della scuola sta gestendo dei rifiuti pericolosi e va in galera".* (Interview L.T., Op. Cit.)

Thus, to foster a second-hand market, SSE operators can act only within the limits of the market of used appliances, and any permeability can occur between the flows of (e-)waste managed by waste collectors and the flows of used appliances intercepted by second-hand actors.
Recognizing the paralysing effect of such bureaucratic regimes, some efforts have recently been made towards a major implication of SSE operators within the e-waste SC, as stated by the key-informant of the CDCR:

> "In some Italian regions new regulations occurred to create *centres of reuse*, which collect electronic equipment but not exclusively. In this case, the equipment is no more considered as *waste* and it is directly resold".[121]

Despite these efforts, there is no evidence of the impact of the SSE sector on the e-waste SC and the uncertainty which surrounds its operations is also interpreted by some institutional stakeholders as a potential source of illegal escape from the official chain: "[we think that] sometimes these operators are nothing more than brokers".[122]Unfortunately, no further details are available with that respect.
2. Another chance to enter a second-hand circuit is that afforded by the operators of the refurbishment sector, which indeed are in charge of the recovery and reselling of used appliances. Equally, this channel is not accounted within the system of eco-organisms and its impact on e-waste management is unknown, notwithstanding it is here considered that its potential contribution is considerable. As for the SSE sector, also refurbishment practices are subject to the same strict regulations which administrates the matter of hazardous waste. In particular, once e-waste is disposed of, it has to pass through a certified and authorised processing phase in order to be *recovered*. But at this stage two problems arise: 1) A cost-benefits analysis: is it worth placing a product under a costly procedure to obtain a second-hand good with a relatively small market value? (Ecor'It: L.T., 2012, 2013; M.C., 2014; Semantic: A.M., 2012). 2) The question of the brand which can be attributed to the recovered item, indeed "original producers are strongly opposed to the possibility that refurbished products are resold with their brand, as they have no economic return".[123] Thus, a new brand is requested in order to re-introduce the appliance into the second-hand market. According to A.M. from Semantic, an Italian company which operates in the sector of EEEs refurbishment: "The problem is not only normative -since we cannot treat objects that have already became waste- but also a market problem: does the question of which brand for refurbished products emerge…?".[124] Thus, in general, e-waste

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[121] *Ibid.*
[122]"*Questo è un settore residuale e parallelo. Da notare che spesso questi enti che fanno iniziative nel campo dei RAEE non sono altro che broker che poi li rivendono*". (*Ibid.*)
[123] Interview to M.C., Op. Cit.
[124] "*Il problema in questo caso non è solo normativo, in quanto non possiamo trattare RAEE, ma anche un problema di riammissione sul mercato: quale marchio deve avere il prodotto ricondizionato?*" (Interview to A.M., Semantic, Op. Cit).

can be put back on the second-hand market but only after a re-certification of the product: to date we are not aware of any applications to that effect (CDCRaee: S.M., 2013). Therefore, as in the case of SSE, actors of the refurbishment sector operate with professionals and privates but limited to the market of used appliances: the recovery of e-waste from institutional stakeholders of the e-waste SC, as municipality, is not actually practised.

The next section goes the hearth of citizens-consumers contribution to the supply chainof e-waste management.

5.1.4.e E-waste collection performances and consumers' habits

One of the questions that we asked to institutional stakeholders involved in e-waste management concerned the role of citizen-consumers in contributing to the e-waste SC (see chapter 4). Interesting responses have been collected with regard to this question, and these involve the matter of awareness and disposal behaviour, the matter of consumption habits, and the effectiveness of e-waste take-back schemes.

First, a widespread lack of awareness and lack of disposal habits is recorded by some institutional key-informants with respect to small e-waste: "there is not a rooted culture of small EEE disposal".[125]

In this, the attention is often focussed on two interrelated factors: the first is socio-cultural and the second is linked to the effectiveness of communication campaigns by municipalities and mainly by retailers. Such arguments require further testing, and in general do not take into account the huge inhomogeneity which characterises the sector of waste management in Italy. Indeed, as seen, waste governance and related collection performances suffer from a great instability depending on the geographical area on the national scale. In this, the literature talks about a *three-speed country*, where the South is considered the less advanced in this domain, followed by the central regions and the North, which has average collection performances in line with the European average, with some points of excellence. Thus, from the one side it is true that small e-waste collection struggles to reach a high rate, and this is also due to citizen-consumers habits (see section 5.1.3). But on the other hand we cannot read such a result univocally, since the involvement of citizens and institutional actors in e-waste management strongly depends on the local context.

Second, the vast majority of institutional stakeholders involved in the e-waste SC considers that in Italy the second-hand sector is poorly rooted as, for cultural reasons, "Italians do not like the second-hand market".[126]Also in that case the argument cannot be totally embarked, but, as long as this study is concerned, it is actually true that the overall impact of SSE sector on e-waste management is

[125] *Ibid.*.
[126] Interview to F.L., Op. Cit.

unanimously considered marginal, and this finding could reveal correlations in consumption habits. However, no further detailed data are available on that.

Third, the accent is also often posed on the take-back systems which are provided to citizens. In particular, we talk about the ineffectiveness of providing municipal landfills for the disposal of small e-waste. Very often these are not easily accessible and they discriminate against users without a car. Moreover, following P.L. of the CDCR:

> "Not only citizens refuse to take the car to go far away to dispose of a small device, but even if they did it wouldn't make sense in environmental terms! It makes sense that collection points are located in already frequented places".[127]

Again, local authorities and retailers are supposed to play a key-role in taking an active role in e-waste management by involving citizen-consumers via a collection scheme which should be well communicated, widespread, easy to access and *user-friendly.*

5.1.5 Conclusive reflections on the clearing house model implementation in Italy

If we want to synthesise in a sentence what has been so far mentioned, we could follow the General Manager of the CDCR, who states: "the system of eco-organisms in Italy is devoid of controls, voluntary on various aspects and subject to unfair competition".[128] The first argument refers to the ineffectiveness of the Committee of Vigilance and Control, which impacts amongst others the effective implication of retailers to the collection phase. The second to the discretionary power that Decree 151 concedes to some institutional stakeholders involved in e-waste management to be in or out of the clearing house model, as municipalities. The third to its general consequence, namely double regimes in terms of treatment protocols, monetary returns and bureaucratic burdens for those inscribed within the CDCR compared to waste operators of the parallel chain. This conclusive paragraph provides some considerations on all that with particular attention paid to:

1. The implications of a schizophrenic management system.
2. The logic of refunds within the clearing house system.
3. The consequences of an excessive level of bureaucratic burdens.
4. Some considerations on the EPR application.

1. The way the WEEE Directive is interpreted and applied in Italy by Decree 151 generated a two-speed e-waste management supply chain. From the one side we find a system of eco-organisms which

[127] *Ibid.*
[128] *Ibid.*

work in order to ensure a public service,[129]from the other a parallel sector operates by following market goals and without being subject to the same rules and efficiency targets. This necessarily makes the official chain vulnerable against market pressures.

> "The extra-CDC operators represent a real lobby: we are subject to strong external pressures by other competitors, which are business and market operators, and we have no way of defending ourselves, since we conceive our work as a public service and not as a business".[130]

The general consequence is that "what is intercepted [by eco-organisms] is often the stuff most uncomfortable (or inconvenient) to manage differently".[131]This means that the most valuable categories of e-waste are usually the most diverted, with inevitable effects on the economic returns that e-waste management can hold to the official chain. The co-existence of a double-track (which becomes a triple-track when considering illegal channels) has brought about a paradoxical situation where those meeting the expectations of the WEEE Directive are the most bound and pressed in terms of tasks, targets and costs to support.

2. The internal mechanism of reward within the CDCR system is inspired by a principle of incentive rather than of reimbursement, as money is paid only if certain efficiency thresholds are reached by the institutional stakeholders.[132] Equally, the logic behind the system of financial penalties corresponds to the same will of stimulating good practices among them. But the average amount of refunds awarded to virtuous operators is "not at all competitive with respect to what is afforded by free market operators".[133]In this sense, what is supposed to be effective in pushing institutional stakeholders to take in charge of e-waste management is the legislative binding, rather than the economic incentive. This is perfectly coherent with the option of conceiving e-waste management as a public service and not as a market provision, notwithstanding it makes the overall system even more vulnerable to *external* pressures.

3. Another problematic point of the e-waste sector is the excessive charge of bureaucratic constraints placed upon the actors involved. This is rightly inspired by the need to guarantee an environmental sound management of hazardous waste, but at the same time it has a paralysing effect with respect to

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[129] About that: an internal debate within the world of eco-organisms is in act concerning the lack of homogeneity of their juridical status and budget management. The question is also addressed by the Italian Decree implementing the new WEEE Directive, where indeed it is stated that all eco-organisms must apply the same status in terms of budjet management.

[130] "*Per quanto ci riguarda noi stiamo subendo attacchi esterni da parte dei nostri competitor, di quelli che fanno business, e non abbiamo armi per difenderci in quanto non concependo la nostra attività come business ma come servizio non abbiamo budjet commerciale per proteggerci*". (Interview to L.T., Op. Cit.).

[131] "*Quello che si evince dal mercato in termini generali è che tornano i rifiuti che sono davvero scomodi da gestire*". (*Ibid.*)

[132] It is not the case that the financial rewards dispensed for C2 and C4 have been increased in the last ANCI-CDC agreement: these categories are less intercepted and the monetary refund has been recognized as an efficient boost.

[133] "*Sono rimborsi per nulla comparabili rispetto a quanto può essere offerto dagli attori di mercato*". (Interview to L.T., Op. Cit.).

second-hand market opportunity and the active implication of operators which has a natural vocation different from waste management, as retailers. In the first case it has been illustrated how the refurbishment sector as well as the SSE operators have very few opportunities to recover WEEE, while they necessarily have to intervene at a stage before e-waste generation. Secondarily, the case of retailers have shown how strong logistical (and economic) constraints can affect the accomplishment of statutory tasks and how the normative binding per se cannot be a sufficient incentive within a context basically devoid of control.

4. The last emerging consideration is related to the application of the EPR and the overall financing mechanism of the e-waste sector in Italy. In fact, despite the EPR principle, it has been described how a good portion of the costs of e-waste management are supported by citizen-consumers, via the eco-contribution and waste tax. In particular, according to Remedia, in Italy they contribute to cover approximately 64% of the entire costs. This means that "it is passed from the willingness to provide a service [subscribed to an EPR logic] to the act of charging citizens with the overall costs".[134]

This mechanism imposes problems on the application of the EPR. Following Bertloni *et al*. (2009):

> "The EPR is thus applied in conjunction with an extended responsibility of municipalities (ERM) and of consumers (ERC). An extra effort is indeed asked of the latter, who are requested to contribute as citizens (via the waste tax) and as consumers (via the eco-contribution). In the end, citizen-consumers are paying the increasing costs of post-consumption on behalf of environmental protection". [135]

Such state of the art makes the EPR application problematic in the context in question and on the effective role which is (expected to be) attributed to citizen-consumers as active contributors to the e-waste SC.

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[134] "*Si è partiti che doveva essere un servizio, invece alla fine abbiamo ottenuto che il cittadino è stato vessato*". (*Ibid.*)

[135] In J-B. Bahers, 2012, p. 374. "*La R.E.P. se conjugue donc avec une responsabilité élargie des collectivités locales (RECL) et une responsabilité élargie des consommateurs (REC). Un effort « physique » supplémentaire est demandé à ces derniers qui, de plus, subissent en retour les incidences financières de la R.E.P., d'une part en tant que consommateurs, d'autre part en tant que contribuables; au final, ils paient en tous cas les coûts de post-consommation et leur renchérissement au nom d'une protection accrue de l'environnement".*

Part II

5.2 E-waste governance on urban scale: the Milan case-study

The present section goes to the heart of e-waste management in the city of Milan, as local policy, take back scheme and the utility system represent the macro factors supposed to influence the disposal behaviour of citizens-consumers (see Chapter 4). To introduce the topic and to frame the case-study, a general view on waste and e-waste collection performances is first presented on a national and regional scale. Further, detail on the Lombardy region is provided, together with a focus on the Province of Milan. Successively, the chapter focuses on waste governance in the city, by considering its performances in terms of separate collection, the take-back scheme provided for citizens and the related collection infrastructures. Here, the fundamental role of AMSA[136], the company in charge of waste management in the city of Milan, is explained. Such contextualisation allows us to comprehend: 1) The situation in Milan concerning waste and e-waste collection performances compared to the national, regional and provincial average. 2) The historical rootedness of waste governance and separate collection schemes in the city, with particular attention paid to e-waste management. After this framing, the chapter enters into the detail of the institutional e-waste disposal channels in Milan with a focus on small WEEE. Here, the effectiveness of the local implementation of the WEEE Directive is analysed: the contribution made by AMSA, the effective implication of retailers into the e-waste SC, and the role of the SSE sector. Further, a view on the parallel chain is offered: citizens' stock and misbehaviour, resale and gifts, and informal chain. The conclusive section reviews the main findings and introduces the following section on e-waste disposal behaviours of citizens-consumers.

5.2.1 Waste and e-waste collection performances in Italy

In Italy, around 528 kg/year per capita of municipal solid waste is generated, compared to a the European average (UE 28) of 489 kg/year per capita. In this, the percentage of separate collection is 35%, compared to a the European picture which varies greatly depending on the country. Austria and Germany have more than 60% of waste collected separately, about 50% in Switzerland, 40% in UK, 36% in France, with less virtuous performances, to mention just a few, about 20% in Portugal and 18% in Greece (EEA, 2013). Thus, within the European scenario, the Italian peninsula occupies an

[136] *Azienda Milanese Servizi Municipali*: Milanese Company for Municipal Services.

intermediate place regarding waste generation and waste management performances, but on a slightly downward trend. In Italy different pathways of local development coexist, due to geo-historical reasons, so that we often talk about a *three speed Italy*. In fact, historically, the northern regions show the highest level of economic development[137]which bring the area close to the central European targets. The central regions follow and finally the South and islands record less competitive performances in terms of economic development. The North of Italy results as more performing regarding the public service provision (e.g. in the field of instruction and health).[138]Under this frame, the service of waste management also brings about different performances in the *Three Italies*: in the North, separate collection exceeded 50%, in the central regions it is around the 33%, and in the South this percentage drops below 28% (ISPRA, 2013).

Milan is the regional capital of the Lombardy region, located in the heart of Northern Italy. It is amongst the first Italian regions in terms of disposable household income, and it is one of the best performing regions regarding the economic competitiveness on the national scale (EEA, 2013a).[139]Moreover, Lombardy is the most populated[140]and the densest Italian region.[141]Despite its relative economic development,[142]the generation of urban solid waste per capita is not among the highest recorded in Italy (ISPRA, 2013) as it is between 451 and 500 kg/year per capita, a little less than the national average. Furthermore, the percentage of separate collection is among the best performing highest with a bit less than about 50%. The maps 5.5 and 5.6 show the situation of Lombardy with respect to waste generation and separate collection performances and compared to the other Italian regions.

[137] Disposable income of households (Istat: http://www.istat.it/it/archivio/111473 last consulted on September 2014).

[138] Classification made by IlSole24Ore (http://www.ilsole24ore.com/ (Last consulted on September 2014). These classifications are here recalled as an example of a strong internal inhomogeneity, which characterises the peninsula in terms of economic development. However, they contain exceptions.

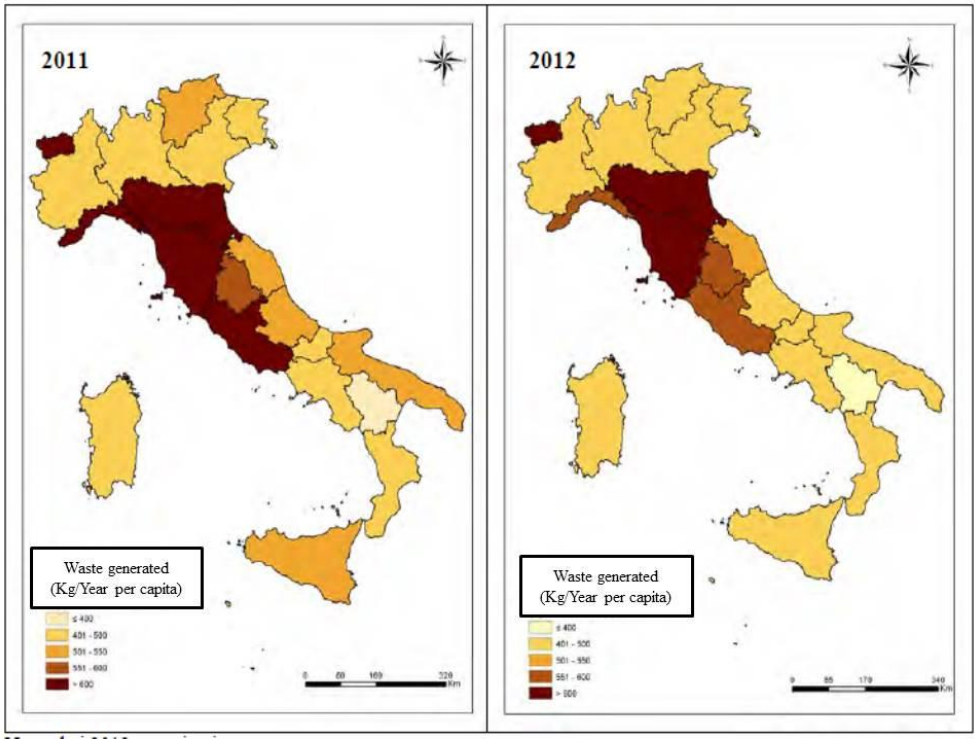
[139] See http://ec.europa.eu/regional_policy/newsroom/detail.cfm?id=921&lang=it. (Last consulted on September 2014).

[140]9,700,881 residents at the end of 2012 (Istat Official Data: http://demo.istat.it/bil2012/index04.html. Last consulted on September 2014).

[141] Together with the Campania Region, with more than 400 hab./km2 (ISTAT Official Data: http://www.istat.it/en/. Last consulted on September 2014).

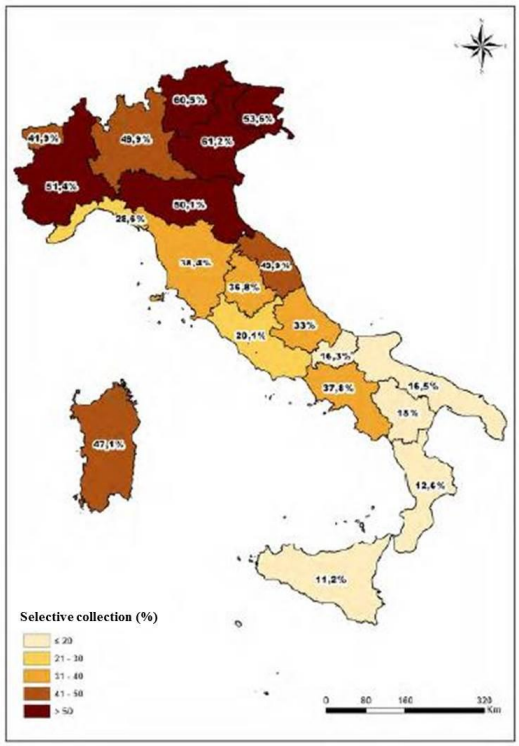
[142] A historical correlation is recorded between GDP and waste generation (see chapter 3).

Map 5.6 - kg Volume of waste produced per capita per Italian Region (kg).



(ISPRA, 2013, p. 60)

Map 5.7 - Percentage of separate collection upon the total rate of USW per Italian Region per year (2011)



(ISPRA, 2013, p. 66)

Table 5.7 also shows refuse separately collected and treated in detail per Italian region . The figures confirm the strong internal non-homogeneity among regions and the more efficient conduct performed by the North.

Table 5.8 – Separate collection matters per Italian region

Region	Biowaste	Paper	Glass	Plastic	Wood	Metal	WEEE	Textile	Other	Tot.
	kg/Year per capita									
Piemonte	86.2	61.4	35.5	21.2	15.3	3.5	4	2.1	17.2	246.4
Valle d'Aosta	41.6	69.3	49.7	24.8	49.3	9.4	8.1		0.6	252.8
Lombardia	101.5	54.1	39.9	18.5	15.6	5.2	3.9	1.9	4.8	245.4
Trentino Alto Adige	116.3	77	38.9	22.3	16.8	11	6.3	3.6	12	304.1
Veneto	134.4	58.7	40.4	21.4	11.2	9.5	4.2	2	8.4	290.3
Friuli Venezia Giulia	106.9	59.7	36.6	25.8	13.3	6.5	5.6	1.1	7	262.5
Liguria	34.1	58.3	30.8	9.7	18.8	4.1	5.5	1.8	13.2	176.2
Emilia Romagna	141.8	77.7	33.4	28.7	25.8	5.4	4.9	1.9	11.7	331.3
Total North	108	61.3	37.6	21.1	16.7	6	4.4	2	9.4	266.3
Toscana	98.6	71.5	24.4	16.4	12.2	4.5	3.9	2.8	15.9	250.2
Umbria	97.9	62.6	32.2	18	15	5.6	4.4	1.7	3.2	240.6
Marche	126.3	65.7	30.8	17.5	14.2	3.7	4.4	2.3	7.9	272.9
Lazio	47.4	54.7	12.2	12	4.8	2.1	3.2	2.3	2.1	140.8
Total Central Regions	77.2	61.9	19.8	14.5	9.1	3.3	3.7	2.4	7.2	199.2
Abruzzo	89	49.7	25.8	11.4	3.9	1.7	2.8	1.9	6.6	192.9
Molise	26.7	20.2	15.6	7.8	0.4	0.8	1.8	0.9	4.1	78.3
Campania	105.3	32.4	22.2	11.1	2.4	2.4	2.2	1.9	11.1	191
Puglia	32.4	32	13.7	11	5.2	1	1.6	1.5	5.5	103.9
Basilicata	28.7	29.9	13.4	8	2.9	2.9	2.5	2.7	1.7	92.7
Calabria	17.8	22.5	5.2	4.1	0.6	0.4	0.7	1.1	9.6	62
Sicilia	32.8	14.3	4.6	3.1	3	1.1	1.4	0.3	2.4	63.1
Sardegna	116.5	43.8	31.1	16.5	1.9	3.8	5.5	0.7	7.5	227.3
Total South	61.7	28.7	14.2	8.8	3	1.7	2	1.3	6.8	129.2
Italy	85.9	50.2	26.4	15.5	10.5	4	3.4	1.8	8.1	205.8

(ISPRA, 2013, p. 68)

Table 5.8 provides in detail an updated[143] general view on the Italian situation per region regarding e-waste collection in kg per capita, together with the demographic weight of the region and the number of collection and regrouping points.Within the table, the collection rate of e-waste greatly varies depending on the region, but even in this case, the northern regions record better performances with the lead position taken by Valle d'Aosta with 8.2 kg/year per capita, while the backseat rests in the south, with less than 1 kg in Calabria, compared to a national average of 4.1 kg/year per capita of e-waste collected in 2013. Within this picture, Lombardy, at around 4.7 kg/year per capita, records a

Figure 5.9 - E-waste collected, demographic weight, number of CP and RP per Italian Region (2012).

Region	Population	E-waste collected (kg/per capita)	Number of Regrouping Points	Number of Collection Points
Valle D'Aosta	126,806	8.28	0	23
Trentino Alto Adige	1,029,475	6.81	5	213
Friuli Venezia Giulia	1,218,985	5.72	2	176
Liguria	1,570,694	5.56	0	70
Emilia Romagna	4,342,135	5.34	7	358
Veneto	4,857,210	4.81	10	456
Lombardia	9,704,151	4.72	20	833
Piemonte	4,363,916	4.22	9	286
Total North	27,213,372	4.94	53	2,415
Toscana	3,672,202	5.60	13	173
Umbria	884,268	5.20	1	66
Marche	1,541,319	5.08	3	115
Abruzzo	1,307,309	2.89	2	31
Lazio	5,502,886	2.62	5	159
Total Central regions	12,907,984	3.97	24	544
Sardegna	1,639,362	5.04	3	131
Sicilia	5,002,904	2.73	3	80
Campania	5,766,810	2.56	3	233
Molise	313,660	2.42	1	24
Basilicata	578,036	2.25	0	48
Calabria	1,959,050	2.32	1	73
Puglia	4,052,566	2.22	7	124
Total South and islands	19,312,388	2.71	18	713
Total Italy	59,433,744	4.00	95	3,672

(CDCR, 2012, p. 26)

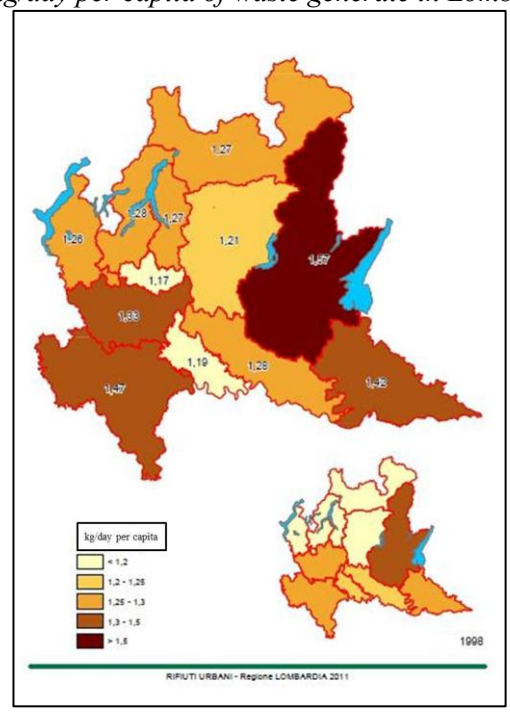
[143] Data provided by ISPRA are published in 2013 but they refer to 2010. Table 5.9 contains instead the detail about WEEE collection referred to 2012.

performance which is consistent with the northern average, namely 4.94 kg/year per capita (2013). Moreover, Lombardy is the Italian region with the highest number of collection and regrouping points, respectively 833 and 20. To resume, in Italy the generation of urban solid waste is slightly greater than the European average, and the percentage of separate collection is in line with the countries of southern Europe, but still far from reaching excellence. In this, the peninsula records a strong internal inhomogeneity, as the northern, central and southern regions have very different performances both regarding economic development and waste management. In particular, the North is revealed to be more efficient in terms of waste management and e-waste collected per capita. The following paragraph goes to the heart of waste and e-waste collection performances in Lombardy and Milan.

5.2.2. Waste and e-waste collection performances in the Lombard provinces and in Milan

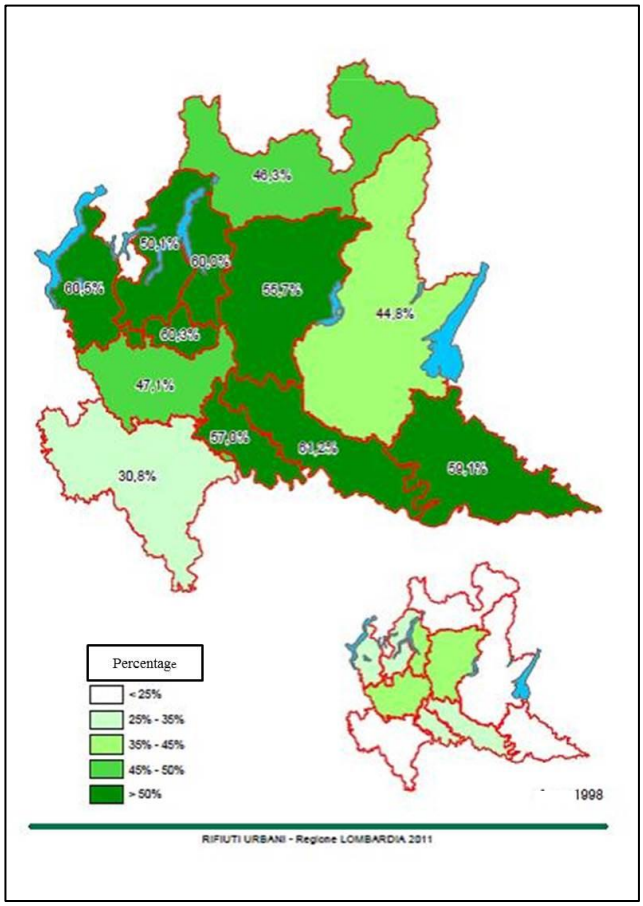
Compared to the rest of Lombardy, Milan and its provinces are among the worst performing regarding waste generation and separate collection. In fact, according to Maps 5.9 and 5.10, the latter records 1.33 kg/day per capita of waste generated, compares favourably to a regional average of 1.2 kg/day per capita. Also, the Province of Milan collects separately about 47% of urban solid waste, while in other areas of Lombardy this percentage can reach around 60%.

Figure 5.10 - kg/day per capita of waste generate in Lombardy Provinces



(Source: ARPA. http://ita.arpalombardia.it/ITA/servizi/rifiuti/grul/estrattoGRUL2011/ReportUrbani_Regione_PCp_2011.pdf. Last consulted on September 2014)

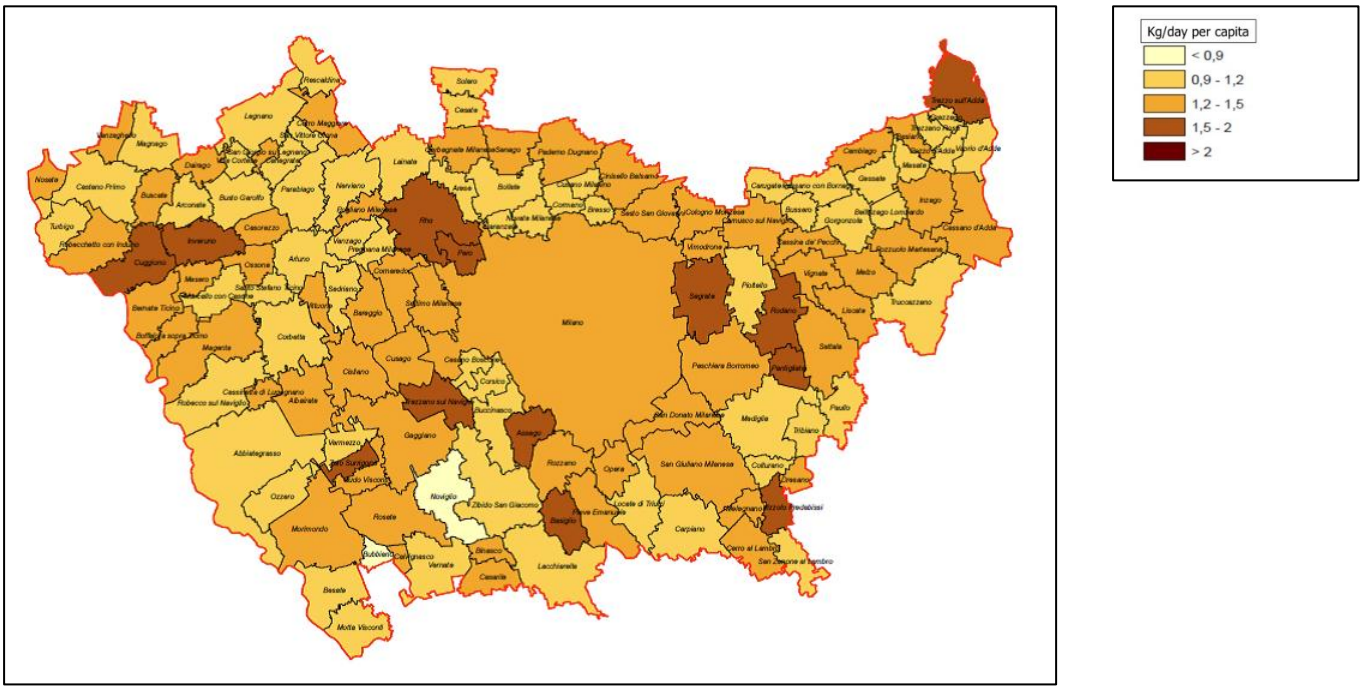
Map 5.11 - Percentage of separate collection in Lombardy



(Source: ARPA. http://ita.arpalombardia.it/ITA/servizi/rifiuti/grul/estrattoGRUL2011/ReportUrbani_Regione_RDp_2011.pdf. Last consulted on September 2014)

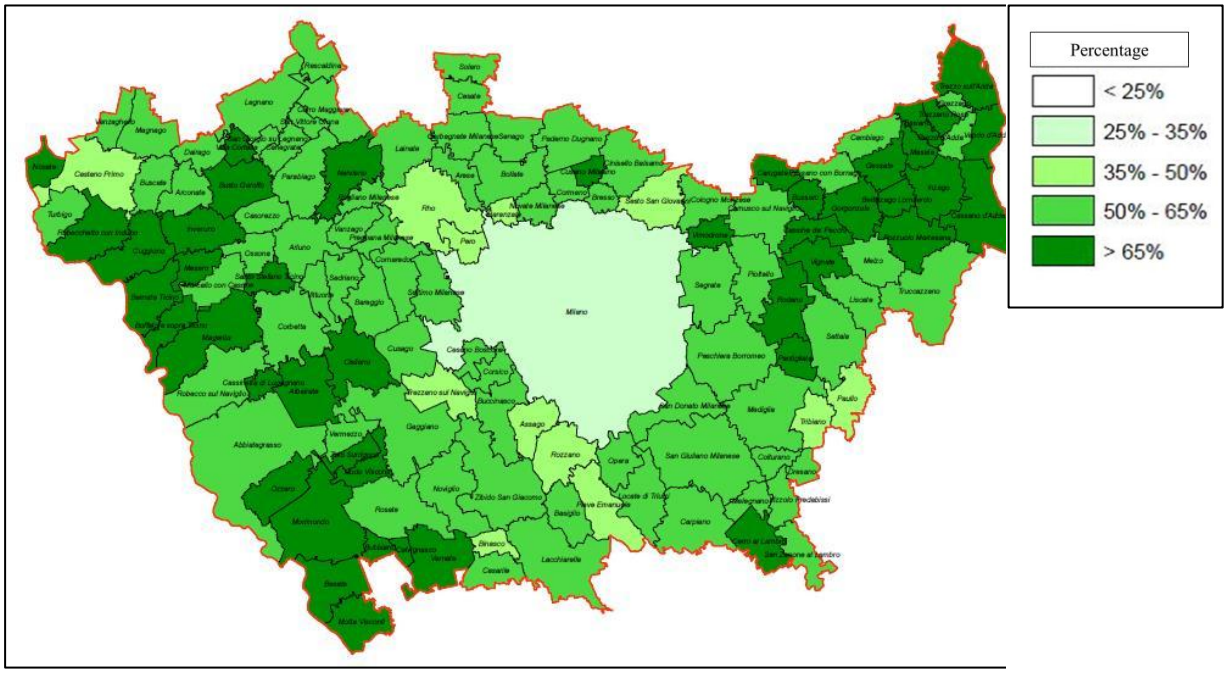
Conversely, focussing on e-waste management, the relation between Province of Milan and the rest of Lombardy is more balanced: the Milanese area holds a collection rate of WEEE intercepted of about 4.64 kg/year per capita. This is in line with the regional average. This can be explained by very high number of regrouping points made available by retailers in the province of Milan, which are 9 compared to a regional average that is below 2 (Regione Lombardia & CDCR, 2012). However, it has to notice that it can be also explained by a probable greater amount of EEEs put on market in the Milanese area compared to the rest of region. Furthermore, the city of Milan generates an amount of waste between 1.2 and 1.5 kg/day per capita, which is in line with the rest of its Province, as showed in Map 5.11. Nevertheless, the percentage of separate collection in Milan is much worse compared to its Provinces, as it records about 35% while in other areas of the same Province this number can exceed 65%, according to Map 5.12.

Map 5.12 - Production of waste per capita per city in the Province of Milan.



(Source: ARPA Lombardia. http://ita.arpalombardia.it/ITA/servizi/rifiuti/grul/estrattoGRUL2011/ReportUrbani_Milano_RDc_2011.pdf. Last consulted on September 2014)

Map 5.13 - Percentage of separate collection per city in the Province of Milan.



(*Ibid.*)

A similar picture is repeated in the case of e-waste collection, as indeed Milan results being one of the worst performing city regarding e-waste collection rate compared to the whole Milanese Province. In particular, the municipality of Milan has intercepted about 3.1 kg of e-waste per capita in 2013, compared to an average of 4.6 kg/year per capita recorded altogether by the whole Milanese Province (Regione Lombardia & CDCR, 2012).

In Milan the total amount of waste generated is calculated around 509 kg/year per capita corresponding to 673,600 tonnes, whom 611,829 are from households. The above mentioned figure of 3,1 kg/year per capita of e-waste collected represents just 1.5% on the total rate of waste collected separately, which is 182 tonnes: 34.71% on the whole amount of urban solid waste. The Table 5.13 shows the detail of refuses separately collected by the municipality of Milan.

Table 5.14- Focus on MSW collection in Milan (2011) per typology of waste

Typology of waste	kg	% on the total of waste collected	% on the total of waste separately collected
Paper and cardboard	82,849,240	12	34.5
Plastic	31,346,880	4.5	13
Biowaste	36,057,960	5.2	15
Green waste	392,540	0.1	0.2
Glass	63,779,620	9.2	26.5
Aluminium	12,840	0	0
Iron	1,621,000	0.2	0.7
Expired pharmaceuticals	148,280	0	0.1
WEEE	3,694,467	0.5	1.5
Wood	5,828,559	0.8	2.4
Vegetal oils	23,840	0	0
Mineral oils	19,270	0	0
Containers F/T	280,562	0	0.1
Recyclable Bulky Item	11,294,510	1.6	4.7
Toner	18,617	0	0
Batteries	219,247	0	0.1
Textiles	2,760,791	0.4	1.1
Pneumatics	57,220	0	0
Tot.	240,392,601	34.7	100

(Osservatorio Rifiuti, 2012, p. 90)

Within the total rate of e-waste collected in Milan, the vast majority in tonnes is represented by the third and fourth categories of WEEE, which are respectively 1,175 and 1,153 tonnes (2012). [144] Refrigerating equipment and other large households appliances follow, while the fifth e-waste category is the least intercepted. The overall WEEE collection performances recorded by the municipality of Milan are contained in table 5.14, which also contains the collection trend 2011-2012[145]and the total e-waste collected per category in 2012 by the system of eco-organisms in Italy.

Table 5.15 - Detail of e-waste collected per category in Milan (2011-2012) and related figure in Italy (2012)

	Tonnes_2011 in Milan	**Tonnes_2012 in Milan**	**Kg per capita in Milan**	**Tonnes_2012 in Italy**
C1	553	492	0.4 kg per capita	55,167.7
C2	460	388	0.3 kg per capita	48,568.5
C3	1,528	1,175	0.9 kg per capita	65,179.3
C4	1,143	1,153	0.9 kg per capita	33,479.8
C5	10	10	0.01 kg per capita	857.4
Total	3,694	3,218[146]	2.6 kg per capita[147] (+ 0.5 kg per capita)	203,252.8

(Athors own based on AMSA, 2013; CDCRaee, 2014)

Thus, Lombardy is one of the best performing regions regarding waste and e-waste collection performances in Italy. Notwithstanding, a certain inhomogeneity is recorded within the region, and in particular between the province of Milan and the other provinces. Indeed, the former has the worst performances in terms of separate collection while at the same time it records an average rate with respect to e-waste collected per capita. Moreover, within the Province of Milan itself, the municipality of Milan is the least performing concerning the matter of waste management, as both waste and e-waste collection rates are the lowest compared to other cities of the same province. The total amount of e-waste collected per capita in 2012 is 3.1 kg, which is slightly less than the national average (4.1 kg/year per capita): within this picture, the most intercepted e-waste category is the C4, which represents in turn about 3.4% on the total C4 collected in Italy. The following section goes into the detail of waste governance in the city of Milan.

[144] Obtained during an interview with L.A, responsible for separate collection management at AMSA, September 2013.
[145] Data on 2013 were not provided.
[146]This data partly differs from what found out into the CDCR report on Lombardy e-waste collection (2012), which records 3,840,012 kg collected.
[147] Again, detailed figures provided by AMSA slighly differ from those recorded by the CDCRaee. Indeed, here we see that 0.5 kg of e-waste collected per capita still miss from the local statistics, as we know that in Milan 3 kg per capita of e-waste are collected. Such gap can be filled by considering the amount of e-waste which is collected my the Municipality by alternative channels different from those directly provided to citizens (e.g. errors in the separate collection, special initiatives, contributions of retailers, etc.) which are not forcedly included in Table 5.15.

5.2.3 Waste governance in Milan

The local authority of Milan has contracted out the service of waste management to a municipality, the Milanese Company for Environmental Service, called *AMSA*. This company has existed since 1907, when it began to provide the city with the service of street cleaning, which then extended in 1910 to waste collection. In the coming decades, technological developments transformed a rudimentary process of waste collection into a more progressively refined system of waste management, and in 1968 AMSA[148]inaugurated the first Italian incinerator, which worked as a waste-to-energy plant. Two years later the company was municipalized and its tasks included an integrated waste disposal service, street cleaning and other services linked to the city space up keeping and sanitation. In January 2008, AMSA became part of the A2A Group, a multi-utility public-private company, where it carries out the same tasks on a wider area which included Milan and eleven neighbouring cities, for a total amount of 272 km^2 and 2,300,000 residents served (AMSA, 2014).[149]

For what concerns the only city of Milan, AMSA provides the service of waste management to 1,322,000 inhabitants on a square area of 181,755 km^2. Here, the separate collection was introduced in 2001, by Articles 4 and 13 of the *Municipal regulations for Municipal Solid Waste (MSW) management and urban sanitation.*[150]At that stage, the separate collection provided to households involved: 1) Paper and cardboard. 2) Glass. 3) Plastics and metals. 4) Unsorted waste. Added to these refuses, which were collected weekly or biweekly by proximity and condominium bins, other types of waste were collected in dedicated bins or in landfills. Among these, to cite just a few, were expired pharmaceuticals, scrap batteries, used clothes, wood, bulky furniture even included large electronic appliances, and the so-called *durable goods* (see footnote 77), which included other WEEE, already collected separately. [151]

Starting from this scheme, the collection of household waste has slightly evolved over time, and nowadays it has the following features: Milanese households are requested to accomplish the so called *mono-material selective collection* (Torino, 2005), meaning they have to separately collect their refuse into different bins according to different materials, with the exception of metals, that can be collected together with plastics. Such scheme involves the following materials:

- Paper and cardboard;

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[148]The company got the name of AMSA just in 1985, as before the name changed several times.
[149] http://www.amsa.it/gruppo/cms/amsa/azienda/index.html. (Last consulted on September 2014).
[150]"*Regolamento per la gestione dei RSU e assimilati e la tutela del decoro e dell'igiene ambientale*", approved by the City Council resolution n. 118/2000 and actually enforced since 06.02.2001 and subsequent amendments.
[151]The Article 8 refers to: a) Refrigerators, and freezers; b) Televisions; c) Computers and related accessories; d) Washing machines and dishwashers; e) Air conditioners. This article already provides for the *one-to-one* mechanism consumers-retailers, and alternatively for the delivery to the municipal collection point or withdrawal at home (both under certain conditions).

- Glass;
- Plastic and metals;
- Biowaste;[152]
- Unsorted waste.

To collect such materials, AMSA provides every housing unit (condominium or house) with dedicated bins and, depending on the material, it withdraws waste via weekly or biweekly collections.[153] Parallel to this system, specifically dedicated to waste generated daily, a further supply service is provided to intercept refuse which is less frequently generated, including:[154]

- Expired pharmaceuticals;
- Scrap batteries;
- Used clothes;
- Furniture and bulky items;
- The five categories of e-waste;
- Green waste;
- Used oils;

The vast majorit of these is then expected to be dismantled into dedicated collection points and not at home. In detail, the institutional channels provided to separately collect such refuses are the following.

1. A service of six landfills accepts all types of refuses with the exception of used clothes, which are collected through street bins and targeted initiatives. Such landfills are situated along the peripheral belt of Milan and they are freely accessible from Monday to Saturday full-time and half day on Sundays, by presenting a valid identification document which certifies the place of residence in Milan.[155]

2. A door-to-door withdrawal service, by appointment, is provided for bulky items like furniture, including large household electronic equipment belonging to the first, second and third e-waste categories.

3. A service of mobile landfills, called Environmental Mobile Centre (EMC), is also offered to citizens.[156] There they can dispose of e-waste categories C3, C4, C5, scrap batteries, used oils,

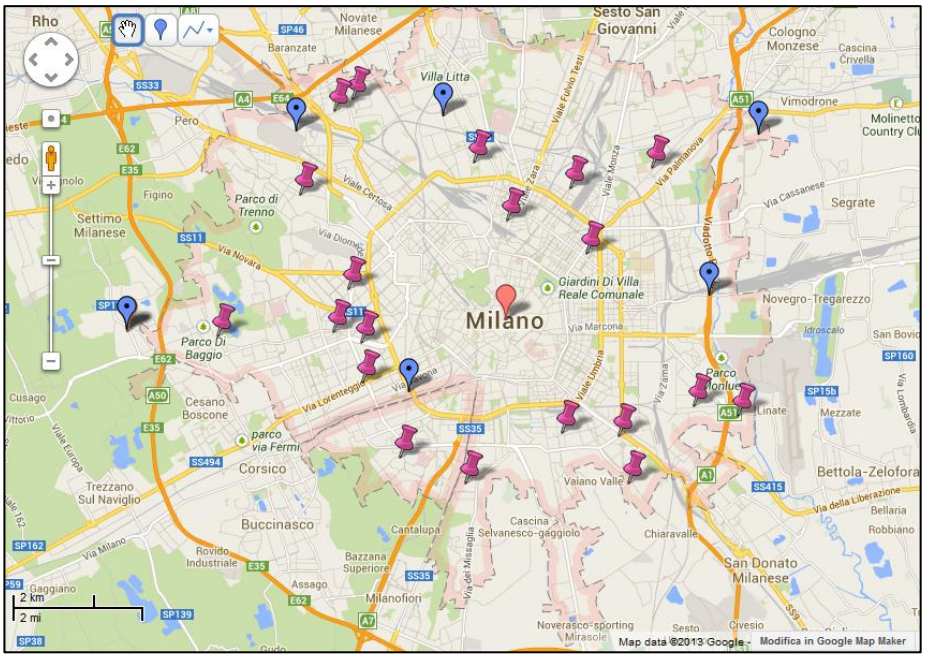
[152]Introduced experimentally since 2013 and involving progressively increasing number of city's areas. To date, it is still not extended to the entire city.
[153]Daily for organic fraction.
[154]This list contains just the most common refuses.
[155]Under certain conditions of size, number of pieces and frequency.
[156]*Centro Ambientale Mobile – CAM.*

spray and toners. It reaches every neighbourhood within a period of a month: it is available just in the morning normally next to the street market.

4. The distribution sector is also involved in waste tack-back for what concerns e-waste, expired pharmaceuticals and scrap batteries, which are directly routed to dedicated supply chains.

Map 5.15 shows an overall picture of the municipal collection points provided by AMSA. Blue markers represent fixed landfills, while pink pins[157] represent the points reached by the environmental mobile centre during its monthly itinerary.

Figure 5.16 – Distribution of municipal collection points in Milan



(Authors' own, based on AMSA and Google Maps)

Looking at the location of municipal collection points, some considerations arise. First, fixed landfills are situated along a very peripheral belt which normally is accessible only by car. The reason why landfills are very commonly peripherally distributed in city spaces lies in the fact that these sites are selected according to specific criteria of pollution containment and risk assessment and also to community and political agreements, which normally move away from city centres. This can in turn strongly affect the waste collection performances of the municipality given that: 1) Citizens are requested to make a specific effort in terms of energy, money and time spent to dispose of their

[157]Since the turn-over of CAM changes every month, it is here represented an overall example which uses the CAM's localization during the first 3 weeks of March 2012. (Source: http://www.amsa.it/gruppo/export/sites/default/amsa/comunicazione/documenti/Calendario_CAM.pdf. Last consulted on September 2014)

refuses. The literature has shown us that such availability greatly varies depending on individuals and that it cannot be unanimously taken for granted. 2) The accessibility of landfills is a strong car-dependent activity, something which necessarily discriminates part of the urban population in its act of disposal.

Thus, the service of environmental mobile centre is offered to citizens. Indeed:

> "The environmental mobile centre has been dedicated to facilitate the disposal of small WEEE which, due to their size, can end up together with unsorted waste or abandoned next to the road side bins with consequent damages in terms of the environment, human health and urban decor".[158] (AMSA: D.V., 2012)

The location of such collection points is more central and, in the words of E.R., president of AMSA, "It has the merit of making it easier for citizens the disposal of their waste, as its location is more comfortable and more consistent with citizens' needs".[159] (AMSA, 2013) Unfortunately, despite the service of mobile landfills is considered a *good success* by local stakeholders (*Ibid.*), data on the effective amount of waste collected through this service is not available, as its contribution is accounted together with the total waste intercepted by the system of municipal collection points (Tables 5.13 and 5.14).

Thus, to conclude, in Milan the governance of waste is entrusted to a historical company that in 2001 introduced a mono-material separate collection system, which nowadays records a percentage of 42% (2013) of refuse collected separately. Such a percentage is the best among those Italian cities with more than 500,000 residents, second only to Turin for one percentage point (ISTAT, 2014).[160]Thus, regarding the city size and the demographic weight of Milan, can be concluded that the waste management and the separate collection rates are relatively efficient. Within this frame, the vast majority of refuse is collected at home by citizens and a door-to-door service is provided weekly to take them. A door-to-door service on appointment is also provided for bulky items, even including large electronic equipments. A further collection scheme is then offered for waste less frequently generated: such a secondary system rests for the most part in the service of municipal landfills, which are both fixed and mobile. Finally, for the collection of some refuse categories, like e-waste and batteries, retailers are entitled and specific initiatives taken.

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[158] "*Il CAM è stato pensato anche per agevolare la raccolta dei piccoli RAEE che a causa delle loro dimensioni possono facilmente finire nel cestino dell'indifferenziata o abbandonati vicini ai cassonetti stradali con conseguenti danni per l'ambiente, la salute umana e il decoro urbano*".

[159] Source: http://www.amsa.it/gruppo/cms/amsa/comunicazione/news/articoli/020714_RAEE.html. (Last consulted on September 2014).

[160] Source: http://dati.istat.it/Index.aspx?DataSetCode=DCCV_INDRACDIFF. (Last consulted on September 2014).

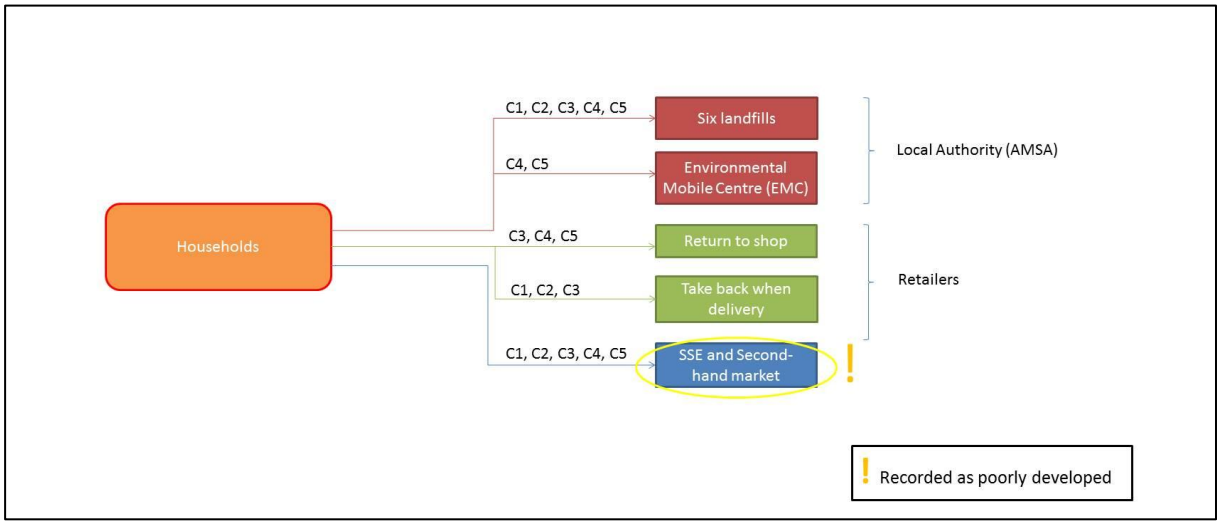
The overall work of the AMSA is financed by a municipal tax called *Tax on Waste and Sanitation Services*, which is referred to by the Italian acronym *TARES*.[161]The e-waste management service provided by AMSA is instead for the most part financed by eco-organisms via the system of financial rewards.[162] Notwithstanding, citizens are asked to contribute to e-waste management via a portion of the TARES, which is dedicated to bulky items withdraw (see section 5.1.2).
The following paagraph focuses on e-waste management and related disposal channels.

5.2.4 E-waste take-back design

As already mentioned in the previous paragraph, in Milan the collection of e-waste started before the implementation of the WEEE Directive, as since 2001 WEEE were already collected via a withdrawal service and also accepted in landfills. However, with the implementation of decree 151 in 2007, the municipality of Milan opted to sign the agreement between NAIM and CDCR, and it started to collect all the five e-waste categories via the system of eco-organisms. Today, the disposal channels provided to citizens to dismantle their e-waste depend on the e-waste category. In general, every category of WEEE can be disposed of into one of the fixed landfills, while, as seen in the previous section, the C1, C2 and C3 categories can also be withdrawn by a door-to-door municipal service on appointment. Again, the third, fourth and fifth e-waste categories can be discarded also into the environmental mobile centre.
Further, retailers of EEEs are in charge of collecting e-waste according to the one-to-one (and in case the one-to-zero) mechanism. Lastly, any WEEE can be theoretically destined to the SSE sector, but this is normally considered a residual sector. These institutional channels of disposal are summarized in Tables 5.16 and 5.17.

[161]*Tassa Rifiuti e Servizi*: it is calculated on the basis of domestic unit surface and number of family components.
[162] It corresponded to 109,104.96 € in 2011 and to 91,980.50 € in 2012, that means between 40 and 65 € per tonne collected per each good load (for any detail see section 5.1.2).

Diagram 5.17 – Institutional collection scheme per e-waste category in Milan



(Authors' own)

Table 5.18 – Institutional channels of disposal of e-waste in Milan

E-waste category	Institutional Actors	
	Local Authority (AMSA)	**Distribution**
C1	Fixed Collection Points (*); Door to door withdrawal on appointment (*)	One-to-one
C2	Fixed Collection Points (*) Door to door withdrawal on appointment (*)	One-to-one
C3	Fixed Collection Points (*) Door to door withdrawal on appointment (*) EMC (**)	One-to-one
C4	Fixed Collection Points (**) EMC (**)	One-to-one or one-to-zero
C5	Fixed Collection Points (**) EMC (**)	One-to-one or one-to-zero

(*) No more than one delivery per month and no more than one piece per each typology of appliance.
(**) No more than 10 pieces and no more than one delivery per month.

Thus, referring to the disposal of small WEEE, the category studied here, the institutional channels provided are:

- Fixed landfills.
- The environmental mobile centre.
- Retailers.
- Charity and second-hand market initiatives when provided.
- Alternative conduct perpetrated by citizens-consumers.[163]

The following section goes to the heart of small WEEE management, by discussing the effectiveness of the e-waste SC in the city of Milan.

5.2.5 Disposing of small WEEE: the effectiveness of e-waste SC in Milan

The present section explores in the detail the e-waste SC in the city of Milan by considering the case of small WEEE disposal, with particular attention paid to the effective role of the institutional stakeholders involved. After presening in the first part of the Chapter the process by which an international regulatory framework is translated on national scale, here its implementation in the city of Milan represents the heart of a further reflection concerning the effectiveness of e-waste policy on an urban scale and its potential weight on citizens-consumers' contributions to goals of sustainability. The paragraph is composed of three parts which analyse:

1. The role of AMSA.
2. The contribution of retailers to e-waste collection in Milan.
3. The marginal contribution of the SSE sector.

The next section starts our reflection by focusin on the role of AMSA.

5.2.5.a The good match between AMSA and the Milanese

From 2001 to 2010 e-waste collection performances in Milan have recorded a positive trend, which is supposedly due to a progressive sophistication of the collection take-back design by AMSA, but also to a more widespread consciousness among the vast public. The last three years have instead registered a decreasing collection capacity by the collection system, which is due to the economic

[163] In particular, section 5.1 showed how this category of device is particularly subject to domestic stock, due to their size. Unfortunately, in Milan an exact figure of such phenomenon is unknown.

crisis that generates on the one hand a contraction of consumption, and on the other a major pressure of alternative channels on the official SC. Within this context, among the five e-waste categories, C4 is the only one for which the collection rate witnessed a slight growth from 2011 to 2012 (see Table 5.13), which is supposedly due to a positive public response to the introduction of the environmental mobile centre at the end of 2011. Notwithstanding, according to D.V., the marketing manager of AMSA (2012):

> "Despite we can consider the sector of large household electronic appliances' collection already mature, there are other e-waste categories which continue to pose some problems in terms of collection rate, in particular the C4, which undoubtedly represents an object of increasingly close attention for policy makers and collection schemes".[164] (AMSA: V. D., 2012)

We thus discuss the efficacy of the municipal collection channels afforded by AMSA to citizens regarding the disposal of small appliances, and what emerged refers to:

1. The relative ineffectiveness of landfills.
2. The limits of the environmental mobile centre.
3. Citizens' behaviour: the introduction of the transparent bag and the stock.
4. The hypothetical introduction of a domestic bin dedicated to small WEEE.

1. As already mentioned in paragraph 2.3 of the present chapter, municipal landfills are normally peripherally situated due to normative and political constraints linked to pollution containment and risk assessment. Such location inevitably impacts their accessibility on the one hand because it implies a specific displacement by citizens for the disposal of their refuse, and on the other because it discriminates a portion of urban residents which does not have a car. This implies in turn a much greater investment of time and energy to reach the landfill by public transport, where available. Moreover, even when citizens own a car, we should ask about the sense, from an environmental point of view, of moving by car to dispose of a small electronic device.

Thus, the channel of landfills cannot be realistically considered a privileged means of disposal of small WEEE, that's why AMSA elaborated an additional channel of disposal aimed to exploit a major proximity to users, namely the environmental mobile centre.

2. The environmental mobile centre has been introduced by AMSA with the specific goal of intercepting that amount of refuses which often end up within the unsorted waste bin, or which are

[164] "*Nonostante ci siano dei settori che possiamo già definire 'maturi' nel campo della raccola dei RAEE, ve ne sono altri che danno ancora dei problemi, come ad esempio la raccolta degli R4, che infatti rappresentano e rappresenteranno sempre di più nel futuro un oggetto di crescente attenzione dal punto di vista delle politiche di gestione e dell'elaborazione degli schemi di raccolta*".

stocked at home. AMSA could not provide data regarding its collection rate, notwithstanding both institutional stakeholders and the slight growth in the collection of C4, give the impression of a relative success of it. Making the act of disposal more comfortable for users means having a positive impact on their habits, even if such a system presents some limitations in the way it has been designed. The first is that with the environmental mobile centre we are very close to the proximity waste collection scheme, but still not within a system of domestic bins. What does it mean? According to L.A., AMSA's head of waste management, "It means that users have to bear in mind in advance the question of waste disposal and to specifically dedicate a moment to it". (2012) So that, on the one hand it rests true that a more comfortable collection scheme would, in general, facilitate users' contribution to collection, on the other it probably affects but a few residents, who are already sensitive to the question. Besides, and this is the second consideration, the localisation of the environmental mobile centre, next to street markets in the morning, implies a subsequent selection of residents made up, for the most part, by pensioners and housewives, which further restricts its scope.

3. In order to limit citizens' misconduct and mistakes in the separate collection, AMSA has replaced in 2012 the black bag of unsorted waste with a transparent bag, which interestingly is aimed to exploit the social norms among users to impede inaccurate disposal. The experiment has had a discreet success and brought about "A sort of migration of recyclable refuse from the unsorted waste bin to the correct dedicated bins: such transit has been evident and it involved for the most part paper, plastic and biowaste, but no e-waste, which we very rarely found in the domestic bins".[165] (*Ibid.*) Two further considerations thus emerged: the first is that apparently AMSA does not reveal a widespread improper disposal conduct concerning small WEEE handling; the second is that "Given the level of consumption of such appliances it is evident that a great amount of such devices is already missing, and we do not know its destinies exactly".[166] (*Ibid.*) Of course we do not know for sure, but we can equally try to guess, starting from previous studies concerning informal and illegal e-waste disposal channels (see chapter 3 and section 5.1). Thus, we can quite safely suppose that, given the subscription of AMSA to the system of eco-organisms for all the e-waste categories –which allows the exclusion from the system *all actors* out of the CDCR-, the most likely *escape paths* from the SC created *ex lege* 151 can be: 1) Retailers. 2) Informal disposal among citizens-consumers which implies resale, gift and stock. 3) SSE sector.

In the words of D.V.:

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[165] "*Abbiamo potuto prendere atto di una migrazione di rifiuti soprattutto di riciclabili che sono passati dal sacchetto dell'indifferenziata a quello dedicato. In particolare la cosa è stata vistosa sulla plastica, la carta e l'organico, ma non abbiamo visto invece migrazione sui RAEE, che comunque troviamo abbastanza poco nel generico*".

[166] "*Dati i livelli di consumo di apparecchi elettronici è evidente che molti non vengono raccolti e che semplicemente restano stoccati in casa della gente*".

> "We believe that nowadays the Milanese have a certain consciousness about recycling and waste and we find them quite educated and receptive concerning this subject. Notwithstanding, we think that a large unquantifiable amount of e-waste is simply stored at home, and for these reasons we are going to elaborate initiatives which move right into their home".[167]

So far there has not been any evidence of such commitment by AMSA, which reminds us about the feasibility of a sixth bin for the collection of small WEEE at home.

4. When the reasons for which a dedicated bin for e-waste had never been provided to citizens were discussed with AMSA, it seemed that a proximity waste collection bin would greatly help the act of disposal and the consequent collection performances, also intercepting the supposed vast amount of appliances which are stocked at home. What emerged refers to 3 main factors. 1) It would be a very costly system. 2) It would pose further problems in terms of logistics and employers' organisation during the phase of collection. 3) It would be preferable to facilitate the contribution of retailers rather than impose a substantial change to municipal companies.

The first factor recalls the excessive economic effort which would be up to AMSA if a sixth bin is introduced. This is linked to a further element, which is that "The economic feasibility has to be calculated according to the daily generation of such refuse: small WEEE are rarely generated and our investment wouldn't be sufficiently supported by the related return". (*Ibid.*) The second factor is instead related to the specific features of the collection system in Milan, which is a mono-material scheme, that implies that any matter is considered and treated separately. This means that, if a further bin is added to households for separate collection, its management would in turn bring about a major effort in terms of operators employed, organisation of space within the garbage trucks and general logistics. Finally, and this is a rather more political consideration made by AMSA, they consider that e-waste collection would be more greatly joint by retailers due to their role in increasingly introducing EEEs on the market. According to L.A.: "We mainly count on the work of retailers and the one-to-one mechanism for the improvement of e-waste collection rate, as a legislative binding is held by them".[168] The following section notably regards the role of retailers within the e-waste MSC implementation in Milan.

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[167]"*Noi riteniamo che ad oggi i Milanesi abbiano sviluppato una buona coscienza ambientale e troviamo che siano ricettivi sul tema della raccolta differenziata. Ciononostante vi è ancora una grande quantità di apparecchi elettronici che restano stoccati in casa, e per questo motivo ci stiamo impegnando per andare direttamente nelle case della gente per prenderli*".

[168] "*Noi contiamo soprattutto sul fatto che sia la distribuzione a farsi carico della questione, tramite l'uno contro uno, dal momento che in capo a loro vi è un obbligo di legge*".

5.2.5.b The poor contribution of retailers: legislative constraints and parallel MSC

Consistent with the national situation regarding the contribution of retailers to the e-waste SC, their active role in the primary collection phase results quite poor also on urban scale. In fact, throughout the whole Milanese territory, just two regrouping points are active and just two agreements have been stipulated between AMSA and retail stores since the issue of the decree 65/2010 (see section 5.1.1.c). Moreover, the general contribution derived by such involvement have generated a residual collection rate. To cite some figures: within the first quarter of 2012, the only municipal collection point open to retailers' e-waste (see section 5.1.4.b) intercepted only 4 tonnes of WEEE, which means an inconsistent figure. Equally, the two regrouping points present in Milan have registered a very small contribution: in that case exact data was not available, although it could be extracted by considering that, across the entire Lombardy region, the 21 regrouping points collected a total of 5.4 tonnes of e-waste in 2012, not even twice the amount collected by AMSA in the same year. In this, one of the two regrouping points signed an agreement with the CDCR but just for the C3, C4 and C5 e-waste categories, while large electronic appliances are not included in the contract, so we can't know how they are managed.

This overall picture gives an image which is perfectly consistent with the structural problems of retailers' involvement within the Italian e-waste SC, and which have been already presented (see section 5.1.4.b). Strong bureaucratic and logistical constraints, economic disadvantages, unfair competition and the availability of a parallel supply chain which is financially more convenient and that has generated among retailers widespread strong impediment or abstention from taking part in the clearing house system. In addition to these structural issues, a further impediment in the city of Milan has slowed the engagement of retailers, and this is again of regulatory nature. In fact, in order to encourage the involvement of retailers, decree 65/2010 has provided a series of simplifications for them, mainly concerning the matter of e-waste stock and the possibility of exploiting a collection point made available by municipalities. In the case of Milan, authorisation to effectively open a municipal collection point for e-waste collected by retailers was up to the Province of Milan, which took 16 months to provide a positive response to such a request. The landfill of Muggiano was then allowed to accept retailers' WEEE just from September 2012 onwards, 2 years after Decree 65 had been enacted. However, as mentioned earlier, opening to distribution actors did not imply a consistent increase of e-waste collected in the city.

A further detail has to be added: if on the one hand it is undoubtedly true that retailers are poorly engaged in the official e-waste SC, it is also true that e-waste eventually collected in Milan by the major EEE stores does not forcibly transit via a regrouping or collection point which is situated within the city. In other words, even recognising the overall small contribution made by retailers, we can consider that it is superior in volume to what has so far been calculated, because WEEE collected in

Milan can be stored within collection points outside of city borders and then separately accounted for by aggregate figures on the inter-municipal or provincial scale. This consideration relates to the limits of the research (see Chapter 3), notwithstaning we provided documentation to assert that also on an urban scale the Italian implementation of the clearing house model suffers from the absence of retailers. The general consequence is that the 3 kg/year per capita intercepted in Milan refers uniquely to the work done by AMSA and to the relatively good match between this municipality and the Milanese. The following section concerns the role of another *great absentee* of the e-waste SC, which is the SSE sector.

5.2.5.c The residual role of the SSE sector

Again, and consistent with the limits of the national e-waste SC, the role of the social and solidarity economy sector can be considered to be marginal, and in any case it is not taken into account by statistics of e-waste collection. Thus, in the case of Milan, none of the key-informants involved in the SC could note institutional initiatives concerning EEE second life which result in significant contributions to e-waste prevention or collection. Some exceptions still exist, as particular events with the schools,[169]with associations for the re-employment of vulnerable workers or prisoners,[170]simple emptying of cellar initiatives,[171]and other special events but which all represent sporadic opportunities. For the rest, everything can either be included in the umbrella of second-hand resale, gift and refurbishment, or is beyond the reach of eco-organisms (and there is no data available on that), with the exception of the proxy figures calculated by Remedia in their study, quoted previously (see section 5.1.4.a).

We discuss the issue with AMSA, and what emerged again relates to the strong constraint represented by the Italian legislation which administrates the matter of waste and refurbished good management (see section 5.1.4.d), that does not facilitate reuse practices. Following D.V.:

> "In some European countries there are initiatives which facilitate e-waste prevention and refurbishment, as [their law] recognises a normative status which we can say *intermediate* between *waste* and *good*… We saw for example in Germany and in Belgium that they created -next to landfills- a sort of free space where people can exchange used goods, or even they have installed next to landfills some ateliers where citizens can test their old appliances in order to verify their functionality and eventually repair them. I find it a very interesting initiative, because it allows us to give an object a last chance for a second-life, and also in Italy we are making some efforts to work in that direction… But for the moment we still have a lot of problems, because -for normative reasons- once an object is

[169]See http://www.amsa.it/gruppo/cms/amsa/comunicazione/.
[170]*Idem.*
[171]*Idem.*

> collected by AMSA, it has to be treated as *waste*, as the owner has expressed the will to get rid of it… So, probably, as time passes and by working with norms, we will recognise an intermediate status between *good* and *waste* too, and this will help us prevent e-waste and foster EEEs reuse".[172]

Thus, the role of the SSE sector in Milan does not represent an exception compared to the national situation, where its contribution is not only not taken into account by the system of eco-organisms, but also in general considered relatively residual by institutional stakeholders and previous studies (see section 5.1.4.d).

Another recurring factor also emerged as unanimously agreed by our key informants: the idea that "In general, Italians do not appreciate the second-hand market" (CDCR: F.L., 2012) and that "in Italy a *second-hand culture* is not rooted" (Semantic: A.M., 2012). There is no room here to delve into such a topic, even if an overview of the literature on the development of the second-hand market and culture confirms, at least in comparison to other European countries as France, that this is not a mature sector in Italy (Marzella, 2013). However, such a finding can be a path toward further deepening and hypothesis building, consistent with our explorative approach.

5.2.6 Conclusive considerations on e-waste collection performances in Milan

With 3.1 kg/year per capita the municipality of Milan has not yet reached the international target imposed by the first WEEE Directive of 4 kg/year per capita. Consequently, the even more stringent goals in terms of e-waste collection imposed by the new Directive are difficult to reach (see Chapter 3). Notwithstanding, the previous paragraphs have already emphasized how such a collection rate has to be read in comparison to the national average of e-waste collected (4 kg/year per capita), bearing in mind the size and demographic weight of the city. Moreover, previous sections have shed light on the fact that e-waste collection performances in Milan should be uniquely attributed to the contribution of AMSA, as retailers and SSE sectors are revealed as having a very marginal role in the local

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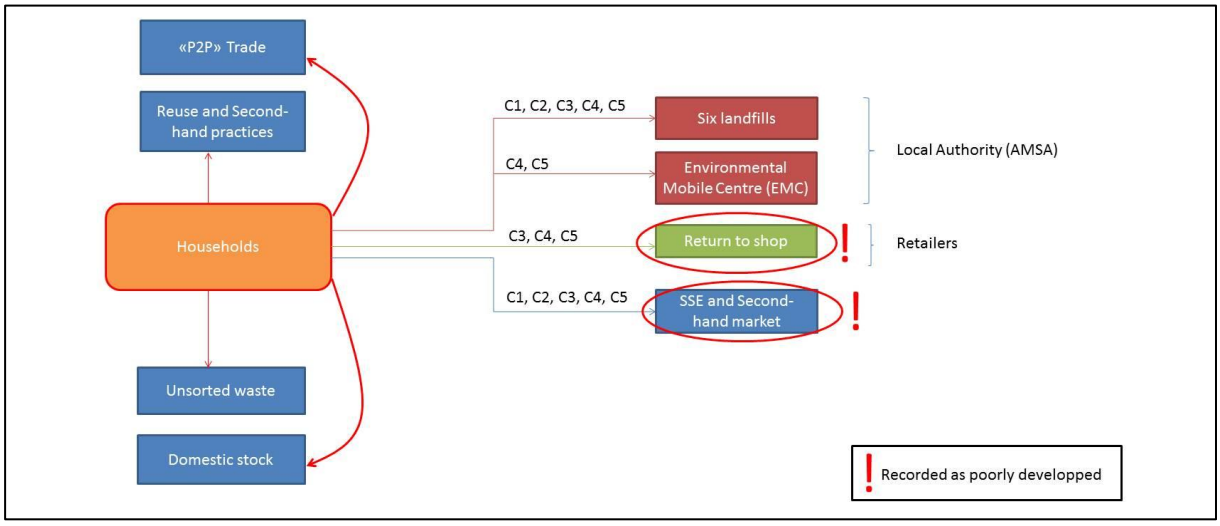
[172]"*Ci sono della realtà che hanno sviluppato – soprattutto nel Nord Europa- per quanto riguarda il trattamento di questi rifiuti, qualcosa che sta a metà nella scala gerarchica tra ancora prima della produzione del rifiuto, ma non è prevenzione bensì l'idea del riutilizzo. Abbiamo visto ad esempio in Belgio o in Germania che in certe realtà a fianco delle piattaforme ecologiche hanno realizzato delle aree dove o si realizza una libero scambio tra cittadini di questo che è rimasto un bene. Oppure di fianco esistono dei laboratori che testano queste apparecchiature che magari potrebbero essere destinate a diventare rifiuti oppure nel caso di un intervento di manutenzione possono essere restituite al proprietario. Trovo che la cosa interessante sia la localizzazione in un solo luogo di una biforcazione di possibilità che consente la medesimo oggetto di diventare rifiuto oppure di prendere una seconda strada. È un'esperienza abbastanza interessante che in Italia stiamo cercando di valutare. Il problema è anche normativo perché oggi tutto quello che arriva sotto forma di raccolta di AMSA di fatto si trasforma in un rifiuto perché 'il possessore se ne libera'. Quindi magari un intervento sulla normativa per creare questa zona intermedia per una 'preparazione del rifiuto' al riutiilizzo oppure delle forme per cui nemmeno arriviamo alla produzione del rifiuto come in Belgio o in Germania. (...) Noi in Italia abbiamo ad ogni modo la possibilità di fare il rigenerato però normalmente questo avviene attraverso delle associazioni onlus, caritatevoli, servizio sociali pubblici (es riutilizzo per le scuole, anziani, ecc)*".

implementation of the e-waste SC. What does this mean? It appears that 3 kg/year per capita are collected in Milan solely via the system of landfills, the environmental mobile centre and the door-to-door withdrawal service which is only provided for bulky items. Thus small WEEE –which represents 0.9 kg/year per capita upon the total rate of e-waste intercepted in Milan- have been collected via the system of landfills and the environmental mobile centre, plus the small contribution of retailers enrolled in the CDCR system. Therefore, it can be provisionally concluded that the e-waste collection rate of Milan is the direct result of a good match between citizens and AMSA, and that such a performance is still a failure compared to the WEEE Directive targets, but a relative success compared to the overall Italian collection rate, the size and demographic weight of the city, the limits of the collection schemes made available by AMSA (see section 5.2.5.a), and the only partial contribution given to e-waste management by those statutorily bound to take part of it.

Thus, 0.9 kg/year per capita of C4 are collected in Milan, compared to a national average of 0.67 kg/year per capita, and this is compared to the amount of C4 generated being about 5 kg/year per capita on national scale (Remedia, 2013). The previous sections have shown how such a collection rate in Milan can be regarded as a relative success when considering that this is the result of the sole work of AMSA using a take-back system which is not of proximity and door-to-door. Notwithstanding, if the national average of C4 generated is taken for granted, it appears that more than 4 kg/year per capita are still missing. Consistent with the structural problems of the Italian e-waste MSC, and after having presented its local implementation on an urban scale, it can be concluded that, as illustrated in Graph 5.18, such a missing amount refers to:

1. Citizens' stock.
2. Citizens' misbehaviour.
3. Informal (W)EEE handling (gift and resale).
4. The drain of E-waste flows by retailers and SSE operators.

Diagram 5.19- Main channels of small WEEE disposal in Milan



(Authors' own)

This last point can't be further investigated on a local scale, and to account for it we do settle for national reports and previous studies to which we make reference (see section 5.1). Conversely, the e-waste disposal behaviour of users is the subject of the following part of this chapter.

Part III

5.3 E-waste collection behaviour in Milan: the case of students

This section offers a deep view on what emerged from the analysis of the interviews conducted on our sample students. According to the literature review and to the specific object of our research, which is seldom investigated in social sciences, the dimensions questioned are briefly reprehended as the following (see chapter 4):

1. Personal attitudes towards environmental, waste and e-waste issues;
2. Environmentally significant behaviour;
3. Awareness concerning waste and e-waste issues;
4. Behaviour-specific knowledge and skills compared to waste and e-waste handling;
5. Relation with institutional stakeholders involved in e-waste management: municipality, retailers and Social and Solidarity Economy (SSE);
6. Social norms and interpersonal influences;
7. Relation with EEE product (and WEEE object);
8. Past behaviour and habits in the forms of e-waste disposal practices and related arguing capabilities.

Moreover, a further section shows the main results descending from the analysis of e-waste recycler profiles, according to the categories *proper*, *improper*, *transient* and *mixed* e-waste collection behaviour, which are defined in detail in section 4.3.a. A final paragraph is dedicated to conclusive considerations to link the research question to our first results, and to offer first provisional findings with regard to our hypothesis and explorative proposals.

5.3.1 The matter of attitudes

Consistent with the literature on recycling behaviour and with the specific features of e-waste disposal, the matter of attitudes are here discussed. In particular, the environmental concern of respondents is investigated together with attitudes towards waste and e-waste disposal. Previous studies have already highlighted that normally a gap appears between environmental concern and related behaviour, however this matter is here considered worthy of further exploration given that it has been seldom deepened with regard to e-waste. Attitudes are then investigated with regard to:

1. Environment.

2. Separate collection.
3. E-waste disposal.

These three dimensions are here treated one by one.

1. Starting from the general attitude towards environmental issues, the first evidence is that respondents' opinions are quite inhomogeneous. However, some common elements arise, and they can be summarized as follows. First, the respect for the environment is ubiquitously considered as an acquired value: this matter is referred to as something "obviously very important"[173] and as "an ordinary value"[174], and its importance is mainly related to factors as quality of life, respect for others, and politeness. The second recurrent item is the problematisation of such statements by respondents: the importance of respecting the environment is indeed revised in the light of the fact that the adoption of a sustainable conduct is often challenged by a series of competing demands. Among these, the most commonly recorded are: the economic factor, the feeling of time squeezing, comfort, and the lack of affordable *green* alternatives to the vast majority of daily acts. According to I.:

> "I think that the respect for the environment is a fundamental issue to guarantee the life of every creature on earth. Notwithstanding I realize that, in the absence of wellbeing and comfort, we cannot expect that people are equally environmentally committed, as often green activism implies also a major economic effort [for example for the purchase of bio products]. I don't blame who refuses to spend one euro more for the environment if he is not in appropriate conditions".[175]

And again:

> "In my opinion environmental issues should be an ordinary value, they should be a habit: everyone should be attentive… But in reality and too often we do not care about it and we make mistakes. Me for example: I use the car in place of public transport… But that's why usually we decide according to variables of comfort".[176]

Another example is offered by the statements of A.:

> "I'm interested in environmental issues and I've read a lot about that, notwithstanding I struggle to find a compromise… The only thing I can do is try to mediate between environmental needs and consumption needs: I reduce my consumption and I use old stuff as long as they work. That's what I do for instance with my clothes. […] Also regarding the matter of travelling I'm trying to make

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[173] "*È certamente molto importante*". Interview to E.
[174] "*È un valore ordinario*". Interview to N.
[175] "*Penso che sia un tema fondamentale per la qualità della vita di tutte le creature. D'altra parte mi rendo conto che se non c'è benessere e serenità non si può pretendere dalle persone una grande attenzione che spesso si lega anche a una spesa economica maggiore per questioni ambientali. Se uno non ha gli strumenti per vivere decentemente non lo biasimo se non spende un euro in più per acquistare prodotti sostenibili*". Interview to S.
[176] "*Secondo me dovrebbe essere per tutti un valore ordinario: dovrebbe essere una cosa automatica, dovrebbe venire a tutti di stare attenti, però spesso e volentieri non ci fai caso e fai qualcosa di sbagliato. Per quanto mi riguarda, è vero, io uso la macchina al posto di usare i mezzi,…però spesso e volentieri si ragiona in termini di comodità*". Interview to B.

> some efforts… But even in this case, things are not easy, as if I want to reach a faraway country I have forcedly to travel by airplane, even if I know that's very polluting".[177]

Thus, despite a common attitude which is declared as concerned, respondents claim that the real opportunities to act consistently with an environmental interest are actually rare, as the compromise between saving money, efficiency, comfort and sustainability, results difficult –or impossible- to achieve.

The third common factor recorded regards the way environmental issues and related questions are discussed by respondents. These are recalled as something far from everyday life, confined to a spatial-temporal *elsewhere*, whose responsibility is limited to a matter of politeness. Such perception is referred to the fact that an environmentally disrespectful conduct does not imply immediate and visible consequences at individual and local scales. In the words of N.:

> "The environmental question today is surely one of the most important topics deserving an immediate consideration… But it is however a problem on global scale, and people, even when interested, have the natural tendency to act according to their local and short-term life dimensions: crisis, income, … The latter are necessarily the most impacting issues for them".[178]

And again:

> "Today we should pay a major attention to environmental issues compared to the past. Notwithstanding these are not considered the first factors to be taken into account… There are other topics which are regarded as deserving a major attention, as the economic crisis… Even if the environment is important it does not have an immediate impact on everyday life: people do not make up their mind, only if they can directly see what is going to happen in few years… The economic dimension has a more direct impact".[179]

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[177] "*Questi sono tutti temi che mi interessano e su cui ho letto parecchio ma fatico poi a trovare quel compromesso. L'unica cosa che osso fare per mediare questa esigenza è ridurre il consumo ossia usare le cose proprio finché non si rompono come faccio per es. con i vestiti. Cerco di avere uno stile di vita sicuramente poco consumistico". Per quanto riguarda i viaggi sto cercando di migliorare però anche lì certe cose sono difficili: io lo so che l'aereo inquina da morire ma io non posso andare in un posto lontano senza l'aereo…*". Interview to Ni.

[178] "*E' sicuramente uno dei primi problemi che andrebbe sicuramente affrontato e considerato… Solo che è un problema su scala talmente grande –planetaria- che poi le persone anche se interessate poi tendono ad andare sulla scala più a breve termine oppure locale, quindi crisi, stipendi,… Sono tutte cose di maggiore impatto*".

[179] "*Oggi sicuramente bisognerebbe fare molta più attenzione che in passato, però non è messo al primo posto. Ci sono comunque altri temi che sono ritenuti più rilevanti tipo la crisi economica… Anche se l'ambiente è comunque importante… però è vero che l'ambiente spesso e volentieri ha un impatto meno immediato, non arriva subito, uno non ci fa neanche caso se non quando ti fanno vedere cosa succede e cosa succederà nei prossimi anni… la sfera economica impatta invece più direttamente*". Interview to I.

2. For what concerns attitudes referred to waste and separate collection issues, answers were more homogeneous. First, the waste question is something which is represented as "of primary importance",[180]"very serious",[181]"worthy of great attention",[182]and "not sufficiently taken into account at media and public levels, compared to its actual importance".[183]In this, also the matter of separate collection is equally regarded as of primary importance, as well as the contribution that all individuals can make to this field in their own small ways. Thus, similarly to the case of environmental issues, respondents tend to represent themselves as concerned and sensitive to the topic.

Also often arises the argument that the inhomogeneity of waste collection systems in different geographical contexts –national, regional, provincial- might be confusing for users and also result in a lack of trust in institutions. Besides, these differences in waste management systems within the same national and regional context are represented as a form of iniquity, since it appears that in some areas citizens are requested to separately collect certain matters, while in others it is not the case. In many passages this fact is referred to as a form of disincentive in making efforts. Just to cite an example:

> "I think that separate collection should be the same in all the country… But I see that many differences already occur between the city of Milan and the neighbouring municipalities, which collect biowaste in a different way. And in general, somewhere you are requested to do that, and somewhere else you are requested to collect waste in a different way… I think that separate collection should be conducted in the same way for everybody, otherwise it makes no sense to me".[184]

Related to this, an interesting scenario emerged and it refers to the experience of secondary residences. In fact, often respondents compare their attitude regarding separate collection in Milan to that in other geographical contexts that they usually experience. Here, it appears that their concern varies depending on the perception of the state of the local environment and of the type of local separate collection. In particular, respondents declare that when they perceive that local waste management is particularly effective, even if the take-back system implies a major effort compared to that in Milan, they are more attentive to waste issues, as "everyone is very careful".[185] Apparently, attitudes vary according to a sort of adaptive will, which depends on the perceived behaviour of others and on the way local waste is managed. Interestingly, several respondents declare to better separate domestic refuses in a second-home, than in their own home in Milan. Conversely, respondents declare that

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[180] "*Di primaria importanza*". Interview to N
[181] "*Molto seria*". Interview to V.
[182] "*Meritevole di grande attenzione*". Interview to I.,
[183] "*Ancora sottovalutata dai media e dalle persone*". Interview to E.
[184] "*Anche perché io penso che la rd per essere fatta bene dovrebbe essere uguale per tutto il paese… invece già vedo che tra l'hinterland di Milano e Milano non fanno l'umido, oppure una cosa qua la fai e là no…. Io penso che la rd per essere fatta bene dovrebbe essere fatta in un certo modo e uguali per tutti, altrimenti non ha senso*". Interview to B.

when they perceive that separate collection is inefficient due to local communities or institutional negligence, this has a negative influence on their own conduct, as the impression of a general waste mismanagement is represented as a form of disincentive to acting properly.

3. Regarding attitudes towards e-waste disposal, the first evidence is that the e-waste category is not immediately identified, despite some examples provided by the researcher. It means that usually students, when questioned on small e-waste disposal, do not always have a clear idea about what the items at stake are, and tend to ask further explanations or talk about refuses that are not e-waste (e.g. batteries). Thus, firstly a sort of uncertainty concerning the identification of the objet *e-waste* itself commonly recurs, and it is quite evident that for many respondents the question of e-waste disposal is for the first time presented to their attention during the interview. This represents a great difference compared to the questions referring to environmental concern and separate collection in general, where a certain arguing capability was ubiquitous. Secondly, even when e-waste is identified, the vast majority of respondents could not remember how they handled their appliances, and had not particular opinion to express on the topic. This suggests that it is a rather unknown question to them for several reasons: 1) The disposal of these objects is quite rare. 2) These can be easily left apart because of their size. 3) Often they are not recognized as refuse as they still work even if they are not in use anymore. 4) Their management is often delegated to parents.

Finally, a common opinion is that the overall impact of small e-waste mismanagement is not serious. Following S.:

> "Maybe [you don't care about it] because small devices are not expensive, and you consider that this is just one consumable good among the others and you don't ask yourself the question of the environmental impacts… That's something which I do not use anymore, that's not plastic, that's not paper: I throw it away together with unsorted waste. Mainly because they are not bulky items… For example a small beater: it doesn't work anymore? I throw it within the bin of unsorted waste… Maybe if devices were more sophisticated or expensive you'd have some more doubts regarding how to dispose of them".[186]

So, concluding, e-waste is in general hardly identified by respondents and commonly they do not have a clear opinion about its disposal and related questions. Added to this, many old EEEs are not considered as WEEE because they still work, and for this reason they are stored although no more

[186] "*Forse in parte è anche perché alcune cose non costano tanto e uno la accosta a una cosa qualunque che ha comprato senza porsi il problema ambientale. Cioè è una cosa che non uso, non è plastica, non è carta: la butto nel cestino. Soprattutto se non sono ingombranti, tipo per esempio un frullino a immersione, non funziona più allora lo butto nella spazzatura… Se invece una cosa magari è più sofisticata, o hai speso di più, magari ti fa più impressione buttarlo nella spazzatura*".

used. Further, small WEEE mismanagement is perceived as having a small impact and that is why it is recurrent. The following section offers additional insights on e-waste recycling behaviour.

5.3.2 Environmentally significant behaviour and waste collection conduct

This section describes what emerged when respondents were questioned regarding their ordinary conduct beyond declared attitudes. Again, the paragraph is divided into three subsections:

1. Environmentally significant behaviour.
2. Waste collection conduct.
3. E-waste collection conduct.

1. To obtain a picture concerning the matter of environmentally significant behaviour, questions referred to mobility choice, food consumption, general consumption and energy consumption.

What emerged is quite recurrent and confirms what has already been seen with regard to attitudes, namely that ordinary behaviour is not consistent with declared environmental concern. This is because it has to fit within a series of external constraints and competing demands –e.g. financial availability, time, accessible alternatives, …- that actually make green engagement something in general not convenient, not easy to access, (perceived as) too time and energy spending. Thus, it appears that behavioural choices, despite a declared environment-friendly attitude, are always the outcome of a series of contributory causes, among which the sustainability goal is in general the less considered, after economic convenience and other various forms of comfort. Besides, the recognition of a lack of green alternatives with respect to the vast majority of daily habits is also very often claimed as at the origin of a forced choice, beyond any personal willingness. To take some examples, in the case of mobility individuals tend to opt for criteria of time optimisation. In the case of consumption, the attention is mostly put on economic expenditure. For what concerns the matter of energy-consumption there are two prevailing scenarios. Students who pay attention to this theme because they care on limiting "useless wastage"[187] as they are in charge of paying energy bills; and students that do not care about their energy consumption, because their financial situation does not lead them to have a direct perception of the associated costs, given that these are dealt with by their parents.[188]

Thus, to conclude, despite that respondents unanimously considered environmental issues as strongly important as an ethic value, they did not behave consistently because they claimed to be exposed to a

[187] "*Uno spreco inutile*". Interview to F.

[188] This last topic is an important variable that has to be taken into consideration in assessing the environmental behaviour of respondents. In fact, the most of students interviewed still live at home with parents and this probably affects their conduct, not only because they very rarely address issues related to domestic management (e.g. alimentary purchase) but also because they do have an indirect or poor perception of the actual (monetary) value of their conduct, as many of them admitted.

series of impeding conditions so that finally this value does not seem to strongly impact their daily life.

2. For what concerns waste collection behaviour at home, the same gap between declared attitudes and actual conduct appears. In fact, the vast majority of respondents stated being attentive to the way they collect refuses, although they often add that "there are always some minimal things that can leak out"[189] or "those things that no one knows how to manage".[190] In the words of N.:

> "As far as I know the way I collect my domestic refuses is… I don't want to say perfect, but that's surely very good. […] Nevertheless, also in my case, sometimes I find some matters that I do not know how to manage… Some details which are not clear – For instance: what about cans? And straws?- And I've never sought for any information, also out of laziness… So sometimes I have some doubts…".[191]

When respondents are further asked to provide some examples of cases when they were not sure about how to dispose of a given refuse, the most often mentioned are cans, milk containers, and dirty plastics and papers. Interestingly, these refuses which are described as "strange", "a detail", "uncommon" or "rare", are actually quite common ones. The vast majority of respondents also declare not to inquire about the way to properly dispose of these types of waste. They prefer acting intuitively, by disposing of them together with unsorted waste or with recyclable refuses perceived as compatible. Thus, despite a strong declared concern about the matter of separate collection, when respondents struggle to identify a refuse they normally avoid to seek information, since they opt for intuitive solutions, which in turn brings about an approximate or improper disposal.

Furthermore, and consistent with what already emerged when the matter of attitudes was questioned, most informants declare to adapt their collection behaviour in accordance with the context. In particular, if a social context is perceived as very attentive to waste management, they are also more available to act properly. On the contrary, when an environment is perceived as poorly respected (as in the case of littering), respondents admit having a less respectful behaviour too.

3. The first evidence regarding e-waste collection behaviour is that very rarely respondents could be uniquely classified as proper or improper recyclers, as disposal choices strongly depend on appliances and related features, so that the most recorded conduct is the mixed one. In particular, a fundamental variability in e-waste disposal depends on the size of appliances: large household appliances are normally disposed of according to the one-to-one and/or via the service proposed by the municipality.

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[189] "*Quelle piccole cose che possono sempre scappare*". Interview N.

[190] "*Quelle piccole cose che chissà dove vanno*". Interview V.

[191] "*Per quello che so la effettuo in maniera assolutamente ... Non dico ottimale ma quantomeno buona, […] Io stesso, a volte ci sono delle cose, alcuni dettagli, che non mi sono chiare –es. dove vanno le lattine o altri materiali- che io non mi sono premurato anche per pigrizia di chiarire o le informazioni non mi sono state rese chiare dalle autorità e dunque ogni tanto ho dei dubbi*". *Ibid*.

However, the act of disposal is not directly perpetrated by respondents, but it is transferred to their parents. Conversely, for what concerns small devices, and according to what emerged when attitudes were questioned, initially respondents struggled to provide information on the way they dispose of such appliances. For instance:

> "You have just asked an excellent question! Actually I have no idea about my small devices… I have so many things that I simply store them… I did not throw them away. My mobile phone… No idea… […] I did not dispose of it… Maybe I gave it back to the store… I have no memories about that, I have no idea about what happened to my old electronic stuff".[192]

When finally responents' memories arise, storing is recalled as the prevailing disposal choice, which is ubiquitous regardless any further improper or proper disposal. In particular, e-waste storage concerns both the appliances still working and those no functional anymore: functional devices are normally stored to be used "just in case", while broken items are stored mainly for two reasons. The first is a widespread lack of knowledge regarding e-waste collection channels together with a low propensity to information retrieval. The second is the will to accumulate a certain amount of small WEEE before their dismantling, in order to optimise the effort of disposal. According to C.: "I don't know how to dispose of small WEEE, while at the same time it is easily understandable that I cannot throw them together with unsorted waste, so I stored them waiting for having information".[193]And following N.: "Because of their size I prefer to accumulate a certain amount of refuses before their disposal".[194] In the first case the behaviour lies in the matter of competences: users do not know how to handle this component of waste and so they postpone the question in time (in the future), in space (by storage), or to other people (parents). In this they are not interested in retrieving information, as the problem can easily be put to one side. For example:

> "That's my mom who manages all this stuff… As I am concerned I store old mobile phones… If I want to get rid of it I'd ask my mom […], I don't know why I store them… Maybe you think that you might use it again".[195]

Secondly, WEEE is stored in order to optimise the effort of its disposal:

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[192] "*Bella domanda! La verità è che non lo so. Tipo cd sono tutti qua: non ho mai buttato via cd. Ho un sacco di roba che non butto perché rimane lì. Il cellulare… Non lo so! […] Sicuramente non l'ho buttato via io… E' possibile che io lo abbia lasciato al negozio… Non so ricordo un solo cellulare mio che poi si è rotto e non so che fine abbia fatto*". Interview to Ni.

[193] "*Non so come si smaltiscono i piccoli RAEE ma è evidente che devono essere gettati a parte. Dunque aspetto di averne raccolti un certo numero prima di prendere informazioni*". Intervista L.

[194] "*Aspetto di accumularne un po' prima di andare a buttarli*". Intervista Cl.

[195] "*Non me ne occupo io ma mia mamma… Io personalmente i cellulare vecchi li tengo in casa… Se volessi buttarli chiederei a mia mamma che mi direbbe di buttarlo via… Non so perché li tengo… Boh… Pensi che magari nel caso potresti usarlo…*" Interview to V.

> "In my house before disposing of something it first accumulates! For instance I found a place where they collect cork stopper: before I will give them my cork stoppers these will have become billions in my home".[196]

Other reasons of WEEE storage emerged: small appliances are stored if they contain private data, or because they have a symbolic value: I. stated "I storage my old mobiles even if they are broken because they have a sentimental meaning: they contain my first messages and pictures that I'd like to store".

Very often, paralleled to stock, small WEEE are also discarded together with unsorted waste and/or donated to family members:

> "I store all my old mobiles… My father donated old computers […] They have actually never been disposed of but they are still somewhere... Maybe my father knows how to manage them… Maybe I also get rid of small devices together with unsorted waste… But just very small things…".[197]

Furthermore, as opposed to large equipment disposal, in the case of small WEEE the one-to-one mechanism is very rarely recalled and normally unknown, as well as the alternative channels of the SSE sector. Finally, none of respondents have ever resold used appliances.

Thus, to conclude, the act of small WEEE dismantling strongly depends on its features: functionality, size, cost, reparability, emotional and symbolic values, and private data contained. All of them affect the collection behaviour of respondents, so that profiling them was quite a hard task, and the most recurrent profile was the mixed conduct. The following section explores respondents' awareness with respect to the waste and e-waste topics.

5.3.3 Awareness concerning waste and e-waste topics

Respondents are then questioned regarding their awareness about waste and e-waste topics. What do they know about these questions? Are they aware of the most common environmental issues related? Referring to this matter, a strong variability arises between waste and e-waste questions. In fact, students are normally as aware regarding the *waste question* as about political and environmental issues, regardless their actual collection behaviour. Conversely, the e-waste question is commonly unknown in its political, economic and societal implications, while there is a common intuition that,

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[196] "*Anche a casa mia prima che qualcosa venga buttata si accumula!! Per esempio ho trovato un posto che fa raccolta dei tappi di sughero per creare quelli rigenerati e prima che riesca a portarli a loro i tappi da me diventano milioni e milioni…*". Interview to S.

[197] "*Cioè: i cellulari vecchi li ho tutti, i pc vecchi mio padre li ha regalati a qualcuno o li usa nello studio, in sostanza diciamo che non li abbiamo mai smaltiti ma sono in giro da qualche e forse –dico forse- mio padre sa come smaltirli ma non so se lo abbiamo effettivamente mai farlo. Per cose piccole comunque per es. i cd vergini rotti io banalmente tendo a buttarli nella pattumiera… Queste cose piccole…*". Interview to N.

due to components, WEEE deserves specific treatment process and cannot be dismantled together with unsorted waste. Notwithstanding, such recognition varies according to the features of e-waste, as size, price, and prevailing matter.

Starting from the *waste question*, respondents show to be quite aware concerning its major implications, even if none of them provided an arguing capability which goes much further the most conventional issues mentioned in the media: pollution, catastrophic events, threat to human health, and in some cases a critical thought on consumption, product design and planned obsolescence. Further, normally respondents are not aware about waste management: they commonly do not know how domestic waste is going to be treated after the collection, sometimes proposing imaginative and misleading scenarios. In particular, many respondents wonder about the effectiveness of institutional waste management, due to a series of scandals which have raised mainly in the South of Italy, where matters collected separately by households end up all together in landfills.

For what concerns e-waste, students are normally not aware of the political, economic and societal implications of such question, while they understand that, due to their intrinsic features, these "cannot be disposed of together with generic waste or other recyclables",[198] and "anyone can understand that this device deserves some specific treatments".[199]Here, the WEEE size affects respondents' opinion: large appliances are recognized as a specific category of refuses deserving a dedicated act of disposal and treatment process. Again respondents are aware that a personal computer should be put into a dedicated bin, so that they store it at home rather than mismanage it, while small devices as earphones come to be thrown into the general bin "Without you even asking yourself the question".[200]With respect to that, there is an interesting testimony by a respondent who declares that, after a certain period of storage, she has thrown away a hairdryer together with unsorted refuses "In a sort of rapture, because I needed to put my house in order". She states:

> "It was a rapture… My home is very small and this hairdryer would fully occupy a whole cabinet, so we decided to gather the courage and throw it away, even if my flatmate studies environmental sciences (…). It was very impressive, after that, to put into the bin other refuses like banana peels… We even took a picture of that!"[201]

Thus, to conclude, two issues recur. The first is that even if respondents do not have any specific knowledge about the *e-waste question*, they are intuitively aware that e-waste cannot be discarded

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[198] "*E' evidente che non possono essere buttati nella spazzatura commune*". Interview N.
[199] "*Si capisce che hanno bisogno di un trattamento particolare*". Interview L.
[200] "*Senza che nemmeno ti poni la questione*". Interview Ni.
[201] "*Per il phon è stato un raptus… Casa mia è piccolissima e questo phon occupava completamente un armadietto e alla fine abbiamo preso il coraggio e lo abbiamo buttato senza interessarci di niente, anche se la mia coinquilina era quella di scienza ambientali. (...) mi ricordo che ci faceva una grande impressione buttarci sopra le bucce di banana… Gli abbiamo fatto anche una foto*!". Interview to M.

together with generic waste, and this impacts their act of disposal. The second is that the effects of such awareness depends on the size of WEEE. The following section presents the main findings concerning behaviour-specific knowledge in waste and e-waste disposal.

5.3.4 Behaviour-specific knowledge: waste and e-waste disposal channels

This section offers a view on behaviour-specific knowledge concerning separate collection and e-waste disposal among respondents, a second part also describes the major information channels adopted by them, and the most educative contexts they recall in which they apprehended to dispose of their refuses.

Starting with the matter of general separate collection, the first evidence is that, despite the fact that this task is unanimously described as "very easy to do", the actual specific disposal competences are not exhaustive, as when matters look dirty, mixed, not easy to identify, or generally different from plastic, paper, glass and biowaste, respondents do not know how to handle them, and this is the case also with very common objects (e.g. cans, milk containers,…). Here, they opt for an intuitive solution: they dispose of refuses together with unsorted waste or with other recyclable ones, and in no case they actively seek information about how to handle refuses, with the exception of informal information retrieved from family members or flatmates. This picture is very common, but a distinction occurs between students living in Milan and the control group of respondents living in small towns of the hinterland. Indeed, respondents belonging to the latter group present a more pro-active behaviour concerning information retrieval and –more interestingly- they result to be much more skilled in waste collection.

For what concerns e-waste disposal specific knowledge, again one has to distinguish between large and small appliances. In fact, awareness being equally poor, students are able to indicate at least one disposal channel of large items, normally the municipal service and the one-to-one mechanism. Here, users are also more likely to actively seek information from institutional channels (normally AMSA website). Conversely, regarding small WEEE, and referring to the question "Which way to dispose of small hi-tech appliances do you know?", all residents in Milan declare not to know anything about the issue. For example: "I have no idea about the way to dispose of small devices… In landfills we have just taken large appliances, bulky items".[202]And: "I can cite no way to dispose of small items as I have no idea about that… I don't think that if I leave a small appliance along the sidewalk [as a big one] AMSA comes to withdraw it…".[203]Very often such statements are followed by additional informations

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[202] "*Non conosco niente. In discarica abbiamo portato elettrodomestici grandi, mobili, ... Cose ingombranti*." Interview to Ni.

[203] "*Ma direi niente…Cioè non è che io penso che se lascio un cellulare giù da basso loro lo vengono a prendere… tral'altro secondo me non è neanche giusto che questo servizio sia a pagamento*…". Interview to V.

regarding the fact that other family members know how to dismantle WEEE, as the most common: "I do not have any idea at all, but I'm pretty sure that my father does".[204]Or: "I don't know what to do with this stuff: I leave them to my mom and she will deal with them".[205]Even in this case a difference occurs between Milaneses and the control group, as the latter is more skilled regarding small e-waste management and normally knows the localisation of landfills, which is quite rare in the first group. For what concerns information retrieval about small e-waste disposal, as in the case of general separate collection, it mostly works via informal channels (family members and friends).

Regarding the contexts which resulted to be the most educative for respondents to apprehend separate collection habits, the most recurrent are:

1. Family.
2. The experience of different collection systems in geographical contexts different from Milan.
3. The perceived social behaviour of others.
4. Personal interest.

Thus, the first learning context results being the family, where separate collection is not so much treated as a factor of environmental engagement, but rather as a domestic task in the management of domestic life. Here, refuses are currently handled according to familiar roles. In fact, mothers are usually considered to be the ones in charge of waste handling and *in-house activites* in general, while fathers are commonly referred to as the most competent person on e-waste disposal and *out-house activities*. Second, the direct experience of more demanding recycling schemes compared to Milan are also usually recalled as educational. In particular, secondary houses, Erasmus experiences in North Europe, and former residences, are all often considered as key experiences when the habit of separate collection was apprehended. Third, social behaviour is also recalled as a strong incentive in raising awareness on waste disposal. Indeed, the perceived interest that others, in various contexts, seem to commit to the issue has a double function: from the one side it pushes to adaptive behaviour, and from the other the social behaviour becomes itself a source of information retrieval about "What to do". The last most common topic recalled as educative in apprehending how to dispose of waste derives from a personal engagement due to an environmental interest. Here, the ethical dimension is mobilised: "I care about the way I dispose of my refuses because respecting the environment is a value in

[204] "*Non ho idea di come si faccia ma sono abbastanza sicuro che mio padre lo sappia*". Interview to N.
[205] "*Non so cosa fare di queste cosa…Quando voglio liberarmene le do a mia madre che se ne occupa*". Interview to A.

itself",[206]or "I love to do things well",[207] "to be always engaged",[208] "to feel like a nice person",[209] and "to like myself".[210]

The next section offers a view on the relation between respondents and institutional stakeholders involved in the e-waste SC on urban scale, which are AMSA, retailers and the SSE sector.

5.3.5. Interaction with institutional stakeholders: AMSA, retailers and the SSE sector

This section offers a view on the opinion of respondents on the institutional stakeholders involved in e-waste MSC, and related experiences. It also shows whether e-waste alternatives and informal disposal channels were experienced by them.

In general, students have a positive opinion on the work of AMSA, and they support such opinion mostly referring to the matter of urban hygiene and general separate collection. For instance: "I think that the work of AMSA is well done, also considering the city size… We have never faced any emergency and streets are always clean."[211] Again:

> "I think that the collection system is not bad. Making separate collection is relatively easy and this is true both in houses and in public places… The collection system is comfortable and not time demanding… I do not find defeats in it."[212]

The same positive opinion relates to information campaigns, as most students declared having received by post brochures from AMSA concerning the separate collection system. This common opinion changes with regards to e-waste collection, as students declare having never been touched by any official information campaign concerning this argument. Notwithstanding, the withdrawal service for the C1, C2 and C3 categories is widely known, together with the service of landfills, even if very rarely respondents know their location, and just in one case these have been directly experienced by respondents. Furthermore, none of the respondents knew about the environmental mobile centre and in general they could not recall any municipal channel to dispose of small appliances.

For what concerns the role of retailers in the e-waste SC, this is relatively unknown, to the exception of the one-to-one applied in the case of bulky items. Indeed, just in a few cases retailers represented a

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[206] "*Io sto attenta a smaltire i miei rifiuti perché rispettare l'ambiente è un valore in sé*". Interview to Al.
[207] "*Mi piace fare le cose bene*". Interview to A.
[208] "*Per essere sempre impegnato*". Interview to Ni.
[209] "*Per essere una bella persona*". Interview to I.
[210] "*Per piacermi*". Interview to S.
[211] "*Mi pare che tutto sommato per la città grande che è Milano il servizio non sia malaccio, comunque non si creano mai emergenze e anche le strade e tutta la città sono sempre decorose*". Interview to A.
[212] "*Penso che come sistema non sia male. Alla fine, non mi pesa né farla in casa né portare i rifiuti nei locali comuni del mio appartamento… E' un sistema fattibile che non mi fa perdere tempo –se alcuni la pensano così…- e che funziona e io non ci trovo niente di negativo*". Interview to S.

disposal channel for small appliances, and it wasn't because respondents were already aware of such a service, but because they asked retailers what to do with used appliances. For instance:

> "I didn't know the one-to-one mechanism, I just used it… I went to the store and I asked *do you take this device back?*… I supposed that I was ignorant while they should instead know the fate of old appliances… I figured that whoever sells mobile phones also knows how to dismantle them… But as far as I knew I thought he could also throw it together with unsorted waste".[213]

Interestingly, the vast majority of respondents, when asked to express an opinion on retailers' and producers' possible contribution to e-waste management, did not have any opinion, or believed that producers should not be considered responsible of e-waste management. Consistently with that, topics related to EPR were commonly unknown.

Regarding the role of the SSE sector in the e-waste MSC, it is quite unknown as well, with few exceptions represented by spot initiatives found by chance. Added to this, also private initiatives as private-to-private resale do not represent a usual channel of disposal, as the most common informal way to handle used appliances is represented by gift among family members.

The following section presents the main results regarding social and interpersonal influences on the disposal behaviour of respondents.

5.3.6 Social norms and interpersonal influences on recycling behaviour

This section describes the main findings concerning social norms and interpersonal influences of waste and e-waste collection conduct among respondents. To comprehend such dimension, two sets of questions were proposed:

1. The first set requests that students make comments about a series of statements and ideal-type situations regarding recycling behaviour. Here, it is to individuate what is, according to them, the difference between good and bad behaviour in the field of waste management, and what issues are recalled by them to support their opinion.

2. The second set investigates the matter of social influences on respondents' collection conduct, with particular attention to family members or flatmates, and neighbours.

Here are recalled the item proposed to respondents and related answers.

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[213] "*l'1 contro 1 non lo conoscevo con questo nome ma so che esiste perché l'ho usato. Che poi non è che l'ho usato perché sapessi che esiste, semplicemente sono andata lì e ho chiesto "questo qui lo prendete voi?". Immagino io nella mia ignoranza di persona che non sa dove finiscono i suoi cellulari usati, che invece loro lo sappiano… Do per scontato che se do il cellulare a quello che vende i cellulari che lui ne sappia più di me, però in realtà di fatto per quanto ne so lui può anche girarsi e buttarlo nel cestino, ma è verosimile che lui sappia quello che deve fare*". Interview to Ni.

a. The first scenario require students to express an opinion on policies supporting economic return for individuals' sustainable conduct (e.g. proper waste disposal, use of public transport, energy saving,…).

Interestingly, monetary incentives are strongly criticized and described as "sad" and "depressing", in the name of ethical ideals: "people shouldn't do that for money, they should do that because it's right".[214] However, such answers are commonly followed by further considerations, as monetary incentives are "better than nothing",[215]because their effectiveness is guaranteed by the fact of "impacting on what people value: money",[216]in this adopting a cynical view on generic "others" or "people". Environmental conduct thus seems to be strongly subjected to social normativity, and its treatment normally refers to ethical variables ("it's right", "it's good", …), regardless the actual conduct of respondents.

b. The second item requests respondents to give an opinion on the attribution of responsibility between citizens-consumers, producers and municipality in e-waste management.

Here, answers are more heterogeneous, even if the vast majority of students respond that the greatest responsibility has to be borne by citizens-consumers, while the second most recurrent opinion opts for a shared responsibility of citizens and municipality. Interestingly, very rarely are producers considered the first responsible of e-waste management, and, in general, they are not at all taken into consideration by respondents. Again, public institutions have never been indicated as the only most responsible or the only responsible for e-waste management. Thus, respondents tend to attribute the responsibility of e-waste handling mostly up to individuals and just secondly to public institutions. This shared view adds an additional element to our reflection: waste collection behaviour is a matter of ethics and of individual responsibility.

c. Trust in public institution is then questioned as an element which can impact waste disposal behaviour. The item proposed is the following:

"There are some users who do not carry out the separate collection at home because they do not trust the public institutions in charge of managing domestic waste. What do you think about such behaviour?".

A complete disagreement is the most recorded reaction: respondents also state that such position is just an excuse adopted by lazy people. Notwithstanding, even if everyone declare that the proposed item does not correspond to their own attitude, they consider that this is something understandable in some cases, where public institutions give proof of negligence and they betray the mandate entrusted with

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[214] "*La gente non dovrebbe farlo per i soldi ma perché è giusto*". Interview to N.
[215] "*Meglio di niente*". Interview to A.
[216] "*Ha un impatto su ciò che interessa di più alla gente*". Interview to M.

citizens. Typically, the South of Italy is the most recalled example.[217] Thus, even if no respondent recognises himself in the item proposed, he finds that it is consistent with a widespread distrust which belongs to people that experienced institutional mismanagement of public good, typically, southern Italian regions, and in this case it is justifiable. Thus, it is commonly recognized that individuals' recycling conduct needs trust in institutions to be effective.

d. The following item is then proposed: "Some people do not separate their waste because they think that a single person cannot modify the whole system".

This statement is unanimously strongly rejected as a short-sighted and unacceptable position of people who actually do not want to engage. Again, respondents show an opinion which poses the waste question in terms of ethic and public good, while we saw that on the front of their behaviour this is much more treated as a practical question within the field of home management.

e. A further scenario proposes: " Some people declare to be interested in properly collecting their waste, but this is not always an easy task. Thus they conclude that, beyond their interest, they cannot always do the separate collection".

In this case two different opinions are the most recalled. From the one side there are those who state that this kind of argument does not make any sense, since "when someone is motivated to do something he/she can easily find the way to accomplish the conduct in question",[218]"if you want you can",[219]and "the separate collection is something very easy to do: it is sufficient to provide three bins… I don't see where there is a problem".[220]

Conversely, other respondents instead agree with the item proposed, that is "individuals can meet some difficulties to act properly, even when concerned",[221] due to factors of information retrieval, variability of recycling schemes around, increasing differentiation of materials and related identification issues. In this case, an improper conduct is understandable.

f. Respondents were then asked to express an opinion of improper waste disposal and improper e-waste disposal. The first behaviour is discredited, as the general result of laziness, lack of civility and lack of environmental concern. The second case is perceived as less socially discredited, and here respondents tend to point out the attention on lack of information and infrastructures. So that,

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[217] Beyond the events in Naples, to make just some examples can be recorded the cases of Ragusa (http://www.corrierediragusa.it/articoli/attualit%E0/ragusa/17765-raccolta-differenziata-solo-sulla-carta-i-rifiuti-vanno-tutti-insieme-in-discarica.html. Last consulted on Septemer 2014); Reggio di Calabria (http://tv.ilfattoquotidiano.it/2013/05/10/reggio-calabria-come-napoli-3500-tonnenellate-di-rifiuti-a-terra/231636/. Last consulted on September 2014); Palermo (http://palermo.repubblica.it/cronaca/2011/11/05/news/cittadini_indignati_contro_la_finta_raccolta_differenziata-24474923/ Last consulted on Septeber 2014).

[218] "*Quando qualcuno è motivato trova il modo di fare*". Interview to El.

[219] "*Se uno vuole fare trova il modo*". Interview to M.

[220] "*Fare la raccolta differenziata è una cosa molto semplice… Basta mettere tre bidoni, dunque non vedo la questione*". Interview to Al.

[221] "*La gente effettivamente anche se è interessata può fare fatica a fare sempre la raccolta differenziata*". Interview to N.

improper waste collection is perceived as an individual act of low environmental commitment, while e-waste improper disposal is referred to external constraints and institutions. Thus, social norms are stronger in the case of separate collection misbehaviour than in the case of e-waste disposal.[222]

What it is interesting here is that such divergent opinion towards waste and e-waste collection arises regardless the actual conduct of respondents. In other words: whichever their actual conduct, they tend to give to the separate collection in general a more stringent normative value, although e-waste collection is considered just a residual and secondary topic, which is not sufficiently supported by institutions. Indeed, in this case an improper conduct is firstly referred to a lack of information or their easy availability, a lack of easily accessible and widespread infrastructures, the perception of a low impact of the conduct, and just secondarily to individuals' laziness. Following N.: "In the case of e-waste the lack of information is a double-edged sword, since people tend to get rid of it inappropriately because who knows what the right way is for them!".[223] Instead, in the case of general waste collection the order of such items is the opposite: first of all it is a matter of personal engagement, and only ultimately is waste mismanagement referred to external conditions.

g. For what concerns interpersonal influences, firstly the role of family members or flatmates are investigated.

Normally, this influence is described as decisive and positive, namely that is the actual engagement of those living in the domestic context of respondents is perceived as having strong incentives on their own conduct. Here, only a strict minority declare to feel a negative influence, which means a personal disengagement due to others' misbehaviour. However, everyone declares to be affected by the collection behaviour of others. Such influence is normally referred to family components, and in particular to the mother, that is the person recognized to be in charge of home management. In other cases, where students live with flatmates, the most impacting role is attributed to flatmates particularly attentive and skilled on separate collection, whose role is described as educative. Thus, in general respondents declare to perceive an influence in managing their own waste in the domestic context, due to the conduct of others. Further, this impact is usually considered positive, since they are more likely to make further efforts and/or to apprehend how to act better, if there is someone close to them who expresses a particular interest on this theme, or which is simply more attentive and informed. Here, close persons are often represented as the exclusive source of information on waste disposal channels. Thus, apparently, social interactions seem to have a major impact on individuals' disposal act compared to personal attitudes, and individuals' conduct suffers a variability depending on situations.

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[222] To notice that these findings probably have a self-justifying role, since the most of respondents actually are not able to argue about their own e-waste collection conduct, while regarding separate collection they show to be in general more competent and self-confident.

[223] "*La mancanza di informazioni in questo caso è una lama a doppio taglio: uno non sa cosa deve fare e chissà cosa si immagina*!". Interview to N.

h. Also the perceived conduct of neighbours is questioned as a hypothetically impacting variable on respondents' collection behaviour.

This insight is useful to understand whatever the synergetic dynamic found in the domestic unit also emerges in a wider, but still delineated, community context. Here, the vast majority of students declare not to perceive any influence, mostly since they have no idea about how neighbours separate their waste, because there are no evidences of it in the dedicated shared spaces, which in turn are normally considered clean and properly treated. However, a rather strong responsibility is attributed to the caretaker, where available, which is considered a key-actor in waste management.

The following section presents how the intrinsic features of (W)EEE objects affect their disposal in the eyes of respondents.

5.3.7 The (W)EEE object in the Italian case

This section describes the impacting effect of (W)EEEs' intrinsic features on their disposal, as already introduced in section 3.4 of the present Chapter. In fact, regardless their environmental concern, EEE's characteristics strongly impact its disposal. In particular: size, functionality, price, data contained, symbolic value. As far as size is concerned, the larger the appliance, the higher the likelihood of its being disposed of. According to Ni.:

> "Let's say that a washing machine cannot be thrown in the domestic bin. So, given that you are forced to make an effort to dispose of it, you take the time to seek the right way… The action would be in any case demanding, so it's worth doing the right thing. On the other hand, if you have to dispose of a mobile phone, it's so easy to throw it into the generic bin: you have not to do any effort to dispose of it, everything is immediate. Thus…. I'd say that the largest the appliance the more likely the act of disposal".[224]

Thus, size intervenes in two ways. The first one refers to the impact, so that a big object is associated to more severe impacts, and it creates in turn a sense of responsibility related to the consequences of the action. The second question is practical: a big refuse cannot be put into a bin, and institutional channels are the most comfortable way to solve a practical problem.

Further, the matter of functionality often occurs in impacting e-waste disposal. In fact, due to the planned obsolescence of EEE, rapidly old appliances are stored and replaced by new ones, even if still working. In this case the attention shifts from disposal choice to consumption habits: often speed of

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[224] "*Diciamo che uno non può buttare nel cestino la lavastoviglie e quindi già che ti devi sbattere e sai che ci devi dedicare del tempo anche solo per staccarla e spostarla, a questo punto tanto vale che fai le cose bene. Mentre invece un cellulare a buttarlo nel cestino non ci vuole niente di niente, mentre per capire come va gestito un po' di tempo ce lo devi dedicare… Buttarlo è molto più immediato. Comunque si, mi viene da pensare che se è un oggetto è più grande ha bisogno di un trattamento più particolare*…". Interview to A.

innovation cycles in the electronic sector brings about EEE hyper-consumerism. This explains in part the common use of storage. Not only, this topic recalls the matter of reparability: many respondents experienced that repair costs normally exceed the cost of new, and this is a decisive factor in boosting consumption. Conversely, old appliances are deliberately stored even when broken due to symbolic value and private data contained (see section 5.3.4). Lastly, the original price of appliances appears to affect their disposal, as a high original price is an additional reason to store.

Thus, concluding, this section shows how the relation between type of item, actual use, functionality and disposal behaviour is complex and strongly disturbed by external factors like characteristics of the electronic sector, size of the appliance, and related symbolic meaning. Managing the end of life of used appliances by storing them is the choice which accommodates the most such a complex configuration.

5.3.8 Past behaviour and disposal habits

Based on the literature (see chapter 2), the matter of habits is here investigated. In detail, we focus on the process by which the concept of *normality* is built within the living context of respondents, and how disposal practices are developed by them. Disposal habits are here questioned both regarding the general separate collection and e-waste handling. To provide information on that, two sections are here proposed focusing on:

1. The matter of waste and e-waste disposal practices according to the operative definition made by Shove and Pantzar (2010).

2. The concepts of discursive and practical consciousness as useful tool to add insight to our findings.

5.3.8.a (E-)waste disposal practices: Imaginaries, skills, artefacts

According to Shove & Pantzar (2010), the matter of *practice*[225] can be investigated by analysing its three components: imaginaries,[226]skills and artefacts. Here, *imaginaries* are intended as the prevailing images respondents recall when they talk about the waste and e-waste question: recurrent items and commonplaces and the object of this section. *Skills* have to be intended both as awareness and disposal-behaviour specific knowledge. Artefacts consist of the relation between respondents and (W)EEE object and utility system dedicated to waste disposal.

1. The most recurrent images related to the waste question refer to a dichotomy South-North and Italy-Rest of Europe concerning the efficiency of waste management. The first terms of the two binomials

[225] For any theoretical definition see Chapter 2.
[226] The authors talk about *images*: the term is here revised as it results more consistent with our methodology.

are adopted to intend a political and cultural context poorly engaged and characterized by low civility. The latter instead recalls positive examples of waste governance and usual concern among people. Indeed, respondents commonly recall "a typical Italian way"[227]and a typical "Southern way"[228]to explain improper collection conducts.

The second most common scenario refers to an implicit coherence occurring between waste mismanagement and rudeness. In particular, it appears ubiquitous the reference to "cigarette end abandoned along the sidewalk". Interestingly, here waste handling is something which is much more referred to as matter of politeness, rather than a question of impact, sustainability of lifestyles and so on.

A third recurrent imaginary recalls a different educative model between young and old generation. Here, a widespread lack of environmental concern is explained by a generation change, where adults and retired people are supposed to be less attentive to such questions as these came in the public debate in a more recent age. Consistent with that, young people would be more attentive regarding this issue.

The last more recurrent images regarding the waste issue refer to catastrophic events, as in Naples.

On the other hand, respondents struggle to provide images about the e-waste question (see section 3.3 of the present chapter), which are limited to a general perception of an object which deserves particular treatment processes due to its intrinsic features.

2. The matter of skills is exhaustively contained in the sections 5.3.3 and 5.3.4 to which reference is made. It is thus sufficient to recall that respondents are quite aware of the waste question, while related disposal-specific knowledge is generally present, with a certain variability depending on refuses' typology. Secondly, students are poorly aware of the e-waste question, and poorly competent about the related disposal channels.

3. Artefacts are here recalled in the form of objects and utility system. With regard to waste and e-waste intrinsic features we refer to sections 3.4 and 3.7 of the present Chapter. To apprehend briefly what has emerged it is sufficient to mention that the intrinsic features of refuses impact their disposal. In particular: dirt, mixed and ambiguous materials, normally bring about an intuitive approximate disposal in the case of the separate collection of ordinary refuses. Conversely, e-waste disposal depends on refuses' size, symbolic value, original price, data contained, and functionality.

Furthermore, for what concerns the relation between students and (e-)waste utility systems provided by institutions, it is sufficient to summarise what has already been described in sections 3.4 and 3.5 of the present chapter. Normally respondents are aware of the service of landfills, but rarely do they

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[227] "*La tipica maniera italiana*". Interview to A.
[228] "*Come fanno al Sud*". Interview to Cl.

directly experience it, and usually they do not know their location. Furthermore, these are commonly perceived as uncomfortable and difficult to access. Secondly, students do not know the mobile environment centre. Thirdly, the one-to-one mechanism is known and adopted for large appliances, while it remains overlooked with regard to small appliances. In this, retailers are poorly considered as institutional interlocutor for e-waste handling, as well as the SSE sector, which is little known and adopted.

A general summary about what emerge from our case studies is offered in Table 5.19.

Table 5.19 – The matter of practice: Images, skills and artefacts

	Images	**Skills**		**Artefacts**	
		General awareness	**Competences in separate collection**	**Object/typology of refuse**	**Utility system**
Waste question	Catastrophic events (Naples) Separate collection at home North-South and Italy/Rest of Europe	Present	Poor present/ present	Intrinsic features of refuse make its disposal difficult (dirtiness, mixed materials, ambiguous materials)	Door to door
E-waste	Weakly present	Weakly present	Absent	Size Affection Functionality	Rarely known

(Author's own)

Here, a difference occurs between the Milaneses and the control group, as the components of the latter are much more competent regarding disposal behaviour and much more used to go to municipal landfills. Lastly, commonly Milaneses show a little knowledge with regard to waste and e-waste management, while they state that it is a familiar task which is expected to be managed by parents.

Following the above analysis, it emerges that in the case of separate collection disposal, habits are perpetrated according to:

1. Practical questions related to home management.
2. A general awareness on the waste topic.
3. Behaviour-specific competences within family context or previous experience.

4. Refuses' features.
5. Convenience of the tack-back scheme.

Conversely, e-waste disposal depends more closely on:

1. E-waste features.
2. Previous experience of the take-back scheme.

The following section goes further by deepening the arguing capability of respondents with regard to their disposal practices.

5.3.8.b Arguing capability and practices

Disposal practices of respondents and related arguing capability have been rebuilt looking at the internal consistency between what do respondents know about the topic (knowledge and awareness), what do they think (attitudes) and, starting from this, how do they argue their disposal choice.
The second step investigates whether there is a gap between disposal behaviour and related arguing capability. To avoid repetition, for what concerns attitudes, knowledge and awareness we make reference to previous sections, while here we emphasize the internal coherence among these three dimensions and its relation with actual behaviour in the field of:

1. Environmental concern and significant behaviour.
2. Separate collection.
3. E-waste disposal.

1. Respondents are quite commonly aware of the major topics concerning the matter of sustainable development, and they show to be concerned about that. Notwithstanding, on the front of conduct, they are normally poorly engaged. In this field, they usually are able to clearly argue their conduct, which is explained by the need of finding an "impossible compromise" between environmental concern and external constraints as monetary limits, lack of alternatives, time availability,… Here we record a gap between attitude and behaviour, while respondents are able to easily fill it with a reference to contextual and situational restraints.
2. In the case of separate collection we again see that respondents are quite aware of the major issues regarding the waste question, even if their specific knowledge is often limited. Their declared attitude towards the theme is concerned, but they rarely engage in seeking information, and in case of doubt they act intuitively. Thus, on the front of disposal behaviour we can conclude that for the most they are committed but strongly dependent on refuses' features and comfort of related disposal channels: it is sufficient that a refuse has an ambiguous material, and that the disposal channel is not immediately

identified, to bring about an approximate act of dismantling or a delegation of the problem to others. Thus, a gap between attitude and behaviour also occurs, as approximate disposal practices often emerge during the interview, but compared to an attitude which was declared strongly concerned. In this, related arguments are not always clear: most respondents are however more likely to talk about personal laziness.

3. The case of e-waste disposal is the most interesting one in terms of awareness-attitude-behaviour consistency. In fact, compared to a common intuition that e-waste deserves specific disposal channels due to its intrinsic features, none could easily indicate at least one institutional way to dispose of them, mainly in the case of small appliances. Moreover, neither are respondents aware of the major questions related to the *e-waste* question, nor could they say to be concerned about that. Consistent with this lack of opinion and knowledge the most common behaviour recorded is the storage. But, more interestingly, even when respondents during the interview were able to recall the solution they found to dispose of e-waste, to the question "What ways do you know to dispose of e-waste?", the answer was commonly "I do not know any disposal channel". This suggests a gap between attitude and behaviour but in an opposite direction with respect to what emerged when questioning separate collection: compared to a poorly concerned attitude, e-waste is properly disposed if specific social and infrastructural factors occur. It means that the act of disposal does not necessarily lie in attitudinal and individual environmental concerns. The following section clarifies such concepts.

5.3.9 Profiles of e-waste recyclers

After having provided the most recurrent items derived from the analysis of the interviews, this section proposes further insights regarding the different profiles of small e-waste recyclers. In this, it is necessary to first highlight that such taxonomy is highly conventional, since indeed every collection conduct results mixed, as seen in section 3.4 of the present chapter. Thus, to define recyclers' profile the focus is placed on the second prevalent disposal choice paralleled to domestic storage. Furthermore, for reasons of simplification, it has been chosen to only consider the disposal behaviour for small appliances which were no more functional at the moment of the interview. This is because, as mentioned in the previous sections, unanimously old devices are still working when they are stored at home, so that no variability is recorded among respondents. The categories that emerged are (see chapter 4):

1. Proper conduct.
2. Improper conduct
3. Transient conduct, that means in turn the subcategories (e-)waste stock and EEE reuse.

1. The first data arising with regard to proper recyclers is that they are not residing in Milan, but in small towns in the hinterland, and they declare to have already experienced the service of landfill of their municipalities also to dismantle refuses different from e-waste. Conversely, just a very strict minority among Milaneses adopted an institutional channel to dispose of small WEEE, and when this was the case, it was because they had stumbled upon a collection point provided by retailers or the SSE sector. Secondly, students not residing in Milan tend to be much more competent concerning the system of provision of their cities, and they have a level of specific disposal knowledge which is sufficient to individually and directly manage their small e-waste, while we saw that Milaneses tended to delegate waste management to parents, which are considered more used to municipal services. Interestingly, every member within the control group is a proper recycler, with just one exception.[229]Instead, Milaneses record always a mixed collection behaviour –domestic stock and generic bin disposal in addition to appropriate disposal channels. Despite this behavioural differences between the two groups, the level of general awareness specifically related to e-waste topic is more or less the same for all respondents, namely low or absent.

Thus, it appears that a proper conduct is not forcedly associated with particular environmental concerns, but that it derives from:

1. An already rooted experience with the municipal system of provision.
2. The easy accessibility of collection points located in spaces which are accessed for various reasons but not related to waste management (e.g. libraries, retailers, schools,…).
3. Synergetic routines within family units, where waste disposal is handled by parents, who are also the major source of information retrieval regarding waste handling.
4. The willingness to solve a practical problem (this is the case for bulky items).

2. The improper conduct is perpetrated by respondents who declare to have thrown their appliances together with unsorted waste. They are however a minority and their conduct always goes with storage.

Here, refuses mismanaged are represented by earphones or other little objects, and the disposal choice is explained on the basis of impacts: improperly disposing of small devices is not considered as something which can seriously affect the state of the environment, and it is regarded not worthy of particular attention. Again, the mismanagement is justified by laziness, as the domestic bin is the quickest way to get rid of something perceived as useless. Thus, it appears that the improper conduct relates to:

[229] A respondent declaring that, under a certain size threshold, hi-tech object come to be disposed into the general bin, while the others are brought to the landfill.

1. The size of the object and related impact perceived.
2. Laziness.

3. Transient conduct: storage and reuse. This is the most widespread recycler profile together with mixed behaviour, as the stock is quite ubiquitous also with regard to broken appliances. In this, the most often stored objects are: mobile phones, chargers and personal computers. Normally, there is no knowledge on how to manage them, while at the same time it is perceived that they deserve a particular treatment. So, since these objects can easily be left apart, they are simply stored and the question of disposal is postponed in time and/or transferred to others. The second most representative case of e-waste storage is given by respondents who, even knowing how to manage small e-waste –for example they know that they can bring them to the landfill or other points of collection- decide to store them anyway, waiting for accumulating a certain amount of devices to optimize the disposal act. Again, as seen in section 3.7 of the present chapter, some devices are also stored because they have affective and symbolic meanings, or because they contain private data. Furthermore, reuse practices are common, mostly represented by the transfer to family members of personal computers and mobile phones, which in this case are still functioning. Thus, storage depends on:

1. The size of e-waste.
2. Intrinsic features of e-waste: mainly symbolic value and data contained.
3. The willingness to accumulate a certain number of appliances in order to optimize the act of disposal.
4. Postponing the question to the future.

The following and conclusive section offers a general summary of the main findings derived from text analysis, and proposes preliminary answers to the research question.

5.3.10 Conclusive considerations from the Italian case

This conclusive part offers a synthetic view about the most important findings descending from the analysis of the interview, and proposes the first insights which connect the latter to the theory and research question. Here, six sets of reflections are offered; they concern:

1. The difficulty to identify e-waste recycler profiles according to the items proper and improper disposal.
2. The weak association between environmental concern and e-waste disposal behaviour.
3. The definition of extra-ordinariness and the limits of personal engagement in the separate collection.
4. Waste management as a domestic task within synergetic family units.

5. The impact of social relations on individual behaviour.
6. The utility system: features and effective channels.

1. The first evidence is that e-waste recycler profiles are not easily traceable, as the vast majority of respondents adopt mixed conducts which vary depending on waste features and perceived accessibility of disposal channels, which in turn depend on users' previous experience and visibility. This finding is interesting as it shows that we could not find a correspondence between willingness to act and related behaviour, while a series of contextual and psychological constraints intervene in such relation. Table 5.21 summarises the main findings that emerged from questioning respondents' collection

Table 5.20 – Proper and improper handling: most often recalled impacting factors

	Endogenous variables		**Exogenous variables**	
	Generic refuses	**E-waste**[230]	**Generic refuses**	**E-waste**
Proper handling	Ethics and personal education Environmental concern	Habits and previous experience with disposal channels	Family education A recycling scheme easy and not too much time/energy demanding Informative brochure Flatmates influence	Easiness of information retrieval (by family members) An existing experience with landfilling Coming across by chance to a collection point
Improper handling	Laziness Perception of a lack of time Lack of awareness and/or knowledge Lack of interest in the topic	Lack of awareness Lack of knowledge Perception of a low impact Laziness	Intrinsic features of refuses Confusing recycling scheme Perception of a general cultural indifference of the surrounding	A system of provision perceived as not easy to reach Lack of information campaign Perception of a general cultural indifference of the surrounding

(Author's own)

[230] Limited to small hi-tech appliances.

behaviour: it presents a list of factors mentioned by respondents to frame their behaviour with regard to waste and e-waste disposal. These are conventionally distinguished between endogenous, that is self-attributed, and exogenous: referred to contextual influences.

Evidences show that endogenous factors have little impact on actual disposal choice, while social and infrastructural contexts, together with past behaviour, have the strongest influence on individuals' actions.

2. Thus, it appears that proper waste and e-waste disposal is not a matter of attitudes and awareness: visibility and accessibility of collection points, together with an already rooted experience with disposal channels represent the key-issue of proper recyclers.

3. According to respondents' behaviour, an extra-ordinary effort in the field of waste management is represented by tasks which cannot be easily and rapidly accomplished or, alternatively, which have never been experienced before. In this, any engagement, even including information retrieval, is aimed to minimize personal effort, and that is why it works mainly through informal channels. E-waste disposal is here considered an extra-ordinary effort compared to separate collection at home. Respondents are seldom likely to take the question in charge, except in case it means solving practical problems, which is with bulky items. Thus, despite a common environmental concern which is rhetorically acquired by students, the actual possibility to engage in taking the question in charge is reduced. Notwithstanding, e-waste disposal is properly handled just when it becomes an ordinary task, namely when:

a. Disposal channels have already been experienced.

b. Disposal channels are accessible without a dedicated effort.

c. An active engagement is already part of a rooted flow of domestic actions which are normally perpetrated within households unit.

4. Family members and flatmates seem to act synergistically regarding house management and related tasks. On the one hand the limits of the sample appear, because students living with their parents are not used to take in charge of waste handling, which they delegate to the latter. It means that, even if a young population has been chosen to guarantee a certain familiarity with EEEs, however most of them still have a residual role within the family for what concerns related WEEEs. On the other hand, this information is useful in terms of information campaigning, as it implies that different socio-demographic populations need targeted communication. Moreover, such a finding means that individuals' behaviour is instable and varies with its social context. For example, students which experienced an Erasmus stay or who live alone or with peer flatmates reveal to be more attentive towards waste disposal, and are normally more likely to engage in acquiring information from institutional channels.

5. In the case of separate collection respondents have simple commitments, which are strongly routinised and considered perfectly integrated in daily practices, with some exceptions (e.g. the approximate disposal depending on materials, which in some cases result ambiguous). In the case of e-waste, things are different as its disposal result not integrated within usual habits and also not identified on the front of arguments. In this, residents in small towns make a difference as they are the only proper recyclers found during the research. It is considered that such a difference lies in the fact that the latter are much more used to the system of provision provided by their municipality for waste management, namely the service of landfills. Such major experience relates to the features of small towns compared to big ones, as in the first case residents are normally more likely to use the car for their daily trips, distance to travel to reach landfills are relatively short, and waste take-back schemes are normally older and more time-demanding than those in big cities, so that waste disposal habits are usually more integrated with daily life, regardless the environmental concern of respondents.

Thus, a utility system appears most effective when it is integrated with everyday life of respondents, namely when the act of disposal does not imply an extra effort but amount to an ordinary flows of action. This is the case when two conditions occur:

1. Users are already used to allocate a specific moment –in terms of energy and time spent- to dispose of their waste.

2. Collection points are situated in busy spaces.

Thus, according to our hypothesis and explorative proposals, our provisional findings lead us to formulate the following statements.

F1. Environment-friendly attitudes are poorly associated with proper e-waste disposal.

F2. Social context impacts e-waste disposal as:

- Social surrounding is the first source of information retrieval who respect to official institutional channels.
- Respondents adapt their collection behaviour according to the perceived social normativity of action in different contexts.
- Domestic units work synergistically, which means that the act of disposal does not need to be forcedly referred to individuals, while familiar and living together contexts imply social roles which distinguish domestic tasks based on different roles.

F3. Domestic habits impact e-waste disposal as past behaviour and previous experience of institutional disposal channels are associated with proper disposal.

F4a. Collection schemes and provision systems impact e-waste disposal when:

- Collection points are visible in busy spaces.
- They are adapted to the population target.

F4b. The lack of retailers in the e-waste Italian SC clearly emerges from the words of respondents, which do not consider them as interlocutors for e-waste management.

F5. Factors related to opinion and citizens' trust of institutional stakeholders involved in e-waste SC do not seem to impact e-waste disposal.

F6. The relation consumers have with EEEs impacts the related act of WEEE disposal.

F7. The level of public knowledge on e-waste disposal channels impacts e-waste disposal.

F8. General waste collection habits impact e-waste recycling behaviour to the extent that respondents are already used to taking care of waste disposal at a specific moment in time.

Such findings will be discussed in greater detail after having shown the results deriving from the French case-study: national e-waste SC, e-waste disposal channel in Paris and related behaviour among the sample of students, which represent the object of the following chapter.

Chapter 6

6. E-waste supply chain and consumers' disposal: the French case-study

This sixth chapter addresses the topic of small hi-tech disposal in the city of Paris. The study will be carried out based on two units of analysis: e-waste supply chain (SC) at national and local scales, and individual standpoints. The structure of the chapter follows that already proposed for the Italian case-study, and the French case is presented in comparison with the Italian one. In this, three sub-sections are provided as follows.

1. A delineation of the WEEE Directive transposition in France, with a specific focus on:

- General logistics.
- Effective roles of institutional stakeholders involved and their coordination.
- Financing scheme.
- E-waste collection and recycling performances and main explicative figures of the French SC.
- A critical view on the strengths and weaknesses of the e-waste SC in France and their potential impacts on local policy and individuals' disposal options.
- A critical presentation of the main relevant comparative insights concerning the French and the Italian e-waste supply chain.

2. E-waste SC implementation on an urban scale in the city of Paris: this second part enters the hearth of e-waste governance on a local scale. The section is composed of:

- A previous general view on waste generation and separate collection performances on a national and regional level.
- A specific focus on Île-de-France region and the department of Paris concerning waste generation, waste and e-waste separate collection rate.
- The state of the art in the city of Paris regarding waste generation figures and e-waste collection performances per e-waste category.
- Waste and e-waste management policy in the city of Paris.
- Small WEEE disposal channels in the city of Paris and related system of provision.
- A critical discussion concerning the implementation of the WEEE Directive in Paris and the effective role of institutional stakeholders involved, with particular attention paid to the practical implications these have on the citizens-consumers' standpoint.

- A critical presentation of the main relevant comparative insights concerning the Milan and the Paris case-studies.

3. E-waste recycling behaviour of individuals: this third part illustrates the outcomes deriving from the analysis of the interviews with students in Paris. Here, their points of view are analysed according to the theoretical and practical categories mentioned in chapter 4 et followed in chapter 5, and their disposal behaviour is put in dialogue with local policy and systems of provision. The section consists of:

- An multiple analysis of interviews where the most recurrent items found during the interviews are presented.
- An analysis per profile of the recycler.
- A critical presentation of the main relevant comparative insights issued from the sociological analysis between the Italian and the French sample of students.
- A critical discussion concerning the main results and considerations about our hypothesis.

Part I

6.1 The transposition of the WEEE Directive in France

In France the WEEE Directive 2002/96/EC has been transposed into internal Law by the Legislative Decree n° 829 of July 2005 (and following amendments),[231]codified in Articles R543-172 to R543-206 of the Code of the Environment. Here, the e-waste SC took effect in November 2006.[232] Consistent with the European Directive, and as in the case of Italy, the main overall objectives of the French law are the following:[233]

1. Prohibiting the use of certain hazardous substances in EEE and working on the design of such goods in order to minimize the environmental impact of related e-waste treatment and to prevent their hyper-generation.

2. Setting e-waste collection targets, with a target of minimum collection of household WEEE at least 4 kg/year per capita in 2008, already successfully reached by the French system within the same year. The new Directive posed more ambitious collection targets to the European members, which are expected to intercept 45% of e-waste collected on the total amount of EEE put on market in 2016. Such objective rises to about 65% in 2019 or, alternatively, to 85% of WEEE generated within the same year (see section 3.8). Today the separate collection rate in France is about 30-35% of the total amount of EEE put on market, which corresponds to 6.9 kg/year per capita. Thus, as well as in the case of Italy, actually the collection targets posed by the new Directive appear very challenging also for the French system.

3. Achieving targets of (W)EEE reuse, recycling and recovery.

4. Applying the Extended Producer Responsibility (EPR) in e-waste management.[234]

The general functioning of the French e-waste SC is virtually identical to the case of Italy, since both countries apply the clearing house model (see sections 3.8 and 5.1). Thus, within the scope of household e-waste, in France producers take the role of eco-organisms,[235]and they operate in free

[231] Legislative Decree 2012-617 on May 2012 and other integrations. In the coming years, the regulatory framework will evolve again due to the publication of the Directive 2012/19/EU of the European Parliament and the Council of 4 July 2012, which modifies the Directive 2002/96/CE. This directive must be transposed into French law by 14 February 2014.
[232] On August 2005 for what concerns professional equipment, and on November 2007 for the overseas departments.
[233] For what concerns further details on the requirements imposed to the French system by the New Directive, it is here sufficient to recall that these are the same as in the case of Italy and for an extended view we make reference to section 3.8.
[234] Also providing a transitory period of collective responsibility for historical e-waste. Despite such requirement, actually none distinction occurs between new and historical WEEE treatment within the household scope, given that no producer have applied an individual responsibility (see chapter 3 for further details).
[235] According to the Decree n° 829/2005, producers have the option to also establish an individual supply chain, since by law it rests upon producers to choose the structure of their system. Notwithstanding, none has so far established an individual system of provision for domestic e-waste. Moreover, similarly to the Italian experience, the logistical and financial

competition to provide the service of e-waste collection, transport and treatment, under the supervision of a coordinating centre, called the Unified Coordinating Centre for WEEE Management, subsequently referred to by its French acronym *OCAD3E*.[236] According to the scheme already seen for the Italian case, also in France a national register is in place to account for the amount of (W)EEE which transits within the system of eco-organisms, and this is maintained by the Agency for the Environment and Energy Management, which will be subsequently referred to by its French acronym *ADEME*.[237]The eco-organisms are expected to declare to the national register[238]the amount of EEE put on market in France by their associated producers, together with volumes of e-waste collected in France, and of e-waste treated in France or abroad. In this, depending on the amount of EEEs put on market, producers are in charge of managing a proportional amount of WEEE: it is up to the OCAD3E to assign to each eco-organism a number of collection points according to the forecast of e-waste production based on estimates from previous years.

With regard to the separate collection of household WEEE, beyond producers, eco-organisms and the coordinating centre, the Decree 829 mentions the role of other stakeholders involved in the e-waste SC, and these are:

1. Municipalities and local authorities which, on a voluntary basis, establish a take back system to selectively collect household WEEE. They are also required to provide information campaigns to citizens about e-waste management and related disposal channels.

2. Retailers of EEE which are required to establish a take back system of WEEE reported by consumers under the one-to-one (or one-to-zero) mechanism (see section 3.8). They are equally required to provide information campaigns to consumers about e-waste management and their related disposal service.

3. Actors belonging to reuse and reemployment sectors, which are also expected to take part to (W)EEE management by recovering used appliances.

4. Citizens-consumers which are expected to properly dispose of old EEE and WEEE by using the aforementioned institutional channels.

5. Operators of the processing, treatment and transport phases, which are eventually involved in e-waste management on behalf of service providers for the eco-organisms.

Subsequent paragraphs enter into the details of the e-waste SC in France in a comparative perspective with the Italian case. In particular, the following issues are addressed:

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responsibility of historical[235] and orphan e-waste have to be shared in a collective form, but this specification does not imply practical consequences given that there are not individual supply chains for domestic e-waste.

[236] *Organisme Coordinateur Agréé pour les DEEE (Déchets d'Equipment Electriques et Electroniques).*

[237] *Agence de l'Environnement et de la Maîtrise de l'Énergie.*

[238] See https://registres.ademe.fr.

1. The main differences between the French and the Italian e-waste SC in terms of logistics and relation among institutional stakeholders involved in the primary collection phase.
2. The financial chain which supports the French e-waste SC.
3. The most important figures and performances of the French e-waste SC.
4. Informal and dispersed channels of e-waste management in France.
5. Conclusive reflections concerning the French e-waste SC and the most important comparative insights emerged with respect to the Italian chain.

6.1.1 The French e-waste SC: differences and similarities with the Italian case

As seen in the previous paragraph, the French and the Italian e-waste SCs have a general functioning which is almost identical, so that we can say that also in France the supply chain is built according to Graphs 5.1 and 5.2. The aim of the following paragraphs is to emphasize the most relevant divergent aspects between the two systems, to the extent that they are supposed to impact the general e-waste collection performances, and since they are considered as having significant effects also on the local scale in study. In particular, is subsequently proposed a focus on:

1. The role of the OCAD3E with respect to the work of the eco-organisms.
2. The relationships between eco-organisms and local authorities.
3. The relationships between eco-organisms and retailers.
4. The relationships between eco-organisms and the SSE sector.

The following section starts illustrating the role of the OCAD3E with respect to French eco-organisms and in comparison to the Italian case.

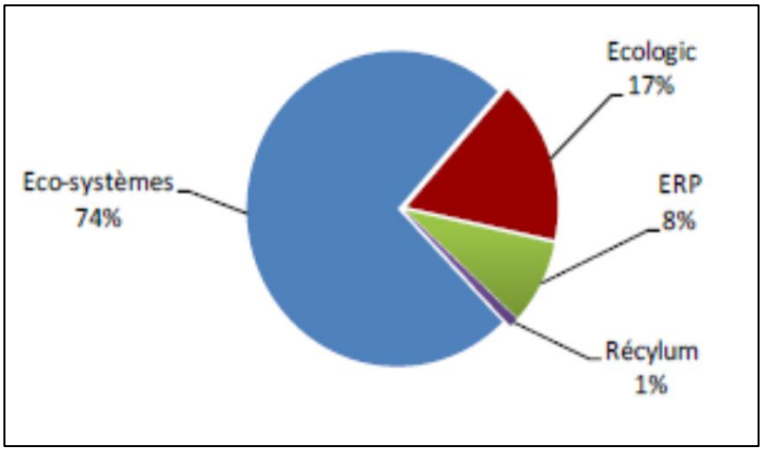
6.1.1.a The OCAD3E and the four French eco-organisms

In France there are four eco-organisms involved in the e-waste SC compared to the seventeen Italian ones (*Eco-systèmes*, *EcoLogic*, *ERP*, *Récylum*). The first three are multi-sector, while the fourth operates just within the sector of lighting appliances. They are all non-profit bodies, while we saw that in Italy eco-organisms exhibit a variety of juridical statuses, varying from non-profit associations to companies limited by shares (see section 5.1.1.a).[239]The four French eco-organisms have different profiles in terms of market share and majority institutional partners. In particular, *Eco-systèmes* is the biggest eco-organism in terms of associated members and market quota. It combines the Association of Manufacturers of Household EEE,[240]the Federation of Commerce and Distribution,[241] and the

[239] The Italian Decree n° 49/2014 which transposes the new WEEE Directive has provided important changes to that matter, as today eco-organisms have to adjust their juridical status according to a homogeneous model which has been approved by the Ministry for the Protection of the Environment, the Land and the Sea and the Ministry of the Economic Development.
[240] *GIFAM: Groupement interprofessionnel des fabricants d'appareils ménagers*

Collective System of Industries of Multimedia and Electronics.[242]Its main, but not exclusive, partner is represented by the distribution, and its overall market quota corresponds to about 74% on the whole rate of e-waste collected in France (ADEME, 2013). *EcoLogic* is the second biggest French eco-organism: it was created by the International Association of Mechanical and Electronic Industries[243] and the professional organisation *Alliance TICS*. The main institutional, but not exclusive, partner is represented by local authorities, and its overall national market share is around 17% (*Ibid.*). Thirdly, the European Recycling Platform (ERP) is the last multi-sector eco-organism operating in France, and the only with an European vocation. It was created by Braun, Electrolux, Sony, and HP, and it is original for its European position and for having outsourced logistical operations to a private company (Geodis Solutions). Today in France it is the smallest generalist eco-organism in terms of market share with about 8% on the whole rate of e-waste collected in France (*Ibid.*). Lastly, there is a fourth eco-organism that only deals with the fifth e-waste category. It was created by Philips Lighting, Osram, General Electric and Sylvania Lighting International in 2005. It is the smallest eco-organism in terms of volumes of e-waste intercepted, which is justified by its product specialisation.[244]Figure 6.1 shows the relative weight that each French eco-organism has with respect to the overall amount of WEEE intercepted by the official SC in France.

Figure 6.1 – E-waste intercepted per eco-organism in France (2012)



(ADEME, 2013, p. 50)

The ADEME approved the establishment of the four eco-organisms in 2005, and one year later the OCAD3E was created by them. It is also a non-profit organisation characterized by a shared responsibility. It has been founded with the goal to ensure the well-functioning of the chain, and to

[241] *FCD: Fédération du commerce et de la distribution*
[242] *SIMAVELEC: Syndicat des industries de matériels audiovisuels et électroniques*
[243] *FICIME: Fédération internationale des industries de la mécanique et de l'électronique.*
[244] Source: Bahers, 2012.

manage the financial and institutional relations between eco-organisms and local authorities. In particular, the OCAD3E establishes the financial compensation scheme according to which eco-organisms are expected to refund local authorities for the costs supported by them when putting in place the primary collection phase. Conversely, for what concerns the relation between eco-organisms and other institutional actors involved in the primary e-waste collection phase, these are managed by agreements which are directly stipulated between eco-organisms and other stakeholders. It means that it is up to each eco-organism to administrate financial and logistical relations with its partners, be they retailers, actors of the SSE sector or treatment operators.

In the words of B.R., technical director at EcoLogic:

> "The OCAD3E is the coordinating centre of French eco-organisms. It means that it is in charge of coordinating the relationships between local authorities and eco-organisms, and also to manage their financial relations. In fact, in France, when a local authority enters the e-waste supply chain, it is refunded for the costs of separate e-waste collection. Namely, refunds are based on a scale which is the same for the whole national territory, and that is established by an agreement between the OCAD3E, eco-organisms and local authorities. (…) The OCAD3E has thus the responsibility of establishing the refunds scale and of making agreements with local authorities (…). For the rest –retailers, SSE and other e-waste operators- French eco-organisms are perfectly free to sign different agreements directly with them whose contents vary on a case-by–case basis."[245]

Thus, the tasks of the OCAD3E with respect to the French eco-organisms are less compelling compared to the role covered by the CDCR with respect to the Italian eco-organisms. The CDCR is indeed is in charge of managing not only the relation between eco-organisms and local authorities, but also between the latter, treatment operators, as well as the financial stipend allocated to retailers to cover their logistical duties. Conversely, we saw that the OCAD3E limits its task to coordinating the logistical and financial relations between the eco-organisms and local authorities. Moreover, we showed that the CDCR can monetarily sanction the eco-organisms in case of misconduct (see section 5.1.2), while this is not the case in France. The following section offers a closer view on the relation between eco-organisms and local authorities in France.

6.1.1.b Eco-organisms and local authorities in the French e-waste SC

[245] "*Les éco-organismes dans ce sens, au niveau de la collecte, travaillent avec les collectivités territoriales, les distributeurs, ou des réseaux type ESS ou privé. Les collectivités locales, on intervient auprès d'eux par l'intermédiaire de la coordination et de l'OCAD3E, parce que les contrats mis en place entre les collectivités territoriales et la filière des D3E sont faits entre l'OCAD3E et les collectivités locales. Par contre, sur les autres origines, dont la distribution et les réseaux privés, sont des négociations de gré à gré entre l'éco-organisme et les points de collecte et les enseignes ou les réseaux de point de collecte avec des accords financiers à la clé et ça c'est purement libre.*" (Interview with B., EcoLogic, 2013).

As in the case of Italy, local authorities are not obliged to sign an agreement with the OCAD3E to manage their e-waste. In fact, it rests statutorily up to them to treat WEEE by adopting an alternative channel, but in compliance with the French law which administers waste matters. Even within this optional choice, the near totality of French municipalities are enrolled in the system of eco-organisms, for a total population covered by the clearing house system about 62 million (*Ibid.*), namely 93% of the total French population, for an approximate amount of local authorities about 98% on the total number (*Ibid.*). Due to their contribution to the primary collection phase, and similarly to the Italian SC, local authorities are paid by eco-organisms via a system of refunds, which will be described in detail in the dedicated section (3.2 of the present Chapter). Furthermore, multi-sector eco-organisms are in charge of managing all of the four e-waste categories generated by collection points associated to them, while in Italy different eco-organisms may relate to the same CP as they manage different e-waste categories depending on the CP. Within this frame, French local authorities contribute to 68% of e-waste collection via an approximate number of 4,000 municipal CP.

Thus, the relation between eco-organisms and local authorities is quite similar in France and Italy, with the sole difference of the number of eco-organisms which can refer to the same CP, and the percentage of local authorities actively involved in the clearing house system, which is nearly twice as much in France compared to Italy (see section 5.1.4.a).

6.1.1.c The role of retailers in France: a more effective implication

As in the case of Italy, retailers are statutorily obliged to apply the one-to-one mechanism (and the one-to-zero when it is the case) to contribute to the collection of household e-waste. Thus, it is up to them to put in place communication campaigns for consumers concerning the one-to-one and one-to-zero mechanisms. Their implication within the SC established *ex lege* n° 829/2005 is defined case-by-case on the basis of direct agreements between them and the eco-organism. Such agreements include a range of refunds paid by eco-organisms to retailers for the costs supported by the latter to contribute to e-waste collection. This monetary scale varies depending on the agreement, while it is however aimed by a goal of volumes' massification, which means that the greater the amount of e-waste collected the higher the monetary award. Moreover, the points of collection made available by retailers enrolled in the clearing house system are also provided by eco-organisms with a service of e-waste withdrawal and transport to treatment plants. Also in this case, the withdrawal service is related to an objective of e-waste collection optimisation, so that it is provided for free (or it implies a financial refund by eco-organisms) just when volumes intercepted exceed a certain threshold, contractually agreed. Beyond

such threshold, the service is not provided.[246]Retailers are also expected to make available e-waste containers for each category within the store, as it is the case in Italy.

With regard to the role of retailers in France, two important differences arise compared to the Italian system. The first one relates to the matter of refunds, the second to the logistical constraints facing retailers within the e-waste SC. First, in Italy retailers are refunded for their contribution to e-waste collection, but only if they enrol within the CDCR system a regrouping point (see section 5.1.1.c). When this is the case, and just in this case, eco-organisms also provide the service of e-waste withdrawal and transportation from the regrouping point to treatment plants. Conversely, when retailers apply the one-to-one mechanism within the clearing house model, but they are not able to provide their own regrouping point, it remains their responsibility to take care of e-waste withdrawal and transportation to an available municipal collection point. Moreover, in the latter case, they are not refunded.

Secondly, Italian retailers are required by law to more compelling requirements in terms of e-waste storage within the store, so that they are expected to provide containers for e-waste collection, but also to satisfy further criteria as, to name but a few, registering within the Registry of Environmental Managers, providing a list containing the identification data of each consumer which adopted the one-to-one mechanism and related e-waste, guaranteeing safety space and conditions for e-waste storage and transportation according to specific technical criteria, etc. (see section 5.1.1.c). We saw that these factors negatively impact the implication of retailers within the Italian e-waste SC, which is indeed quite poor. Conversely, in France they are relatively more facilitated to take part in the chain of e-waste management, and relatively much more supported by the eco-organisms, in particular with regard to the logistical and financial burdens that e-waste management implies.[247] Under this frame, the total number of collection points provided by retailers in France is about 22,000 (see Table 6.2),[248]

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[246] For instance, EcoLogic considers 200 kg as a minimal threshold of e-waste collected to provide the withdrawal service. Between 200 and 400 kg, it is free, while above 400 kg retailers are refunded for their contribution to the primary collection phase. (source: Rapport d'Activité, Résultats financiers, EcoLogic, 2013). Conversely, in Italy, when the withdrawal service is provided to retailers, it occurs monthly or, alternatively, when the threshold of 3,500 kg of collected e-waste is reached, which is an amount of refuses nine-times greater than the threshold established by the agreement here presented as an example for the French case.

[247] Despite this, also in France the role of retailers in contributing to the e-waste SC is often considered not fully satisfactory. It is for example what showed by the research "*Déchets d'équipements électriques ou électroniques ménagers"* conducted by the French consumer sssociation *Association nationale de défense des consommateurs et usagers* (CLCV), MV2 Conseil and Maximiles. They showed that the one-to-one mechanism was neither widely known nor widely guaranteed on all the national territory. In line with that, also P.G., employed at EcoLogic, stated that e-waste collection within the stores was not always an easy task in France, for reasons linked to logistical and space constraints. It means that the implementation of the one-to-one and one-to-zero mechanism within stores present some common problems both in Italy and in France, which for the most refer to questions of space availability and other forms of retailers' resistance to provide the service. However, in a comparative perspective, in France retailers are more effectively involved in the e-waste MSC, due to a fairer system of refunds and to the logistical support which eco-organisms offer them.

[248] 21,928 (ADEME and OCAD3E, 2013).

compared to the Italian 2,100 (see section 5.1.4.d), and they contribute to 26% of the overall collection rate of the French e-waste SC, compared to the Italian 6% (*Ibid.*).

6.1.1.d The involvement of the SSE sector in e-waste management in France

As in the case of retailers, French eco-organisms are free to sign agreements with actors of the SSE sector to contribute to the primary phase of (W)EEE collection. When this is the case, used and recoverable EEE are returned to the second-hand market, thereby contributing to e-waste prevention. In France the circuit of used EEE can follow two main channels: reemployment and reuse. These two channels involve associations,[249] charity bodies, insertion companies for the employment of vulnerable social groups, and the network of *ressourceries*, which are special CPs aimed to collect goods for reemployment and/or reuse. In particular:

1. Reemployment is an operation of e-waste prevention. In this case used EEEs are still in the circuit of goods and they are reemployed on a second-hand market. This is the case for example of on-line resale of second-hand goods (Article L 541-1-1 of the Code of the Environment).

2. Reuse is a term used in case of waste recovery. It means that a good, which has already been disposed of in a collection point and has already entered the circuit of waste management, if it is considered, prior control, recoverable, is submitted to a process of recovery and then destined to reuse.

Normally, the actors of the SSE sector cooperate with municipalities and eco-organisms on waste prevention and collection. Also in this case, the relation between the eco-organism and the SSE actor varies depending on the agreement. However, when (W)EEE are treated under such frame, it is accounted within the official e-waste SC, which is a great difference compared to the Italian case, where an effective implication of the SSE sector is rather low and in general not accounted by the official statistics of the CDCR. Some examples of the successful implication of the SSE sector in e-waste management is offered by the associations *Emmaüs*[250]and *Envie*,[251]two of the major French actors of the SSE sector, with a specific vocation in terms of second-hand market and reemployment of vulnerable social groups. Under this frame, the SSE sector contributes to e-waste collection to about 6% on the whole volumes intercepted by the official chain (ADEME, 2013), plus the amount of e-waste which is prevented by EEEs recovery, reuse and resale.

Tables 6.2 shows the co-participation of local authorities, retailers and the SSE sector to the e-waste SC in terms of collection points made available. Here, we see that the total amount of collection points enrolled in the clearing house system in France is 28,492 with respect to multi-sector eco-organisms, plus 23,382 dedicated to the fifth category of e-waste. In particular, the collection points provided by

[249] As the most important in France are Emmaus and Envie,
[250] http://www.emmaus.fr/
[251] http://www.envie.fr/

local authorities, retailers and SSE operators to multi-sector eco-organisms are altogether 26,363 compared to the Italian 5,572 put available by the same stakeholders, namely: one CP each 2.500 inhabitants is provided in France in the system of eco-organisms, while in Italy we have 1 CP each 10,768 inhabitants referring to the official supply chain.

Table 6.2 – Number of e-waste CPs in France in 2012 per category of collector: local authorities, retailers, SSE sector and others.

Typology of collection point	**Number of collection points**	
	Multi-sector eco-organism	***Récylum***
Local authorities	4,194	3,121
Retailers	21,928	17,823
SSE	241	7
Other[252]	2,129	2,431
Tot.	28,492	23,382

(ADEME, 2013, p. 92)

The following section concerns the financial mechanism which supports the French SC.

6.1.2 Compliance cost and visible fee: a double financing mechanism

In France the financial chain of the official e-waste SC is very similar to the Italian one, with the exception of the visibility of the eco-contribution, which in Italy is guaranteed just for the C1 category (see section 5.1.2). While in France it covers all e-waste categories. Here is applied a financial mechanism called *compliance cost and visible fee*, which is defined as follows:

> "Producers finance activities in the system, bearing costs for management of waste they put on the market (for example, by joining a compliance scheme or financing their own take-back system). They also bear costs for management of e-waste put on the market by other producers in the past (i.e. historical waste) but they use a so-called *Visible Fee* to generate revenues from final users to cover historical waste management costs". (UNU-StEP, 2009, p. 12)

Therefore, retailers transfer to producers the exact amount of the visible fee that they have collected from consumers at the moment of an EEE purchase. The value of the visible fee per product is

[252] Various types of brokers, actors of the recovery sector and refurbishers.

calculated on the basis of real EoL (End-of-Life) costs for each WEEE category, and it varies depending on the eco-organism.[253]The application of the visible fee is specifically related to historical and orphan e-waste, and it is the only economic cost[254]charged to consumers in relation to e-waste management. In turn, as in Italy, producers pay a subscription to their eco-organism, so that it can finance the operations of collection and treatment put in place, respectively, by local authorities, retailers, SSE operators, processing operators and any other partner. In the case of local authorities, as seen, the scale of economic compensation is based on a national agreement between these latter and the OCAD3E. Here, they are paid via a fixed annual amount for the cost supported to provide the service of e-waste collection to citizens, plus further refunds are offered according to certain thresholds of optimisation of volumes collected.

> "This scale of refunds considers a monetary flat-rate for every local authority, plus a variable rate which depends on the local conditions of collection, plus some years ago certain flows on money have been paid to local authorities due to the enforcement apparatus they had put in place to guarantee a safe e-waste collection".[255] (B.R.: EcoLogic, 2013)

In this, and in general, French refunds are slightly more significant than in Italy and, more interestingly, a fixed annual amount of money is guaranteed to local authority to take part in the e-waste SC, while in Italy this is not the case, and poor or inadequate collection rates can also bring about no compensation or even monetary sanctions to municipalities (see section 5.1.2).

In the case of retailers and the SSE sector, as seen, refunds vary from case to case depending on the agreement between the latter and eco-organisms, while it is here sufficient to know that logistical and monetary supports are provided by eco-organisms depending on the effectiveness of each collection point in terms of e-waste collected and prevented. With regard to that, we saw that in Italy eco-organisms can monetarily sanction retailers in case of improper collection (*Ibid.*), which is not the case in France, where eco-organisms do not have the power to exert financial sanctions on their associates.

Thus, concluding, in general terms the Italian and the French e-waste SCs lie on an identical financial mechanism, with the only difference of the eco-contribution visibility. Furthermore, in France local authorities receive financial refunds which are more relevant compared to the Italian ones, as well as retailers. Again, the SSE sector is not taken into account in the Italian chain, whereas in France it is involved, accounted and refunded to take part to e-waste management. Furthermore, the tasks of

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[253] For any detail see the report of ADEME (2013) which provides the detail per each eco-organism (p. 61).

[254] With the only exception of further monetary quotas charged to citizens as in the case of waste taxes for bulky items management.

[255] "*C'est le même barême d'ailleurs qui s'applique sur tout le territoire national Francais et qui est défini à un montant forfétaire par lieu de collecte et à un montant variable en fonction des conditions mises à disposition et aussi il y a quelques années on a ajouté un montant aussi pour compenser lesinvestissements de sécurité qui auraient été faits*".

French eco-organisms also involve a logistical support to their associates during the phase of e-waste withdrawal and transportation. We saw that such support was not always guaranteed in the case of Italy. Again, Italian local authorities and retailers can be subjected to monetary sanctions by eco-organisms in case of misconduct in e-waste management, while in France it is not the case. Equally, in Italy also eco-organisms can be subjected to monetary sanctions by the CDCR in case of inappropriate conduct, while we saw that the OCAD3E has a mere coordinating power between eco-organisms and local authorities, and does not have the power to sanction them.

Thus, concluding, it appears that the French e-waste SC is overall more effective compared to the Italian one, which is mainly due to the major involvement capacity it has with respect to all the institutional stakeholders implied. In particular, such effectiveness lies in the matter of economic refunds and logistical support, which are guaranteed by eco-organisms to their associates. The following section focuses on the effective performance of the SC in France, presenting its main figures and performances.

6.1.3 Performances of the French e-waste SC

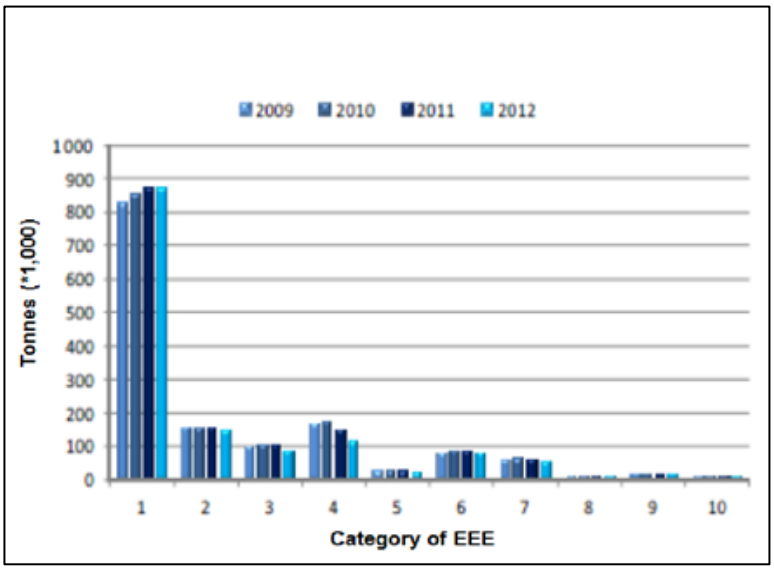
Similarly to what has already been illustrated in the Italian case, to comprehend the success of the implementation of the clearing house model in France, it is necessary to go into the details of its actual performances. Firstly, in France the European target of 4 kg/year per capita of e-waste collected has been reached in 2008. Today, compared to an approximate rate of 1,500,000 tonnes of EEE put on market,[256] corresponding to 22-23 kg/year per capita, it is calculated an amount of 20 kg/year per capita of household e-waste generated, which is around 1,300,000 tonnes.[257]On this overall volume, what is intercepted by the system of the eco-organisms is about 450,000/500,000 tonnes, corresponding to 6.9 kg/year per capita, which in turns means 30% upon the total rate of e-waste collected, and around 35% upon the proxy figure of e-waste generated. Figures 6.4 and 6.5 show the

[256] In France, as in many other developed countries, the economic crisis has brought about a general decrease of products purchase and global Put on market. In this, in 2011, also the market of hi-tech products has been stressed, and in France has been experienced a decline of 4.7% of economic turnover, which was however less than that in Italy (-7%). This percentage, in terms of EEE Put on market, corresponds to a -2%, while in terms of weight corresponds to -0,6%. Again, in 2012, a further decline is observed in number of units (-6%) and volumes (-4%) of EEE Put on market. In particular, consistently with the specific focus of the present study, the third and fourth EEE categories[256] respectively recorded a decrease about -3% and -14% (2012), even if this was not only due to a minor amount of EEEs put on market, but also to the miniaturisation of equipment design, and to the replacement of PCs with tablets and smartphones. Referring to collection rates, it is noticeable that, compared to an overall decrease of EEE put on market in 2012, e-waste has instead experienced an increasing collection amount of about +1% for the domestic sector. This means an overall figure of 452,732 tonnes of electronic appliances collected in 2012, distributed among the five waste categories

[257] Under this frame, according to statistics (ADEME, 2013), the French registry of EEE put on market has recorded 609 million of equipment, that means 1.60 million tonnes put on market, that are distributed across the 10 EEE categories. Among these, 1,37 million tonnes put on market corresponds to domestic EEE.

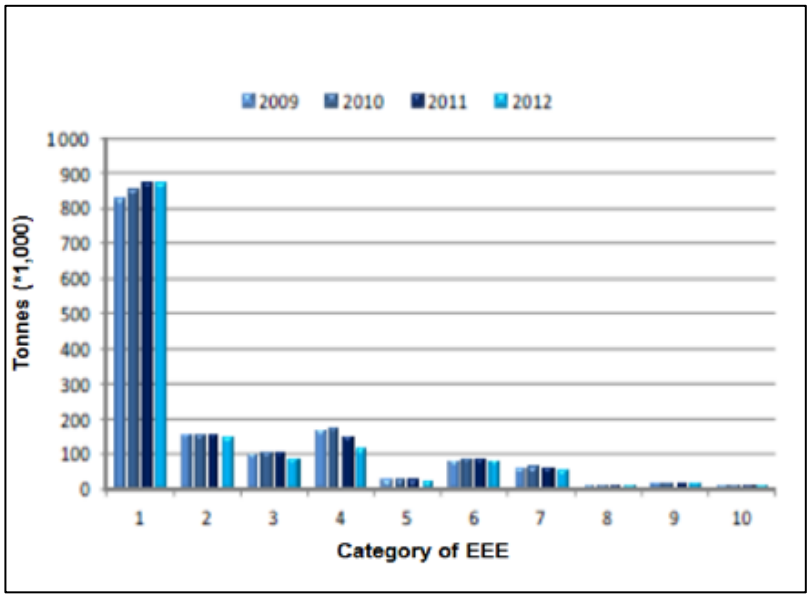
detail of EEE put on market and WEEE intercepted by the official SC per category of EEE and WEEE.

Figure 6.3 – EEE Put on market (tonnes) in France per category in the domestic sector (Trend 2009-2012)



(ADEME, 2013, p. 25)

Figure 6.4 – Tonnes of e-waste collected in France per category (Trend 2006-2012)258



(ADEME, 2013, p. 31)

[258] The collection of small appliances mixture (PAM) continues to increase as well (+6 % compared to 2011 and +20 % compared to 2010) through the deployment of collection points specifically dedicated to this flow (collection in containers sorting in some municipalities, collection terminals to distributors, collection waste disposal, etc.).

So far, two considerations arise. First, it appears that the supposed greater effectiveness of the French e-waste SC indeed corresponds to a better performance in terms of e-waste collection between 5 and 10 percentage points compared to the Italian case, where the system of eco-organisms intercepts about 20-25% of EEE put on market. Conversely, the relative capacity of the two chains with respect to e-waste generated, what we referred to as *effectiveness rate* (see section 5.1.3), is less distant, with around 35% in France compared to the Italian 30%. The second consideration relates to the collection targets imposed by the new Directive of about 45% of EEE put on market expected to be intercepted in 2016 (see chapter 3). Such goals seem too ambitious in France as well as in Italy, since "So far, we are just half-way to achieving these targets".[259]Thus, we record about 65-70% of e-waste which still escape from the official SC, as in Italy we record a corresponding figure of around 75%. It means that, despite the effective better performing involvement of the local institutional stakeholders within the French chain, however a vast amount of e-waste is intercepted by parallel channels. The following section offers a closer view on the e-waste drain in France.

6.1.4 E-waste leakage from the official SC: informal and dispersed channels

A study conducted in France in 2013 by the ADEME in partnership with the OCAD3E and the consultancy firm *BIO Intelligence Service*, aimed to quantify and qualify the e-waste flows subtracted from the system of eco-organisms, has estimated that the overall amounts of e-waste which escape from the SC corresponds to about 13 to 14 kg/year per capita. Furthermore, as in the Italian case, the alternative channels can be distinguished between informal and dispersed, while this distinction is highly conventional given that, if we exclude the purely illegal management upstream, the boundary line between the two is sometimes thin, and also e-waste initiated to proper disposal channels can be intercepted at different stages by illegal actors along its management process. Taking that in mind, as in the Italian case, we can say that the informal channel is represented by what we define as *historical operators*, which means stakeholders involved in e-waste management or in the management of related matters before the issue of the WEEE Directive, and which continue to manage e-waste through a channel that is mostly parallel to the official chain -but not exclusively- in compliance with legal provisions concerning dangerous waste management.[260]Informal handling includes alternative

[259] *"Aujourd'hui on a une mise sur le marché enregistrée dans le registre de l'ADEME de l'ordre de 21 o 22 kg des déchets ménagers, auquel il faut ajouter 2-3-4 kg en professionnel. L'essentiel des retours enregistrés au registre pour les ménagers seraient sur environ 450 000 tonnes sur 500 000 tonnes. On est sur à peu près 7 kg collectés par habitant sur 22 kg dans la filière ménagère. C'est un peu plus de 30% par rapport aux mises sur le marché. Pour les mises sur le marché, 5% sont relativement stables sur trois ans aujourd'hui. Donc si on prend le futur objectif du dispositif on doit être à 45% dès 2016, on n'y est pas. Il faut qu'on soit dans la filière ménagère déjà à 10 kg et on est à 7, donc (...) on ne sera jamais à l'objectif (pour 2016). On a vraiment de vraies difficultés à ce niveau là actuellement et là par contre si on projette à 85% de taux de retour en 2018 là on est plus très loin, on est à la moitié du chemin et c'est la moitié la plus dure qui reste".* Interview to B., Op. Cit.

[260] There are agreements also between the eco-organisms and operators of the e-waste recovery sector.

channels provided by e-scrap but also the SSE actors, the sector of refurbishment, retailers and local authorities out of the system of the eco-organisms. Conversely, the dispersed channel includes consumers' improper handling, and illegal e-waste management, which means theft and damaging in landfills, and other activities of e-waste mismanagement perpetrated by any stakeholder which, intervening at various stages of the chain, subtract e-waste flows without respecting the law. The first informal channel would intercept about 453,000 tonnes of e-waste, which means 6.9 kg/year per capita, the same amount collected altogether by the eco-organisms. The second chain would collect 403,000 tonnes, namely 6.1 kg/year per capita. Such alternative channels correspond to those described in the Italian case (see section 5.1.3), while each of them has different relative weights in the two countries. In particular in France:

1. About 1 kg/year per capita of e-waste, commonly the C4 category, is found out together with unsorted waste due to households' mismanagement. This is related to citizens-consumers' mismanagement, to which we should also add an amount of stored appliances estimated between 17 and 24 kg per capita (Bio Intelligence, 2013). In Italy the amount of e-waste improperly disposed of with unsorted waste is between 1.6 and 2.3 kg/year per capita (see section 5.1.3), which is nearly twice what was recorded in France. Further, in Italy 19.7 kg per capita of household e-waste is stored at home.[261]

2. Between 0.8 and 1.2 kg/year per capita of e-waste is stolen or damaged within landfills, which prevents a subsequent proper management. This phenomenon is particularly evident in city spaces for the reasons already described in chapter 3 (see section 3.4.1).

   Following A.F., responsible for e-waste management at the ADEME:

   > "One of the biggest challenges we face in France is the collection of large appliances including refrigerating devices. The big problem is represented by the due to the valuable matters these contain. So there are people who come into the landfills and steal large appliances and then they go to scrap dealers to dismantle the components for resale. All that is prohibited, but this is a relatively strong economy".[262]

   And again:

[261] Appliances not in use, both functioning than not functioning (Ecodom, 2012).

[262] *" Aussi en France la grosse difficulté sur la collecte c'est sur les gros électroménagers et notamment les gros froids. Le gros problème c'est le vol, parce-que ils ont des composants qui ont valeur, mais à partir de ça ces substances sont pris sans faire des opérations de dépollution. Donc il y des gens qui viennent dans les déchetteries et qui volent les gros électroménagers et ensuite ils vont chez des ferrailleurs à démembrer les composants pour les revendre et le ferrailleur récupère la ferraille. Tout ça est interdit mais il y a cette économie".*

> "There are thefts in landfills. There are also phenomena of e-waste damaging along the sidewalk to extract specific e-waste components with consequences in terms of pollution… It is a real problem".[263]

Unfortunately, the same data is not available for Italy.

3. Between 0.1 and 0.8 kg/year per capita of e-waste are subtracted from the system of eco-organisms due to retailers' alternative management, which derives in particular from the non-application of the one-to-one mechanism (e.g. free riding, on-line resale, …) or by e-waste resale and management out of the system of eco-organisms.[264]In Italy, we saw that such channel is more significant, although hardly quantifiable. In particular, we know that just a small percentage of Italian retailers is enrolled within the clearing house system, and that just about 37% of e-waste collected by them transits via the system of the eco-organisms (see section 5.1.3).

4. Between 0.5 and 1.5 kg/year per capita of e-waste are contained in bulky items disposed of in landfills and which are not submitted to the process of separate collection and treatment. The same data is not available for Italy.

5. Approximately 3.2 kg/year per capita of e-waste are contained in the scrap metal managed by those who recuperate scrap and scrap crusher. A further figure of 0.7 kg/year per capita of e-waste is contained in scrap containers. The same data is not available for Italy.

6. An unknown amount of e-waste passes through the operators of refurbishment, also in Italy such figure is not quantified.

7. E-waste and used EEE are also legally and illegally exported, as it is the case in Italy.

8. As seen, in France local authorities are not statutorily obliged to subscribe an agreement with the eco-organisms for e-waste management. However, we saw that about 98% of them is within the e-waste SC. Thus, we can suppose that a certain little amount of e-waste is subtracted by the official chain by that 2% of missing municipalities. According to B.R.:

> "We can say that within a couple of years almost all municipalities will have joined the system of eco-organisms, even if some *incorrigibles* already exist. The latter cannot propose any programme to their citizens, or they have their

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[263] *" On a des vols en déchetterie. Après, on a aussi des récupérations sur le trottoir qui ne sont pas vraiment des vols parce que le produit était là, par contre sur le trottoir il y a souvent des pillages spécifiques comme les déviateurs, donc là on fait de la casse, de la pollution etc. Donc c'est un vrai problème… Mais autrement quand le produit disparaît en entier c'est discutable, mais c'est relativement impossible à contrôler et après il y a aussi les professionnels de la récupération sur le trottoir mais qui sont aussi dans des systèmes où ils récupèrent auprès de quelqu'un des produits, et qui eux vont les revendre. Donc on a ces 3 canaux là qui sont assez significatifs : d'un côté le vol, la récupération de la borne et des professionnels qui gèrent les déchets qu'ils ont récupéré et qui en font quelque chose. Et dans ces 3 filières là clairement, la récupération informelle ou en particulier celle qui consiste en du vol, il y a des pratiques sur le vol avec différents dispositifs qui ont été mis en place sur lequel on peut constater par la mise en place par exemple en France de la suppression de l'achat comptant (c'est à dire que du paiement par chèque) et la fiscalisation de ces revenus là, on constate qu'il y a eu mécaniquement un effet de frein sur ces filières là de reprise illégale ou informelle. Illégale c'est grave. Et donc c'est là qu'on retrouve éventuellement des circuits complètement illégaux en France mais peu maîtrisés et les circuits d'export frontalier où les gens vont dans des pays frontaliers qui n'ont pas ces règles là comme l'Espagne ou la Belgique par exemple".* Interview to B.R., Op. Cit.

[264] A system of traceability concerning e-waste issued from retailers has been made operative in 2012 in some stores. After that, we interestingly record a threefold growth of e-waste collected within such stores.

> own reasons to refuse to attend our system, which in any case it is not mandatory, as it rests up to municipalities to decide if collecting e-waste separately or not. In case they don't, they simply must respect the general normative on the management of hazardous waste".[265]

Moreover, even among local authorities enrolled within the OCAD3E system, the correspondence between e-waste intercepted and e-waste donated to the system of eco-organisms can suffers from some subtractions, due to the lack of infrastructures which can occur somewhere, in fact:

> "Even if in theory e-waste collection infrastructures are widespread, we could easily see that there are some areas which are not covered by them, since actually we don't know exactly how many these infrastructures are and which are their zone of influence. I think that we can easily find that the real population covered by e-waste collection service is not 62-63 millions, as it is normally announced, but probably a bit less".[266]

In Italy we see that the contribution of local authorities represents the almost unique channel of e-waste collection within the clearing house system, with slight more than 4 kg/year per capita. At the same time, we know that just about half on the total number of Italian municipalities has subscribed an agreement with an eco-organism. Thus, the e-waste drain from the official SC originated by local authorities is necessarily more significant in Italy than in France.

Concluding, the overall e-waste collection rate of the official SC in France is about 30% with respect to the amount of EEE put on market, and around 35% compared to WEEE generated. The remaining approximate 65% ends in the parallel channel of informal management and in the dispersed channel of illegal handling. Here, data are uncertain, while we can consider that about 35% of e-waste is treated under the informal chain, while around 30% under the illegal. Notwithstanding, we highlighted how the line between these two chains is often thin. According to the CDCR & Legambiente (Legambiente & CDCRaee, 2014):

> "The informal chain of historical waste operators is not necessarily a purely illegal channel, while it represents however a sort of 'grey area' which is subtracted from the system of monitoring and easily infiltrated by irregular operators and practices. […] And, in an any case, operators which manage e-waste in compliance with what

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[265] *"Ça fait à peu près un an ou deux qu'on peut dire que l'effort d'adhésion des collectivités s'est fait, mais il y a quelques irréductibles qui ont soit pas de solution à proposer à leurs concitoyens dont ils ne peuvent pas forcément proposer de solution là-dessus, soit ils ne souhaitent pas de dispositif pour des raisons qui sont les leurs, parce qu'en France l'adhésion au dispositif D3E n'est pas obligatoire pour les collectivités. Ils peuvent décider de ne pas collecter les D3E séparément. Et à ce moment-là les obligations qui portent sur eux ne sont que légales en matière de déchets et de contenu de déchets dangereux". Idem.*

[266] *"Même si dans une carte théorique on a un maillage très dense du dispositif D3E, si vraiment on était capable, et on ne sait pas trop le faire, de dire "quelles sont les infrastructures de collecte que j'ai et ma zone d'influence de collecte". Je pense qu'on verrait des trous et que la population couverte n'est pas tout à fait celle qu'on attend, pas à 62 Millions. Là on annonce 62/63 Millions d'habitants, mais à mon avis elle est plus faible". Idem.*

> provided by law but out of what required by the WEEE Directive are necessarily making unfair competition for the work of eco-organisms".[267] (P. 23)

The following section offers a comparative critical view on the two e-waste SC in France and in Italy, with particular attention to the role of institutional stakeholders involved and to the relative weight of informal and illegal channels.

6.1.5 The Italian and French e-waste SC: formal, informal and illegal channels

This paragraph offers a critical resume on the main differences between the Italian and the French e-waste SC. This part consists of three subsections concerning firstly the official SC, secondly the informal chain and thirdly the illegal channel.

6.1.5.a The official e-waste SC: Italy and France in comparison

Compared to an identical scheme of implementation of the WEEE Directive, namely the clearing house model, we saw that the Italian and the French systems present some differences which are supposed as affecting their overall collection performances. Here we resume the most significant:

1. The Italian CDCR has a major binding force with regard to the Italian eco-organisms compared to the French OCAD3E. In fact, the Italian coordinating centre administers the financial and logistical relations between eco-organisms and: local authorities, treatment operators and retailers. Conversely, the OCAD3E manages the relations between eco-organisms and local authorities, as the first are free to stipulate further agreements with retailers, SSE actors and any other actors virtually implied in the e-waste SC. Under this frame, we see that the French system is more performing than the Italian not only with regard to e-waste intercepted, but also to a more cooperation between the various stakeholders involved in the supply chain.

Moreover, despite in both the countries the eco-organisms have very different market shares, in Italy these are seventeen, compared to the French four eco-organisms, which means that the Italian scenario is more fragmented but within a stronger centralized system. Following F.L. of the CDCR: "It's not an easy task to provide homogeneous conditions of management to such a various array of actors". Regarding this latter aspect, we couldn't provide evidences about the possible impact that such higher fragmentation has on the supply chain effectiveness.

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[267] *"Accanto al mercato illegale, esiste il cosiddetto mercato informale, quello cioè che riguarda tutti i flussi di RAEE non intercettati dai sistemi dei produttori. Non è necessariamente fuorilegge, ma costituisce comunque una "zona grigia", un'area economica sottratta ai controlli e quindi soggetta a facile infiltrazione da parte di operatori e pratiche irregolari. […]Questi operatori si concentrano soprattutto sul trattamento dei raggruppamenti non pericolosi, esercitando di fatto un'azione di concorrenza sleale verso i produttori di AEE che hanno obiettivi di riciclo elevati e ben definiti.*

2. In Italy local authorities are refunded for taking part to the SC but just above certain conditions in terms of quantity of e-waste collected. Conversely, in France local authorities receive an annual monetary flat-rate by the eco-organisms plus further refunds according to the quantity of e-waste collected. Further, in both the countries the logistical phase of e-waste transport from the municipal CP to the treatment plant is up to the eco-organisms. Within this context, in Italy less than 50% of municipalities are enrolled into the official SC and "year after year their number is still decreasing",[268]whereas in France about 98% of local authorities is into the SC. In this, we saw that the monetary scale of refunds to local authorities is slightly higher in France than in Italy, but not sufficient per se to imply a so much greater participation within the clearing house system. Thus, it is here hypothesized that further elements are at stake in explaining such gap. In France we discussed such issue with E.F. of the ADEME and he states that "E-waste management represents a financial and logistical cost which local authorities are glad to prevent by contracting the service to the eco-organisms". But when we proposed the same topic to our key informant of the Italian eco-organisms, he states that "e-waste drain are due to the unfair competition which is perpetrated by the informal channel towards the institutional one. […] By selling e-waste to informal actors, local authorities can gain ten times greater than what do they gain by join an eco-organism". (L.T., Ecor'It, 2013). Apparently, as seen above when the French informal chain was illustrated, also in France the same unfair competition from informal channel to the official one occurs, which in turn means that also French local authorities should be more widely attempted by selling e-waste to alternative waste operators, especially because they are not statutorily obliged to join the clearing house system.

We couldn't deepen such topic, but we formulated some hypothesis which try to explain the different willingness between the French and the Italian local authorities in participating in the e-waste SC. First, we can suppose that the historical waste actors (see section 6.1.4 of the present Chapter) are more significantly present in the Italian territory, where indeed a debate concerning the opportunity to shift to an *all actors* system compared to the clearing house is much more current than in France. Secondly, we can also suppose that the implementation of the WEEE Directive in France has been more effective also in terms of *legal certainty*, while in Italy a legal uncertainty has surrounded the transposition of the Directive in internal law, so that today some related implementing decrees have not issued yet.[269]We can hypothesize that such delay negatively impacts the internal consistency of the overall system, which is already defective in the involvement of retailers and other potential cooperating stakeholders. In this perspective, local authorities would more easily join an alternative

[268] M.C., Op.Cit.
[269] See for example the Tarif Decree (see section 5.1.4.c).

channel of e-waste management by following uniquely a market logic because the institutional orientation to a clearing house system is not perceived as well established.

3. In Italy retailers are requested to apply the one-to-one mechanism and they receive financial and logistical support by the eco-organisms, but just if they enrol a regrouping point within the CDCR system and beyond certain collection threshold. Otherwise they are left out from the system of monetary awards and logistical support even if they apply the one-to-one mechanism. Conversely, in France retailers are involved within the system of the eco-organisms via direct agreements among them. The financial and logistical supports offered by the eco-organisms to retailers depend on the agreement, while in general these are guaranteed according to minimal collection target. Thus, despite "In theory financial refunds are paid just under certain conditions of e-waste collection: actually it never occurred that retailers have not been refunded by an eco-organism".[270]We also saw that in Italy retailers are submitted to a series of legislative constraints in e-waste managing (see section 5.1.1.c) while this is not the case in France. The comparison allows us to highlight how the logistical and financial support guaranteed to retailers by the eco-organisms represents a key factor in fostering their contribution to the e-waste SC. Moreover, since these actors have a natural vocation to market, a mitigation of the bureaucratic charges on them is a further key element which positively impacts their implication. Indeed, the Italian legislation –particularly costly with regard to retailers' tasks in e-waste management- has evolved in the direction of a regulatory simplification concerning their role.

d. The European hierarchy of the three *R*: Reduce, Reuse and Recycle is more effectively put in place in the French context of e-waste management. Indeed, we saw that not only the SSE sector is included within the supply chain, but also that the French legislation provides specific regulation to foster the actual prevention of e-waste, by considering a transient status between *good* and *waste* (see section 6.1.1d of the present Chapter). All this implies that, thanks to the agreement between eco-organisms and SSE operators, and thanks to a dialectic relationship between local authorities and SSE actors, old appliances have a more effective chance to enter a second-hand market compared to the Italian context. Indeed, in this latter case, not only the SSE sector is not included within the e-waste SC, but the Italian legislation is more stringent with regard to the matter of waste management, and less developed with respect to (W)EEE recovery. This in turn implies that the opportunities for used appliances to enter a second-hand market (being accounted within the system of eco-organisms) are radically lower in Italy than in France.

Considering that the French e-waste SC records better collection performances than the Italian about between 5 and 10 percentage points, we thus conclude that such major effectiveness is due to the following issues:

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[270] Interview with B.R., Op. Cit.

1. The financial support provided to all the stakeholders involved in the primary collection phase by the eco-organisms under the criterion of e-waste collection massification.

2. The logistical support provided to all the stakeholders involved in the primary collection phase by the eco-organisms under the criterion of e-waste collection massification.

3. The effective involvement of retailers in the e-waste SC which is encouraged through the limitation of administrative burdens upon them compared to the Italian case.

4. The effective involvement of the SSE sector in the e-waste SC, which is encouraged by the development of a favourable legislation aimed to emphasize a transient status between good and waste.

5. The major discretionary power that the eco-organisms have in terms of contractual arrangements with retailers and SSE operators, which is here supposed to positively affects the clearing house system in terms of dynamicity and flexibility of the relations between actors.

6.1.5.b The informal supply chain in France and in Italy

The informal sector in Italy and in France is virtually represented by the same phenomena, which implies the interception of e-waste flows by a various array of stakeholders managing e-waste but out of the system of the eco-organisms. We see that, even if such operators are submitted to the national law which administrates the matter of waste management, the boundary line between such informal (or historical ?) sector and the illegal one can be sometimes thin. Moreover, we saw that however this chain represents a source of unfair competition with regard to the official SC, as it is not engaged to achieve the target imposed by the WEEE Directive, but just oriented towards a market logic. The already quoted study made by the Italian eco-organism Remedia, has quantified the Italian informal chain in 5 kg/year per capita compared to 4.2 kg/year per capita intercepted by the eco-organisms, while in France the ADEME has estimated the same informal channel around 6.9 kg/year per capita, compared to 6.9 kg/year per capita managed by the official chain. This means that in Italy the informal sector impacts the clearing house system more significantly than in France, as already considered in section *a* of the previous paragraph. We also know that in France the most common potential sources of e-waste diversion are represented by SSE operators, refurbishers, brokers and other waste operators which purchase e-waste by municipal landfills, retailers and SSE actors out of the clearing house system, plus scrap dealers and crushers which treat volumes of e-waste that ended in bulky items and in scrap metal diverted from the official SC. Conversely, in Italy we saw that volumes of e-waste are diverted to alternative waste operators directly by retailers, SSE operators and local authorities to a greater extent than in France, given the structural poor implication of retailers and SSE sector in the official chain.

6.1.5.c The illegal component of e-waste management

The illegal chain consists in Italy as in France of purely illegal phenomena of e-waste subtraction from the official SC. These are represented by various and different practices, from theft in landfills, e-waste damage along the sidewalk, citizens-consumers mismanagement, to more macro phenomena of illegal e-waste collection, improper treatment, illegal shipping abroad and so on. In Italy this flows is estimated about 5.2 kg/year per capita whereas in France around 6.1 kg/year per capita. Poor details are available on such flows in both the countries, while for our purposes it is here sufficient to recall that households' improper disposal -in the form of e-waste thrown together with unsorted waste- in France is estimated around 1 kg/year per capita, while in Italy it is around 1.6 and 2.3 kg/year per capita: the C4 is the category the most subject to such practices. Moreover, we have to take in mind that in France the amount of e-waste destined to proper management is 6.9 kg per capita compared to the Italian 4 kg per capita, which implies for us to reframe the data on consumers' mismanagement as in France these have a relative lower weight with respect to proper disposal.

Added to such three main channels, we saw that a certain amount of e-waste is stocked at home by households (see paragraph 4 of the present Chapter), or it is subject to informal practices of handling within a *private to private* frame (e.g. gift and resale). Here we are not forcedly talk about e-waste but also used EEE, whom disposal act is simply delayed in time.

Table 6.5 offers a resume about the most important figures of the French and the Italian e-waste SC.

Table 6.5 – Summary of the main figures of the e-waste SC in France and in Italy

	Italy		**France**	
PoM declared on the national register	900,000 tonnes (15 kg/year per capita)		1,500,000 tonnes (23 kg/year per capita)	
PoM recorded by considering free-riders and on-line purchase (estimation)	1,200,000 tonnes (20 kg/year per capita)		Not available	
E-waste generated (estimation)	880,000 tonnes (14.6 kg/year per capita)		1,300,000 tonnes (20 kg/year per capita)	
E-waste flows intercepted by the system of eco-organisms	260,000 tonnes (4.3 kg/year	Local authorities 94%	453,000 tonnes (6.9 kg/year	Local authorities 68%

	per capita)	Distribution 6%	per capita)	Distribution 26%
				SSE sector 8%
Collection rate of the official SC (e-waste collected by the eco-organisms/official PoM)	25%		33%	
Effectiveness rate of the official SC (e-waste collected by the eco-organisms/E-waste generated)	30%		35-40% (depending on the estimation)	
Number of municipal collection points enrolled into the system of eco-organisms (proxy of the number of municipalities enrolled)	3,672 points of collection (About 50% of Italian municipalities is enrolled into the system of eco-organisms) [271]		4,000 points of collection (About 98% of French municipalities is enrolled into the system of eco-organisms) [272]	
Number of CP offered by retailers and enrolled into the official SC	2,100 sales points are enrolled in the official SC. 100 regrouping points are recorded among them.		22,000 collection points are enrolled in the official SC (No difference occurs between collection point and regrouping point in France)	
Number of agreements with operators of the SSE within the e-waste SC	Unknown (considered residual)		Depend on the eco-organism	

[271] Upon a total rate o 8,092 municipalities. (Source: http://censimento2011.blogspot.fr/2011/12/quanti-comuni-ci-sono-in-italia.html. Last consulted on Septmber 2014).

[272] The total amount of French municipalities is about 36,500 (excluded overseas lands). [Source: http://www.cartesfrance.fr/geographie/cartes-administratives/carte-communes-francaises.html]

E-waste flows intercepted by the informal chain (estimation)	300,000 tonnes (5.02 kg/year per capita)	453,000 tonnes (6.9 kg/year per capita)[273]
E-waste dispersed and intercepted by the illegal channel (estimation)	315,000 tonnes (5.25 kg/year per capita)	403,000 tonnes (6.1 kg/year per capita)[274]

(Authors' own based on CDCR and ADEME)

The following paragraph offers some conclusive considerations before entering into the details of the e-waste SC implementation on urban scale in Paris.

6.1.6 Conclusive considerations

This first section of the chapter illustrated the French e-waste SC in comparison with the Italian case. We saw that in France the system of the eco-organisms is overall more effective than in Italy, and such effectiveness is mirrored by the related amount of e-waste collected, which is between 5 and 10 percentage points higher than in Italy. Notwithstanding, we knew that in both the countries the official supply chain is equally subject to unfair competition by the informal supply chain, and it is also damaged by widespread illegal phenomena of e-waste diversion. Such double channel subtracts to the official chain more than 60% of e-waste flows, to a variable degree in the two countries.

We also saw that the French official chain has a greater internal consistency compared to the Italian, thanks to a major involvement of the various stakeholders and to a more fair support from the eco-organisms to them in participating in the primary collection phase. Again, we knew that in France the regulations concerning e-waste management has a facilitating role with regard to the institutional stakeholders involved (e.g. by fostering free agreements among them, by guaranteeing a major discretionary power on them, by orientating the law towards the matter of EEE reuse and recovery). Conversely, we acknowledged that the Italian law sometimes implies an over-bureaucratisation of the burdens upon the actors involved in the SC. Moreover, we saw that the effective implementation of the WEEE Directive in Italy is also in part pending and late (see section 5.1.4.c), which negatively impacts the overall fluidity and effectiveness of the relations among the actors. In particular, according to F.M., lawyer and legal expert:

[273] Authors refer to as *e-waste flows out of e-waste register but even recorded* (Bio Intelligence. Op. Cit., p. 32).
[274] Authors refers to as *e-waste flows out of e-waste register and not traceable* (*Idem*).

> "The Italian legislation has a standard settings which works *in the cases provided*, which means that *what is not avoided is notably allowed*. This logic explains the actual density of the Italian regulation, which normally deepens and administers the technical specifications of any matter in order to guarantee its legal certainty. Conversely, in other countries [and this is the case in France] we have a different orientation of making law, and this is represented by a principles-oriented system. Here we see that the law administers its matters by establishing a related principle, and by limiting the technical specifications, which basically rest discretionarily upon the concerned stakeholders. In other words: in this latter case the Law establishes the goals according to a principle, and the implied actors have a certain discretionary power towards its accomplishment".[275]

Such arguments are also confirmed by the voice of another lawyer and expert in environmental law and e-waste management:

> "In Italy the new WEEE Directive implementation has been strongly delayed by the way the Italian system translates international regulation in internal law, namely by adopting every time *ex novo* a series of legislative decrees, which in turn remind to subsequent decrees, that need long bureaucratic practices in order to be effective. Conversely, in other countries (as in France), the transposition in internal law of the new Directive is more direct and agile".[276] (M.C., 2014)

We saw in chapter 5 that such way in the Italian legislative system has also an impact on the effectiveness of the committee of vigilance and control, which actually doesn't work due to the delay in applying the tariff decree (see section 5.1.4.c). However, we knew that such constraint doesn't occur in France, where actually there is not a committee of vigilance and control dedicated to e-waste management, but the monitoring on the supply chain is entrusted to the following tools:

1. The eco-organisms which are in charge of monitoring and accounting for the activities of their associates and for their own performances.

2. The ADEME which monitors data provided by EEE producers and by the eco-organisms, as well as phenomena of free-riding among producers.

3. Public authorities and environmental inspectors in charge of verifying the compliance of institutional behaviours and e-waste treatment processes to the national law.

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[275] *"La legislazione Italiana ha un sistema di normazione cosiddetto 'per casistica', che significa che 'ciò che non è vietato è permesso'. Questa logica spiega la densità del sistema di leggi italiano, che normalmente deve dunque entrare nelle specifiche tecniche e nelle casistiche di ogni material per potere garantire la certezza del Diritto. Diversamente, in altri paesi abbiamo un'orientazione diversa, ovverossia una normazione 'per principi'. Qui vediamo che la Legge amministra le varia materie attraverso l'enunciazione di principi e senza entrare nella casistica. Ciò significa che, stabilito il principio e l'obiettivo, gli attori interessati hanno un potere discrezionario maggiore di perseguirli*".

[276] "*In Italia il recepimento della nuova Direttiva RAEE è rallentato dal modo attraverso cui il sistema Italiano traspone in diritto interno le leggi Europee, ossia adottando ogni volta dei decreti ex-novo, che a loro volta rimandano ad altri ulteriori decreti attuativi. Diversamente, in altri paesi come la Francia, il recepimento della Direttiva Europea avviene in modo più snello, senza bisogno di riproporre ex-novo un corpus di leggi ma sovrapponendo alle esistenti delle specifiche e modificazioni".*

In Italy, similar monitoring items are at play. Indeed, a register of producers is equally established at the Ministry of the Environment; the CDCR verifies the conduct of the eco-organisms which in turn provides accounting reports about their associates and their own work, and a national inspectorate operating in the field of environment is active as well. Such common frame and the lack of a committee of vigilance and control dedicated to e-waste management in France suggests that also in Italy the above mentioned monitoring tools would be sufficient to guarantee the compliance of the overall system. Thus, why the committee of vigilance and control is established in Italy? And how its poor engagement is claimed as negatively impact the good functioning of the e-waste SC? Again, we discuss the topic with a legal expert, F.M.(2014), which states that "In Italy the lack of the committee of vigilance and control is a false problem". More in particular:

> "In effects, the lack of the committee of vigilance and control negatively impacts the effectiveness and the fluidity of the relations between the various stakeholders involved in the e-waste SC. Notwithstanding, it cannot be considered the main cause of the non-application of the law in this field, as normally in Italy the committees have just consulting and coordinating tasks and not sanctionary and decision-making power. Thus, the focus must be moved to the administrative authorities in charge of the main competences in the field of e-waste management (as the implementation of the tariff decree), which in this case is the Ministry of the Environment".[277]

This argumentation means that the partial lack of controls on the clearing house system in Italy is just indirectly due to the lack of the committee of vigilance and control, while the actual origin of such failure has to be traced back, once again, to a certain previous slowness in the specific institutions to rapidly adopt actual regulations about this matter.

This first section concerning the French case-study is here concluded. The second one illustrates how the e-waste SC so far described has been implemented in the city of Paris.

[277] "*La mancata costituzione del comitato di vigilanza ha certamente un impatto con riguardo all'efficacia e alla celerità del coordinamento fra le diverse istituzioni competenti in materia; tuttavia, non può essere ritenuta la causa principale della mancata applicazione della legge in quanto i comitati hanno, di norma, funzioni consultive e di raccordo fra diversi soggetti e raramente funzioni decisorie dirette o addirittura sanzionatorie. L'attenzione andrebbe spostata, pertanto, sul corretto ed efficiente funzionamento dell'autorità amministrativa investita in via principale delle competenze in materia, ad esempio, in ordine alla emanazione del c.d. decreto tariffe".*

Part II

6.2 The Paris case-study: e-waste governance and comparative insights

The second part of the French case-study goes the hearth of the local implementation of the e-waste MSC on urban scale in the city of Paris. The section consists of five parts. The first offers an overall view on the estate of the art concerning waste and e-waste collection performances in France, while the second enters into the detail of the Île-de-France region and the department of Paris. The third paragraph illustrates the matter of waste governance in Paris, and the subsequent part regards e-waste management policies, with a particular emphasis on e-waste take-back systems, collection performances, and small WEEE disposal channels. Here the role of the institutional stakeholders – municipality, retailers and SSE sector- is deepened together with the other alternative forms of e-waste handling. A final part concludes the section by offering conclusive insights. As in the case of the French e-waste SC, the Paris case-study is illustrated in a comparative optic to the Italian case.
The following paragraph starts this second part of the chapter by introducing the case-study with a focus on waste and e-waste collection performances within the French territory.

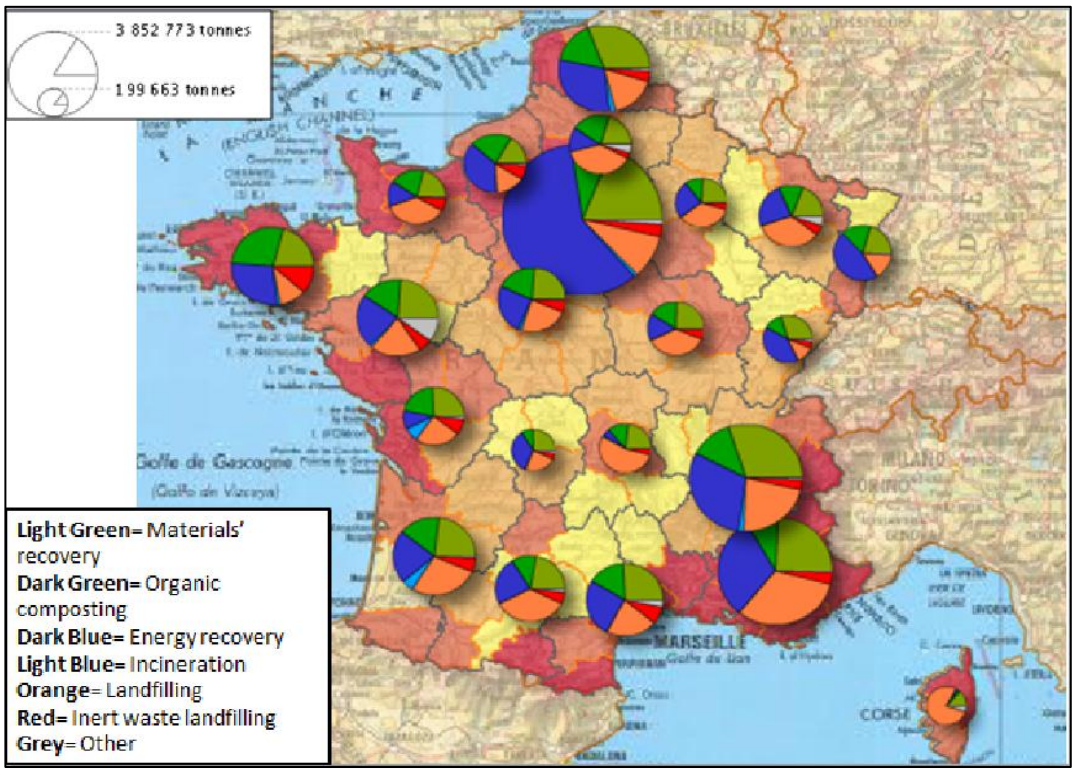
6.2.1 A general view on waste and e-waste collection performances within the French territory

In France, about 527 kg/year per capita of waste are generated, which is slightly more than the European average (27 EU), and just under the Italian 528 kg/year per capita (EEA, 2013).[278]As already mentioned in section 5.1.1, the French separate collection rate is 36% compared to 35% in Italy (Eurostat, 2013). Despite such similar performances, and according to a study conducted by the European Environmental Agency in 2013, the French waste management system is overall evaluated much more effective than the Italian in terms of waste prevention, waste actually recycled, and other criteria referring to the quality of waste management.[279]On national level, as in the case of Italy, in France we recognise an internal inhomogeneity with regard to waste take back systems and collection

[278] We refer to data provided by the European Environmental Agency and published in 2013 (http://www.eea.europa.eu/publications/managing-municipal-solid-waste. Last consulted on September 2014). We choose the same source for the Italian as for the French case and we did that in order to guarantee homogeneity in data recruitment methodology. However, we notice that in Italy and France national data can slightly differ from those contained in the EEA report.
[279] In the study, called "Screening of waste management performance of EU Member States" (2012), a score is attributed to each EU member country according to a series of qualitative and quantitative criteria estimating its overall performance in the field of waste management. The study attributed 31 points to France and just 15 to Italy, whereas the most performing country obtained 39 points and the less performing 3 points (ISPRA, 2013. P. 41).

performances, as showed by Map 6.6. Indeed, also here we see that waste collected and related waste treatment processes strongly vary depending on different regions.[280]

Table 6.6 – Waste treatment processes per French region

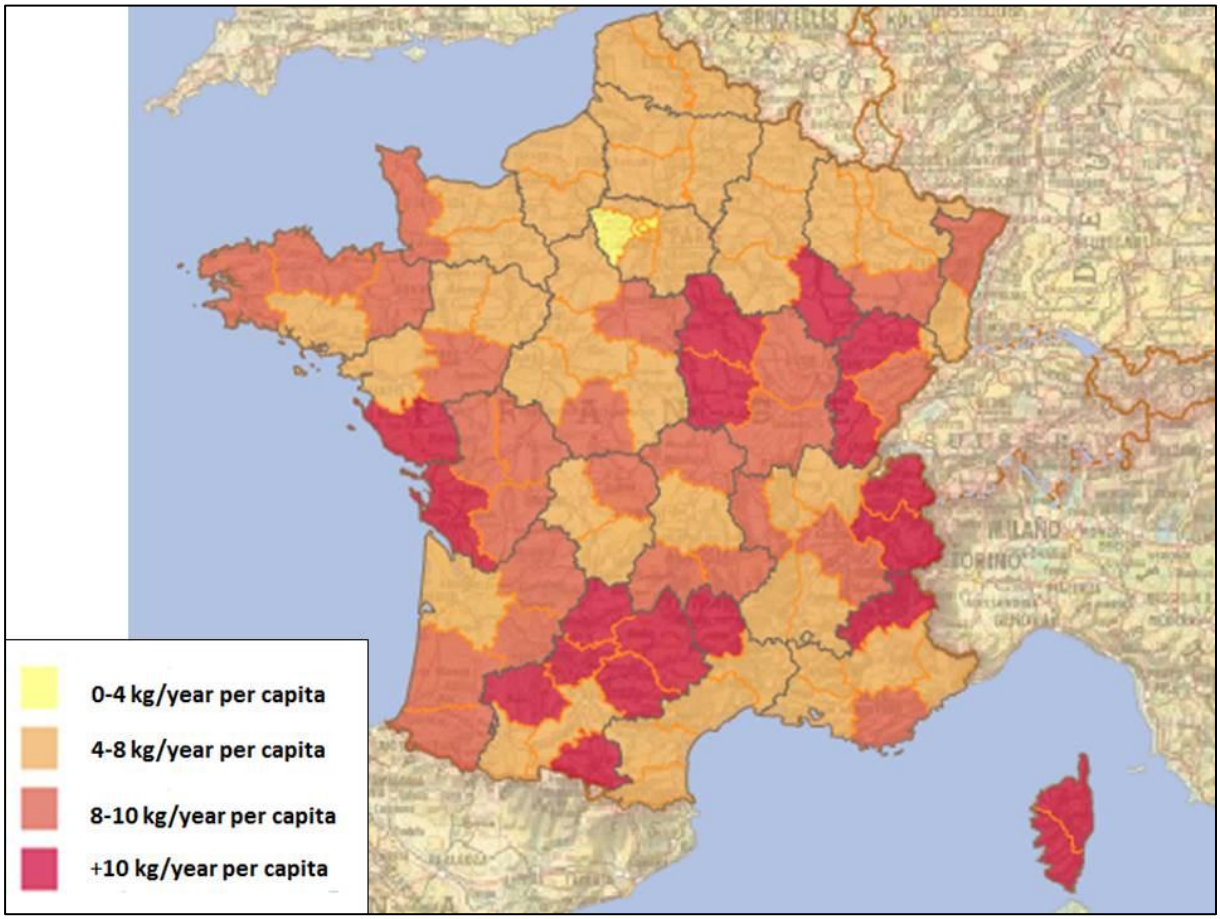


(Source: SINOE http://carto.sinoe.org/carto/enquete_collecte/flash/#. Last consulted on September 2014)

Within this frame, as seen in the previous section, the detail of e-waste collected in France corresponds to 6.9 kg/year per capita compared to the Italian 4 kg/year per capita in 2012. But also in this case, a strong variability is recorded among the different regions, as showed in Map 6.8, where we find also the detail per department. Here, we apprehend that, even within a certain regional inhomogeneity, almost all departments have achieved the goal of 4 kg/year per capita imposed by the WEEE Directive, which is not the case in Italy, where just slightly more than half of the regions reached such objective (see section 5.2.1). Further, the map shows that the Île-de-France region represents a negative exception within the French context, as it is the sole area where the majority of departments record e-waste collection rates lower than 4 kg/year per capita.

[280] We couldn't find a map recording separate collection performances per region, as in the case of Italy. We thus opted for the present map, which can as well indirectly shows a strong variability in waste management among the different French regions.

Map 6.7 – E-waste collection performances per region and department in France.



(Source: SINOE http://carto.sinoe.org/carto/deee/flash. Last consulted on September 2014)

Conversely, in Italy we knew that the Lombardy region registers satisfactory e-waste collection rate and that, in general, the region is one of the most effective areas in Italy with regard to waste and e-waste management, together with the rest of the North (see sections 5.1.1 and 5.1.2). The following paragraph enters into the detail of waste and e-waste collection performances in Île-de-France and in the department of Paris.

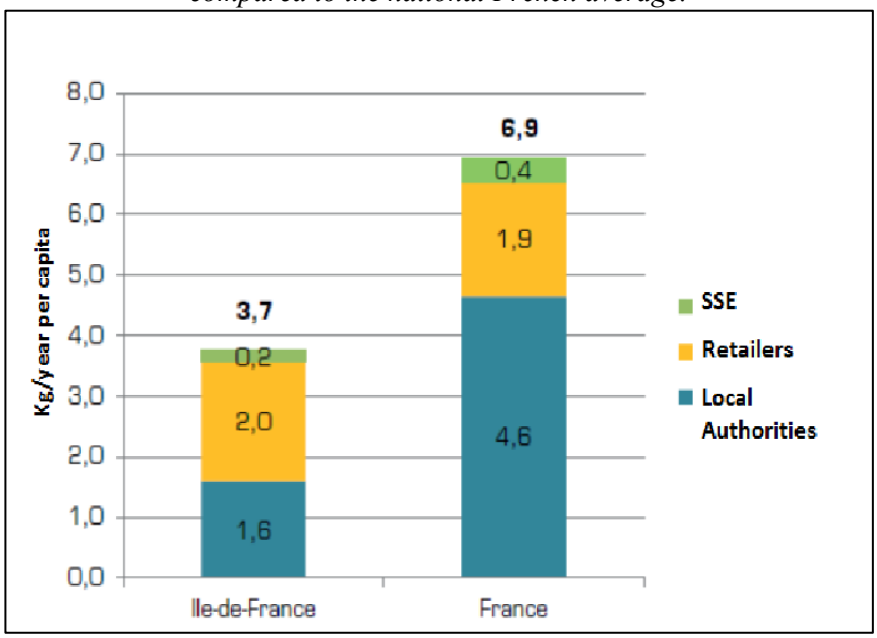
6.2.2 The estate of the art about waste and e-waste collection in Île-de-France

In the Île-de-France region 308 kg per capita of household waste are collected,[281]compared to a national average about 298 kg per capita (Commissariat Général au Développement Durable, 2013). For what concerns e-waste collection rate at regional scale, and according to the figure 6.9, here we see that 3.7 kg/year per capita are intercepted by the system of the eco-organisms, which means just over half of the national average, and 1 kg less than the Lombardy average. The figure also shows the

[281] Sinoe, op. cit.

detail per e-waste collector, and we apprehend that the highest contribution to e-waste management is represented by retailers with about 2 kg/year per capita of e-waste intercepted, followed by local authorities, with 1.6 kg/year per capita, and by the SSE sector, with 0.2 kg/year per capita. Conversely, on national level, two thirds of e-waste collected is intercepted by local authorities, followed by retailers, with 1.9 kg/year per capita, and by the SSE sector, with 0.4 kg/year per capita. Thus, compared to the national average, in Île-de-France the role of retailers is relatively much more significant compared to local authorities in contributing to e-waste management, while the role of SSE operators is slightly less relevant than in the rest of France. For what concerns the Italian case, we know that 4.7 kg per capita of e-waste collected is almost solely intercepted by local authorities, as retailers contributes to the e-waste SC just for one-ninth via the regrouping points,[282] plus a further unquantifiable amount via the municipal collection points open to the distribution, but considered not significant (see section 5.2.2). The SSE sector is finally not included in the Italian official chain. Thus, we can conclude that, in general, the Île-de-France region is the worst performing area in France with regards to e-waste collection, but relatively more effective in the implication of retailers in the supply chain. Conversely, we saw that the Lombardy region is one of the high performing region in Italy concerning the matter of e-waste management and collection, even if within a frame where retailers are poorly engaged and the SSE sector misses.

Figure 6.8 – E-waste collected in Île-de-France per category of collector. compared to the national French average.

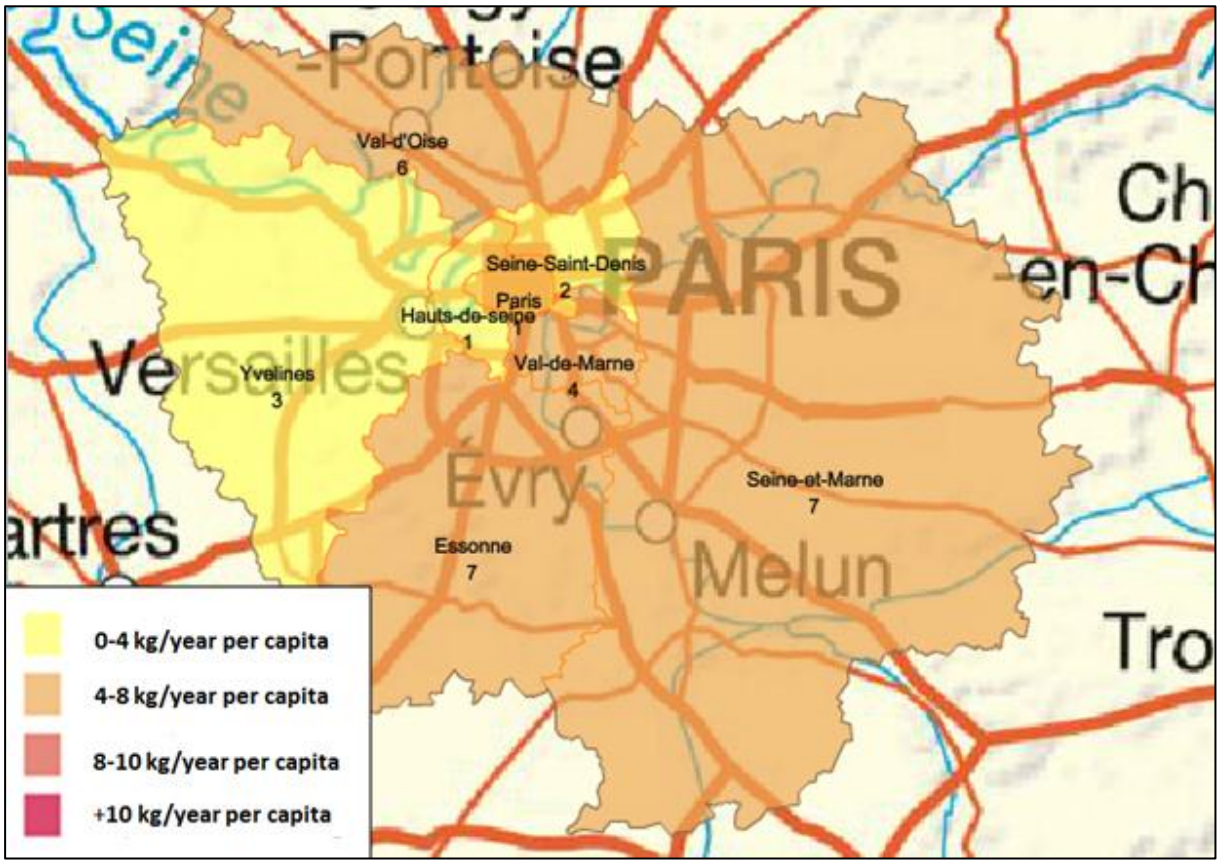


(Ordif, p. 20)

[282] The CDCR record an amount of 5,349,119 tonnes of e-waste collected by retailers in Lombardy (2012), compared to a total amount of 45,812,582.50

Further, even within the Île-de-France region there is a strong inhomogeneity in terms of e-waste collected among the different departments. In fact, according to map 6.10, some of them, as Val d'Oise and Essonne, are perfectly in line with the national average and even more performing, while others, as the department of Paris and its neighbouring departments Seine-Saint-Denis, Hauts-de-Seine and Val-de-Marne, intercepts just between 0 and 4 kg per capita. The regional average then corresponds to 3.5 kg per capita of e-waste collected (ADEME, 2013). In particular, the department of Paris records 1 kg per capita, which is a strong unsatisfactory rate compared both to the national average and to the WEEE Directive requirements. Conversely, we see in the Italian case that, among the provinces of Lombardy, the province of Milan is one of the best performing for e-waste collected, even if the sole municipality of Milan records lower collection rate compared to the rest of its province.

Map 6.9 – E-waste collection performances in Île-de-France per department (2013)



(Source: SINOE http://carto.sinoe.org/carto/deee/flash. Last consulted on September 2014)

In the department of Paris,[283] according to map 6.11, a driving role in contributing to e-waste management is represented by local authorities, which collect about 81% on the total departmental rate, followed by the SSE sector, at 9%, and by retailers, at 7%. A residual 3% is upon other institutional actors involved in the official chain. Unfortunately, we couldn't rebuild the relative weight of local authorities compared to retailers among the Lombardy provinces as this data is not available. However, we make reference to what illustrated in section 5.1.2, where we saw that the province of Milan records the highest number of regrouping points compared to the other provinces of the same region, and the number of municipal collection points open to the distribution is 32, which is in line with the regional average. Thus, even within an overall context where retailers poorly contribute to e-waste management, in the Province of Milan they have a higher relative weight compared to the rest of the region.

Map 6.10 – E-waste collected and contribution to e-waste collection by local authorities, retailers and SSE sector in the department of Paris in 2013

(Source: SINOE http://carto.sinoe.org/carto/deee/flash. Last consulted on September 2014)

In the French capital 502 kg/year per capita of waste are collected (Municipality of Paris, 2013), compared to 542 kg/year per capita in the city of Milan. In Paris, 65 kg/year per capita are separately collected, which corresponds to 12% of waste intercepted, compared to 35% in Milan. Table 6.11 illustrates the detail of waste collection in the French city. Here, we see that the greatest component of waste collected is represented by unsorted waste, followed by bulky items and by recyclables matters (mainly paper, plastic, and glass). Moreover, the overall quality of the separate collection made by households is quite low, given that about 50% of what found in the bin of unsorted waste is composed

[283] The department of Paris is the only French department which corresponds to a city, namely the departement of Paris corresponds to the city of Paris (INSEE: http://www.cartesfrance.fr/carte-france-departement/carte-departement-Paris.html. Last consulted on September 2014).

by recyclable matters (see Table 6.12), and about 17% of what issued by the recyclable waste bin is represented by refuses improperly disposed. Unfortunately, we couldn't provide comparative insights to the case of Milan, as similar data are not available.

Table 6.11 – Waste collected by the Municipality of Paris in 2012 per waste category

Components of waste on the total amount of MSW	
MSW (Households and Special Waste)	904,817
Recyclables	75,283
Glass	66,383
Bulky items and waste hold in the municipal collection points	87,735
Tot. (Tonnes)	1,137,586
Tot. (kg/year per capita)	501,5

(Mairie de Paris, 2013, p. 31)

Table 6.12 – Waste components found into the bin of unsorted waste in 2012 in Paris

Typology of waste	**Percentage found on the total recyclables thrown in the yellow bin**
Paper	17%
Plastic	15.6%
Biowaste	15%
Cardboard	11.5%
Textiles	9%
Glass	6.5%
Used clothes	4%

Metals	3.7%
Other	18%

(Mairie de Paris, 2013, p.35)

Within this frame, in Paris the e-waste component on the whole rate of waste separately collected corresponds to 1,596 tonnes,[284]namely 0.6 kg/year per capita, compared to 3.1 kg/year per capita in Milan. However, the French performance does not already include the contribution of retailers and the SSE sector, while we know that, in the case of Milan, e-waste collection performances refer almost exclusively to the work of municipality.

Thus concluding, compared to quite similar patterns of waste generation, in France waste management is overall more effective than in Italy, and this is the case also for e-waste governance. However, both the countries show a regional inhomogeneity with respect to waste and e-waste collection performances. Within this frame, the municipality of Milan is included into a regional and provincial context which is among the best performing on national scale. Conversely, the Île-de-France region and the department of Paris represent a negative exception into the French context regarding waste management. Again, in Milan waste collection performances are more effective than in Paris, as well as the separate collection rate, which in the Italian case is three times greater than in the French capital. We also knew that Parisians are not very attentive towards waste handling, as a lot of disposal mistakes are recorded by the municipality. Unfortunately, we couldn't provide equivalent data in Milan, while we just apprehend by the institutional stakeholders that Milaneses are considered in general good recycler.[285]Further, even if both the municipalities struggle to achieve e-waste collection targets imposed by the Directive, in Milan the municipality collects an amount of e-waste that is three times greater than in Paris. However, the French figure already misses a deepening about the contribution of retailers and SSE operators to the collection performances on urban scale. The following paragraphs enter into the detail of waste and e-waste governance in Paris.

6.2.3 Waste management policies in Paris

The first system of waste collection on urban scale has been introduced in Paris at the end of the nineteenth century by the prefect of the city Eugène Poubelle. He indeed introduced the legal obligation for Parisians to equip with a bin in order to collect their waste, before it was recollected by

[284] 1,253 tonnes of e-waste are collected in landfills plus 343 tonnes are intercepted by the yellow bin..
[285] Report made by A2A and titled "Milan recycling city" presented at the conference Novamantic. May 2014. Milan.

a door-to-door collective service.[286]At that stage and since the beginning of the twentieth century, rudimental centres of treatment already existed,[287]which consisted in plants producing fertilizers for agricultural soil, and incinerating unrecoverable matters. Further, a specific role in waste management was attributed to *ragmen*,[288]a social category dedicated to the collection and recovery of matters contained in waste already collected.[289]During the rest of the century, the system of waste collection and management evolved as in the case of Milan (see section 5.2.3), and in 1983 the separate collection of glass was introduced, followed, ten years later, by newspapers and magazines, which, for the first time, could be separately collected at home thanks to a dedicated door to door service provided by the municipality. Further, since 1997, such service was provided also for packaging waste and, since 2001, the separate collection consists of the scheme it has today,[290]which is described below. In line with the increasing evolution of waste management policies, since 2007 the municipality has been implementing a Local Program for Waste Prevention, with ambitious goals expected to be achieved in 2015,[291]specifically aimed to put in place actions for preventing waste generation and improving the separate collection rate. Today, the city of Paris provides the service of waste management to 2,268,265 inhabitants (Mairie de Paris, 2013) on a territorial surface of 105 km².[292]In this, it is the most dense French city with 21,400 inhabitants per km², and one of the most populated in Europe. We instead saw that the city of Milan has a population which is almost half that in the French capital, but distributed on a surface which is almost two times that in Paris. Thus, the city of Paris records a population density which is three times greater what registered in Milan. Here, the municipality is in charge of managing waste management and urban sanitation,[293]while the service of waste treatment is entrusted to the Metropolitan Agency for Household Waste, subsequently referred to by its French acronym *Syctom*,[294]which treats waste from Paris and also from other 83 municipalities in the Île-de-France region,

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[286] A carriage pulled by horses. Which became a motorized vehicle since 1920

[287] Called Grinding and Incineration Centres (*Centres de Broyage et d'Incinération*)

[288] *Chiffonniers* in French.

[289] Source: SYCTOM (http://www.SYCTOM-paris.fr/edi/traiter/hist/. Last consulted on September 2014). And http://www.smicval.fr/content/histoire-des-dechets. Last consulted on September 2014).

[290] Source: http://www.planete-echo.net/CollecteParis/Paris.html#Ancre_Q1. (Last consulted on September 2014).

[291] *Programme Local de Prévention des Déchets* (Source: Municipality of Paris, http://www.paris.fr/pratique/ordures-menageres-tri/prevention/plan-de-prevention-des-dechets/rub_10191_stand_68473_port_25630. Last consulted on September 2014).

[292]http://www.paris.fr/politiques/paris-d-hier-a-aujourd-hui/geographie-de-la capitale/dimensions/rub_4946_stand_3079_port_10579. (Last consulted on September 2014).

[293] For the most such services are directly provided by the Municipality, while in some roundings (*arrondissements*), and depending on different waste components collected, they are provided by external service providers. (Mairie de Paris, op. cit.).

[294]*Syndicat mixte de Collecte et Traitement des Ordures Ménagères* (http://www.SYCTOM-paris.fr/). Last consulted on September 2014.

Differently from Milan, the take-back system of domestic waste implies, beyond the separate collection of unsorted waste, a *multi-material* scheme for what concerns the recyclable matters, except glass (Torino, 2005). In particular, Parisians can separately collect at home the following matters:

- Unsorted waste into a green bin;
- Paper and cardboard, plastic, metallic waste, and small WEEE into a yellow bin;
- Glass into a white bin.

Thus, apparently in Paris condominiums are equipped with three bins. Notwithstanding, a study conducted by the ADEME illustrates that about 19% of Parisian condominiums are actually not equipped with the yellow bin, and around 40% are not provided with the white bin, for reasons of lack of space,[295]which means that a not marginal component of the population is provided just with the green bin for unsorted waste.[296]Conversely, we saw that the Milanese condominiums are actually equipped with five bins, and that no problem of space management occurs in that case.

As it is the case in Milan, in Paris a further supply service is provided to intercept the other refuses generated by households and it is represented by:

1. A door to door withdrawal service for bulky items, including the first, second and third e-waste categories.
2. A system of seven landfills, called Centres for Waste Valorisation and Delivery of Bulky Items,[297]which accept all refuses. As in the case of Milan, they are situated in the external ring of the city space, with just one exception (see Map 6.15). [298]
3. Two *clean points*:[299] two spaces dedicated to the collection of paper, plastic, metals, textiles, batteries, print cartridges, lamps and radiographs. Such collection points are situated in semi-central areas (see Map 6.15).
4. Different collection points are also provided by the distribution or by associations in partnership with the municipality[300]to collect expired pharmaceuticals, scrap batteries, used clothes and e-waste.

Map 6.13 shows the localisation of the seven landfills and the two *clean points*. We see that, compared to the case of Milan -where landfills are situated solely along the peripheral ring of the city space- in Paris such pattern is in part counterbalanced by two semi-central points.

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[295] Source: ORDIF (http://www.ordif.com/public/article_archiver/?id=16488. Last consulted on September 2014.).
[296] In order to minimise the damages deriving from the lack of space in condominiums, the municipality provides collection points dedicated to the collection of glass along the city space.
[297] *Centres de Valorisation et d'Apport des Encombrants (CVAE).*
[298] The landfill *Invalides*, which is quite central (see Map 6.14).
[299] *Espaces Propretés.*
[300] It is the case of old clothes' collection.

Concluding, in Paris the separate collection, as it is today, was introduced in 2001, as in the city of Milan. In the French capital citizens are provided with a multi-material collection scheme, which implies that the act of disposal is for them easier than in Milan. In fact, they can dispose of plastic, paper, metals and small WEEE into the same yellow bin. They are however expected to separately collect glass and unsorted waste in dedicated bins. Thus, the overall number of bins to manage for households is virtually three, but we knew that a relatively significant part of the population is not provided with bins for recyclable matters due to lack of space in condominiums, which is not the case in Milan, where households handle five bins. Again, in Paris there are seven landfills, namely one landfill for every 323,000 inhabitants, while in Milan we find one landfill for every 210,000. Further, Paris offers two *clean points* for some refuses, which instead are covered by the service of mobile landfills in Milan. Both the municipalities finally provide a door-to-door withdrawal service on appointment, and special collection points for some refuses are equally present in stores and spaces dedicated by associations. The following section enters into the detail of e-waste governance in Paris.

6.2.4 E-waste management in the French capital: a multi-stakeholders approach but a poor collection rate

This paragraph illustrates the matter of e-waste governance in the French capital. It consists of three sections: the first enters into the detail of the e-waste take-back system; the second offers a critical view concerning e-waste collection performances and the actual contribution of the institutional actors to e-waste management, and the third goes the hearth of small WEEE collection.

6.2.4.a E-waste take-back system in Paris

On the whole rate of waste collected by the municipality of Paris, about 1% consists of the e-waste component, compared to the Milanese 1.5%. Here, coherently with what required by law, the local authority, retailers and the SSE sector are expected to contribute to the primary collection phase. In this, the municipality concludes an agreement with the eco-organisms Eco-systèmes and EcoLogic,[301]which indeed are in charge of the secondary collection phase in Paris since 2007.[302] Equally, also retailers and some of the SSE operators have signed agreements with the two eco-organisms to manage household e-waste collected under the one-to-one mechanism or within a context

[301] EcoLogic makes reference to collection points located South of the city space, which are two landfills (*Quai d'issy* and *Carnot*), and one ressourcerie (*Rejoué*), while Eco-systèmes refers to the remaining collection points which are three landfills (*Chapelle, Lilas, Jessaint, Carnot, Fabert*) and three ressourceries (*La petite Rockette, Emmaüs and Interloque*).
(Source: interview to M.P., Municipality of Paris, 2013).

[302] The phase of e-waste management subsequent to the primary collection phase upon municipalities, retailers and SSE operators. For further details see section 3.6.

of solidarity economy. As seen in section 6.1.1, the contents of such agreements in terms of financial and logistical support provided by the eco-organisms, vary depending on the eco-organisms and related partners. Furthermore, the two eco-organisms have also subscribed to an agreement with Syctom, as this last is in charge of sorting small WEEE by the yellow bin at the treatment plants and to return them to the related chain.[303]Therefore, we see that the local implementation of the e-waste SC brings about an effective involvement of all the institutional actors in e-waste collection, which is not the case in Milan. Therefore, in Paris citizens-consumers are provided with the following e-waste disposal channels:

1. A door-to-door withdrawal service on appointment for the C1, C2 and C3 e-waste categories.
2. Seven landfills for all WEEE.
3. The yellow bin for small and middle-sized appliances (as microwaves, hairdryer, …).
4. Collection points provided by retailers' stores. About thirty of them have subscribed to an agreement with EcoLogic, while Eco-systèmes supports 230 collection points put available by the distribution, for a total amount of about 260 stores involved in the official e-waste supply chain within the city space.304
5. Four ressourceries which are implied in the collection of used goods and which have subscribed to an agreement with the eco-organisms and the municipality of Paris. Here, citizens-consumers hold appliances not-in-use and these are recovered and/or reintroduced into the second-hand market. In this, when old appliances result unrecoverable, they are disposed of in the municipal landfills. In Paris there are four ressourceries which contribute to EEEs reuse and e-waste management, and these are: Emmaüs,305 Interloque306 and La Petite Rockette,307 in agreement with Eco-systèmes, and Rejoué,308 in agreement with EcoLogic.

A synthetic view concerning e-waste disposal channels in Paris is offered by Table 6.14.

[303] In this, Syctom is refunded by the eco-organisms for its contribution to the supply chain (F.N., SYCTOM, 2014).
[304] Source: not published data provided by the eco-organisms EcoLogic and Eco-systèmes.
[305] http://emmaus-paris.fr/. (Last consulted on September 2014).
[306] http://www.interloque.com/ressourcerie1.htm. (Last consulted on September 2014).
[307] http://www.lapetiterockette.org/. (Last consulted on September 2014).
[308] http://rejoue.asso.fr/. (Last consulted on September 2014).

Table 6.13 – Institutional disposal channel per e-waste category in Paris.

E-waste category	Institutional Actors		
	Local Authority (Municipality of Paris)	**Distribution**	**SSE and refurbishment sector**
C1	Fixed Collection Points Door to door withdrawal on appointment	One-to-one	Ressourceries
C2	Fixed Collection Points Door to door withdrawal on appointment	One-to-one	Ressourceries
C3	Fixed Collection Points Door to door withdrawal on appointment	One-to-one	Ressourceries
C4	Fixed Collection Points	One-to-one or one-to-zero	Ressourceries
C5	Fixed Collection Points	One-to-one or one-to-zero	Ressourceries

(Authors' own, based on the Municipality of Paris)

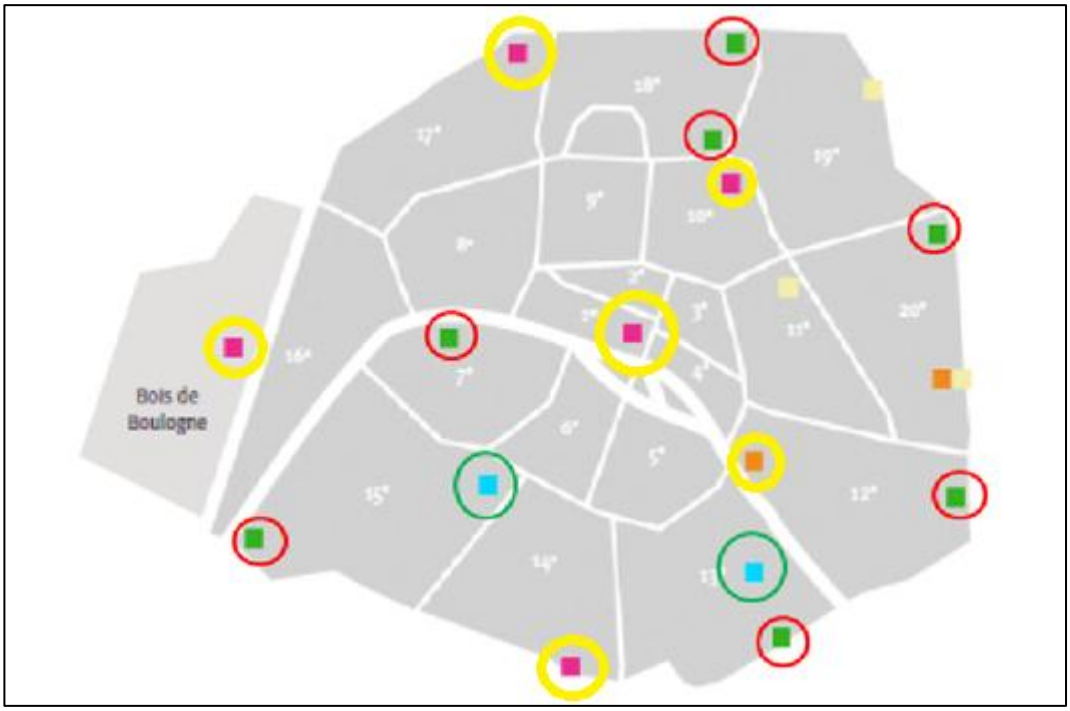
Added to these channels, M.P., key-informant in charge of waste management at the Municipality of Paris, reports that there are other institutional collection points provided, and they are represented by the so-called *focus-points*,[309]which are 6 regrouping points virtually not open to citizens but just to workers implied in waste management, and expected to collect bulky items derived from the door-to-door service, even included e-waste. Thus, they are not considered conventional disposal channels provided to citizens, however they accept waste from them when it occurs (M.P., Municipality of Paris, 2013).

The overall synthesis of all the institutional e-waste collection points in Paris is offered by map 6.14. Here we see that, parallel to the quite peripheral landfills, various disposal alternatives are provided to citizens, also located in semi-central and central areas, which in part solve the problem of their

[309] *Points Relais.*

accessibility (see section 5.2.3). To these we have to add 260 collection points put available by the distribution.

Map 6.14 – Localisation of landfills (red circles), "clean points"(green circles) and "focus point" (yellow circles) sin Paris



(Mairie de Paris, 2012, p. 40)

We can conclude that in Paris, and differently from Milan, the local implementation of the e-waste SC, consistently with the national frame, is supported by an actual engagement of the local authority but also retailers and the SSE sector. Thus, how can we explain the poor collection rate recorded? The following section goes the hearth of such question.

6.2.4.b E-waste collection rate: official, informal and illegal flows

Thanks to data provided by the Municipality of Paris,[310]we know that 0.6 kg/year per capita of e-waste are collected altogether by the municipal disposal channels. This amount is distributed among the first four e-waste categories according to table 6.15,[311]which also offers a view about the evolution of e-

[310] During the interview to the key-informant M.P. we obtained a file containing e-waste collection performances per municipal collection points (landfills, focus points and clean points), including the amount of bulky items hold by the door-to-door withdrawal service and the amount of e-waste collected by the ressourcerie La Petite Rockette, for a total rate of 1,254.369 tonnes of e-waste, namely 0.6 kg per capita in the reference year 2012.
[311] Lamps record just residual rate, namely 4 tonnes (see ADEME, 2014, p. 92).

waste collection performances from 2010 to 2012. Here, we see that a negative trend is recorded in the collection capacity of municipal channels as from 2011 to 2012 it reduced by almost half, while we know that, on national average such rate has instead slightly increased (ADEME, 2012b). Also in Milan the collection capacity of institutional channels has witnessed a decrease from 2011 to 2012, notwithstanding it was less significant than in Paris and within a national context which was recording lower collection performances as well (see section 5.2.2). Again, we apprehend that the gap recorded between 2011 and 2012 should be ascribed to a diffuse decrease in interception capacity by the municipal channels with regards all the categories, but with particular regards to the C1. Further, in Paris we see that today the C1 category is the less intercepted on the whole rate of e-waste collected (16%), followed by the C2 (26%), C4 (27%) and C3 (28%), which have however similar collection rates. Again, compared to Milan and with regard to the reference year 2012, we notice that the municipal channels prove an overall collection capacity three times greater than in Paris. In particular, in Milan are collected 492 tonnes of refrigerating equipments compared to the Parisian 210 tonnes, namely 0,4 kg per capita compared to 0.1. Then, 388 tonnes of other large household appliances compared to 345 tonnes in Paris, namely 0,3 kg per capita compared to 0.15. 1,175 tonnes of TVs and monitors compared to 350 in the French capital, that means 0.8 kg per capita compared to 0.15. 1,153 tonnes of small WEEE compared to 691 tonnes, which is 0.8 compared to 0.15 kg per capita.[312]Thus, normally, both in absolute and in relative terms, the Milanese municipal collection channels are two or

Table 6.15 - Details of e-waste collected per category in Paris (2011-2012)

	Tonnes_2011 in Paris[313]	**Tonnes_2012 in Paris[314]**	**kg per capita in Paris**	**Tonnes_2012 in France[315]**
C1	632 (26%)	210 (16%)	0.1 kg per cap.	102,757
C2	490 (21%)	345 (26%)	0.15 kg per cap.	82,762
C3	700 (29%)	350 (28%)	0.15 kg per cap.	159,195
C4	550 (23%)[316]	348[317] (27%)	0.15 kg per cap.	103,757
Tot.	2,372 (100%)	1,253 (100%)	0.55 kg per cap.	448,471

(Authors' own, based on the Municipality of Paris)

[312] We put 691 tonnes rather than 348 tonnes, as noticed in table, since we add what found into the yellow bin, as further described.
[313] Municipality of Paris, 2012. P. 39.
[314] Municipality of Paris, 2013. P. 43. Op. Cit.
[315] Source: ADEME, 2013. P. 92. Op. Cit.
[316] To which it has to add 300 tonnes found in the yellow bin (Mairie de Paris, 2012).
[317] To which it has to add 343 tonnes found in the yellow bin namely other 0,15 kg per capita. (Mairie de Paris, 2013).

three times more effective, depending on e-waste categories, in e-waste interception, except for what concerns TVs and monitors, which instead record similar rates.[318] However, we know that the primary collection phase in Milan is almost solely accomplished by local authority, so that what above illustrated represent the definitive picture about e-waste collection on urban scale. Conversely, we apprehended that in France the e-waste SC implies a more effective implication of retailers and the SSE sector in e-waste management, which are instead not already included in the collection rate so far presented, as they have a different accountability. Therefore, Parisian data already miss the contribution of such actors together with what found in the yellow bin. We thus added such flows in order to have a more complete picture of e-waste collection on urban scale. Starting from the figure of 1,254.369 tonnes provided by the municipality, we include the following additional e-waste volumes:

1. 343 tonnes of e-waste found in the yellow bin.[319]
2. 137 tonnes derived from the contribution of retailers.[320]
3. 198 tonnes derived from the contribution of the SSE sector and other alternative stakeholders involved in the official chain and in agreement with EcoLogic.[321]

We finally obtained a total amount of e-waste intercepted by the official SC about 1,932 tonnes, namely 0.9 kg per capita. Now we have a complete picture of e-waste collection performances in Paris, which is enough to conclude that, despite the overall engagement of all the institutional actors, this is strongly insufficient compared to national and international targets, and quite far from achieving them. Apparently such result conflicts with the system of provision offered to citizens, that instead seems various and diffuse, and in any case more various and diffuse compared to the case in Milan. We discuss such issue with the main stakeholders implied in e-waste management on urban scale, and emerged what follows.

1. E-waste collection performances in Paris are strongly affected by illegal phenomena, which consist for the most of theft in landfills and subtraction of appliances along the sidewalk. M.P. states that such phenomenon is responsible for the subtraction of at least 50% of WEEE disposed of in landfills by citizens and employers of the Municipality. In this, the flow of bulky items is the most affected, consistently with the valuable matters contained. He also makes notice that Parisian landfills are devoid of night surveillance, which necessarily increases the impact of such phenomena. Furthermore, C.R. of EcoLogic (2014) makes notice that, due to repeated thefts, the two landfills managed by this

[318] Here we use absolute data as we cannot provide a detailed picture on the PoM in the two urban scales.
[319] *Ibid.*, p. 43.
[320] This data doesn't include 32 tonnes of lamps collected. ADEME, 2013, Op. cit. P. 92.
[321] This data doesn't include 38 tonnes of lamps collected. *Idem.*

eco-organism ceased to collect e-waste volumes and they are temporarily inactive, as the minimum volume of WEEE necessary to make eco-organisms withdraw the cargoes couldn't be reached.[322]
In her words:

> "The decline of e-waste collected has become even more dramatic since the beginning of 2013. What we expected to collect in the landfills located South-West of the city failed to realise. (…) [Due to the repeated thefts] we decided to end the service of e-waste withdrawal and to activate a picking up service on-demand starting from 400 kg of e-waste collected. Since that date we have no more withdrawn any cargoes".[323]

Again, A.F. of the ADEME (2012) confirms that such phenomenon is a serious and widespread calamity for the e-waste supply chain. In fact:

> "The biggest challenge for e-waste SC in France is the collection of large appliances including refrigerating equipments. Here the big problem is theft, because -as these devices contain valuable matters- they are often stolen and such matters are subtracted without any environmentally sound management. So, there are people who come into the landfills to steal large appliances and then they go to scrap dealers to dismantle their components for resale. All that is prohibited, however there is an entire economy based on it".[324]

Parallel to this, a similar phenomenon is also often recalled by the institutional actors, and this is the subtraction and the e-waste cannibalisation along the sidewalk, concerning appliances which have been set down by citizens due to an appointment with the municipality to withdraw a bulky item. Also in this case our sources talk about a great amount of e-waste involved: 400 kg of appliances damaged every year plus 100 tonnes subtracted,[325]which means an additional huge e-waste drain. In the effort to prevent this event, the municipality has anticipated the timing which occurs between citizens' disposal along the sidewalk and municipal withdrawal. Notwithstanding, "The delay between e-waste disposal

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[322] The volume of e-waste which represents the minimum loading cargo is represented by eight unites, namely eight big appliances or seventeen loads of small devices (Source: M.P., Op. Cit.).
[323] "*La chute des tonnages est encore plus abrupte depuis début 2013. Le pillage a pris une telle proportion sur les sites en début 2013 qu'il arrivait à notre prestataire d'enlèvement de se déplacer pour quelques dizaines de kilos voir un aspirateur. Ces enlèvements, hors des scénarii de collecte contractuels, n'étaient financièrement pas supportables. Nous avons été contraints de suspendre les enlèvements automatiques en janvier de cette année et de passer à des enlèvements à la demande (déclenchement des enlèvements à partir des 400kg contractuels)sur les deux déchèteries. Les seuils d'enlèvement ne sont pas atteints. Aucun enlèvement n'est demandé par la Ville de Paris sur les déchèteries".*
[323] "*Aujourd'hui c'est vraiment l'informel, le vol et l'activité professionnelle ou un peu informelle parce que parfois ce sont des salariés de personnes qui arrondissent leurs fins de mois par ce genre d'activité, tout ça soit en local, soit en frontalier*".
[324] "*Aussi en France la grosse difficulté sur la collecte c'est sur les gros électroménagers et notamment les gros froids. Le gros problème c'est le vol, parce-que ils ont des composants qui ont valeur, mais à partir de ça ces substances sont pris sans faire des opérations de dépollution. Donc il y des gens qui viennent dans le déchetteries et qui volent les gros électroménagers et ensuite ils vont chez des ferrailleurs à démembrer les composants pour les revendre et le ferrailleur récupère la ferraille. Toute ça est interdit mais il y a cette économie".*
[325] Data obtained by a private phone conversation with an institutional stakeholder involved in the official e-waste SC which cannot be explicitly referred to. In the lack of detailled institutional figure about the phenomenon in question we opted to cite such figures, however it has to be regarded as merely indicative.

by citizens and the actual withdraw by the municipality is not sufficient to prevent appliances' subtractions".[326]In the words of B.R. of EcoLogic (2013), the subtraction of e-waste along the sidewalk cannot be merely attributed to illegal practices. In fact, he proposes to distinguish this flow in three channels: first: e-waste theft aimed to obtain the valuable matters contained. Secondly, the recovery of appliances. Thirdly, the intervention of waste operators which manage e-waste. We are sure to be within an illegal frame just in the first case, as the other practices are closer to the informal chain (see section 6.1.4). In his words:

> "In my opinion, today the real question concerning e-waste management is represented by the informal sector, by thefts and by the implication within this sector of an array of actors which informally handle e-waste to round their income".[327]

Thus, the first significant source of e-waste drain is represented by its theft and damage aimed to steal the valuable matters contained, and by other practices of e-waste subtraction due to informal and illegal management.

Such phenomenon has been signalled also in the case of Milan, but a smaller emphasis is given to it by the interviewed stakeholders compared to the Parisian case. However they notice that "Actually theft in landfills are quite recurrent, normally perpetrated by gipsies" (A.L., AMSA, 2012). The case of gipsies' theft is the most quoted also by other Italian informants.[328] Unfortunately, there are no further data about such phenomena in the context in study.[329]

2. Citizens' improper disposal has also to be counted amongst the causes of e-waste drain. In particular, we previously saw that that about 50% of what found in the bin of unsorted waste is composed by recyclable matters, and about 17% of what issued by the multi-material bin is represented by refuses improperly disposed. Such figure provides a general picture of a relative widespread inaccuracy in waste handling among citizens, which is supported by the institutional stakeholders. For instance, in the words of N.F., key-informant of Syctom (2014):

> "Actually, Parisians are not very attentive in waste handling. […] Also the quality of the separate collection strongly depends on the different roundings. There are some of them which record an accurate collection, as the 16th, while others that are not at all performing, as the most densely populated".[330]

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[326] *Ibidem.*

[328] CDCR, Ecor'It, and D.V. of AMSA.

[329] See the national report "*I pirati dei RAEE*" by CDCR and Legambiente.

[330] "*Les Parisiens ne sont pas trop attentifs… Après ça dépend beaucoup des arrondissements. On y a qui font une bonne collecte, comme le 16ème, et d'autres qui ne sont pas de tout performants, par exemple ceux qu'ils sont très dense".*

As in the case of Milan, e-waste improperly disposed of together with unsorted waste is then incinerated. We equally cannot provide detailed data on e-waste mismanagement by households, even if we realistically hypothesize that it represents a further cause of e-waste drain from the official chain, and in line with national and local statistics on disposal habits of consumers (see section 6.1.4).

3. The lack of the yellow bin in 19% of Parisian addresses necessarily affects the proper disposal of small WEEE, also considering the huge population density. Added to that, we see that just around 343 tonnes have been collected via this channel in 2012, compared to the Milanese 1,153 tonnes intercepted just by the EMC and the system of landfills that supposed to be less comfortable than the domestic bin. Again, we discussed the topic with the involved stakeholders, and interesting findings emerged. In particular, the municipality of Paris, in the voice of the already quoted M.P., states:

"The yellow bin for the disposal of small appliances is not prohibited but at the same time it is not encouraged. […] We've got some problems with Syctom concerning the management of these appliances in the treatment centres, so we decided to not further favour such channel at the eyes of citizens".[331]

Thus, apparently, despite the yellow bin is one of the institutional channels provided to dismantle e-waste, for reasons linked to its management in the treatment plants,[332]advertisements on it are deliberately not encouraged. We share such view with N.F. of Syctom, which comments as follows:

> "When the municipality introduced the e-waste component within the flow sorting from the yellow bin, our treatments plants got damaged, since the appliances break our machines. This is because in many plants the selection process didn't permit to sort e-waste before they pass (and damage) our machines. But it was just at the beginning… Some time ago. Indeed, today we introduced pre-selective machines which allow us to identify the e-waste component before it is destined to the treatment process. These machines are now mandatory in treatment centres, thus we solved the problem which is not occurring either".[333]

Consistent with what above, the problem would be solved, as it is confirmed by other sources.[334] Thus, we just interpret this data by considering that the introduction of the e-waste component within the flows of multi-material waste has caused some problems in terms of management both to municipality

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[331] "*Le bac jaune n'est pas interdit mais il n'est même pas permis. […] Nous avions eu des problèmes avec Syctom dans la gestion des petits appareils aux centres de traitement. De coup ce canal n'est pas trop publicisé non plus".*

[332] As seen, the Syctom is in charge of treating household waste from Paris. In this, it subscribed to an agreement with EcoLogic and Eco-systèmes in order to return e-waste issued from the yellow bin within the e-waste supply chain.

[333] "*Quand la Mairie a introduit le bac jaune pour les PAM on a eu des problèmes aux centres de traitement car les PAM ont abimé des instruments. Ça c'était parce que nos instruments ne permettaient pas de présélectionner les déchets avant de les introduire dans les machines de traitement. Mais ça fait longtemps que ça n'arrive non plus. En fait, on a installé des cabines de prétraitement qui sortent les DEEE avant d'introduire les déchets dans le machines de traitement. Aujourd'hui ces cabines sont obligatoires dans le centres de traitement donc on a bien résolue la question*".

[334] EcoLogic, op. cit.

and Syctom. For this reason, such channel has not strongly supported in communication campaigns.[335] We hypothesize that today, even if the technical problem is solved, the lack of related communications has however some middle-terms effects on citizens' disposal habits. Such topic is then deepened in the analysis of the interviews.

5. Finally, e-waste poor collection rate can be regarded in the light of a wider difficulty in general waste management in the Parisian context. In fact, as showed by local statistics and by scientific studies (Berglund & Söderholm, 2003) matters as population density, its strong variability in terms of sociodemographic features, the high percentage of *temporary populations* (students, workers from the rest of France and abroad, migrants, etc.), the urban and architectural characterisation of neighbourhoods and condos, which are equally dense and devoid of space dedicated to the separate collection, in general negatively affect the disposal habits of households. Further, we see that waste handling habits has an impact on e-waste handling habits. In Paris we knew that the waste take-back system is overall more comfortable and user-friendly than in Milan, notwithstanding the French capital records less effective collection performances. Concerning this paradox the scientific literature is divided:[336]from the one side a comfortable take-back scheme with regard to general waste is considered having a positive correlation with e-waste dismantling. From the other it is instead proved to have a negative impact on e-waste disposal. This second theory lies on the fact that normally WEEE handling represents an extra-effort in the eyes of consumers compared to waste components disposed of at home (see section 2.7). Thus, if households are already used to make poor efforts to handle their refuses, they will be also less likely to engage to manage e-waste. Conversely, individuals already used to engage to handle refuses daily produced may be more conscious about e-waste management too. Here we embrace this second theory, which seems confirmed by our empirical data. However, the analysis of the interviews will give us further details about that.

The following section offers the detail of small WEEE management in the Parisian context.

6.2.4.c Small WEEE handling in Paris

Considering altogether the disposal channels provided in Paris to dispose of small WEEE, we obtain a collection rate corresponding to 793 tonnes, which corresponds to 0.35 kg per capita: about 27% on the whole rate intercepted, compared to the Milanese 36%, namely 0.9 kg per capita. The overall Parisian figure is intercepted via the following channels:

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[335] Despite on the website of the Municipality of Paris wuch channel is well indicated: http://www.paris.fr/pratique/ordures-menageres-tri/comment-trier/dans-la-poubelle-jaune-papiers-et-dechets-recyclables/rub_8584_stand_52168_port_20232 (Last consulted on September 2014).

[336] See Darby and Obara, 2005. Op. cit.

1. Seven landfills,[337]which intercept 348 tonnes of C4;
2. The yellow bin, which intercepts 343 tonnes of C4;
3. Four ressourceries and the channel of the SSE operators, which intercepts 59 tonnes of C4;[338]
4. 260 collection points provided by retailers, which intercept 43 tonnes of C4.[339]

Let's see these channels one by one.

1. With regard to landfills, we make reference to what already stated in the case of Milan (see section 5.2.a). To reprehend it briefly: we suppose that, at the eyes of citizens, they are hardly considered the primary channel to dispose of small WEEE both for reasons linked to their localisation and for reasons linked to the environmental soundness of moving by car to dismantle small appliances. However, we knew that in Paris the distance to cope with to reach the municipal landfills is shorter than in Milan, and that in the French case one of them is situated in a central area (see Map 6.14). For these reasons, and also may be due to the informal implication of *focus points* in collecting e-waste from households, this channel intercepts about 44% on the whole C4 collected, being in this the first C4 collector in Paris.

2. In the acknowledgment of the limits linked to the service of landfills, the municipality of Paris is the only French city where e-waste management policies opted to provide a domestic bin for small appliances.[340] Interestingly, such scheme is claimed as a decisive factor in fostering e-waste collection by Milanese respondents. In this, we knew that it contributes to 43% of small WEEE collection in the French capital, which means that it is the second most successful collection channel with regard to these appliances, for just one percentage point. Anyway, it results quite surprising that it intercepts a lower amount of e-waste compared to the system of landfills, given the different relative comfort implied in the two systems. Again, we need to recall the limits of such scheme, that is: the city is not totally covered by such service which means that a relatively high percentage of inhabitants necessarily opt to alternative disposal channels. Secondarily, apparently the service has not been widely advertised among citizens due to some technical problems occurring in the treatment phase at the Syctom's plants. This could in turn contribute to get people not used to adopt such system. Furthermore, contributory causes to the poor collection rate are represented by citizens' little commitment towards waste topics, by domestic stock and by the deliberate choice to adopt different channels due to various forms of convenience and opportunity (resale, gift, other institutional disposal channels and informal handling), which are deepened in the analysis of the interviews.

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[337] Here we also include the residual and not official channel represented by *focus points*.
[338] ADEME, 2013. Op. Cit. P. 92.
[339] *Idem.*
[340] F.N., Syctom. Op.Cit.

3. The SSE sector represents the second most important e-waste collector in Paris, after the local authority. It indeed contributes to about 7.6% to the whole collection rate concerning the fourth e-waste category: 2 percentage points more than retailers. Such relative success is consistent with a national and local institutional orientation that effectively implies the circular economy in its planning. In the city of Paris this seems particularly evident also with respect to goods other than EEE.[341]Further, we can also hypothesise that such trend is not only due to the institutional implication of the solidarity economy in the e-waste MSC, but also to an already diffuse habits among Parisians to be used to second-hand markets, yard sale, flea markets, and so on, compared to the case in Milan. Here, it is not easy to identify the most impacting factor between local policies and *urban market culture*:[342]so far we can just note that the institutional involvement of the SSE sector in the official chain allows us to account for its contribution and that such contribution in Paris is relatively successful. However, we miss wider data regarding citizens' likelihood to access the second-hand market in general. Again such aspect is deepened in the analysis of the interviews.

4. Despite 260 stores equipped with e-waste collection points, in Paris they contribute to just about 5% to the whole collection rate of small equipments. How to interpret such figure? We have two main interpretative keys: the first lies on the matter of policies, the second on that of consumers. In the first case we hypothesize that the service is not very effective and not well communicated. Such topic cannot be exhaustively deepened here given the different and various stores implied, to which probably corresponds an equally various approach to e-waste management contribution. In the second we focus once again on the disposal habits of consumers, which for example are not attentive or not engaged towards e-waste handling, or deliberately more likely to choose other channels. So far we can just conclude that, on the side of policies, retailers are relatively well involved in the official e-waste SC, as discussed in the first part of the chapter, while the matter of disposal habits' has yet to be set.

The following paragraph offers conclusive and comparative insights on the local implementation of the e-waste SC in Paris.

[341] The website of the Municipality of Paris strongly fosters goods reuse and waste recovery in all the sections dedicated to waste disposal channels provided to citizens (See: http://www.paris.fr/pratique/environnement/ordures-menageres-tri/prevention-des-dechets/rub_5430_stand_124636_port_11670. Last consulted on September 2014).

[342] *Urban market culture* is here referred to in the acception proposed by Lalleman (2011) which studied the specific treats of Paris and its inhabitants in terms of market habits, with an emphasis on neighbourdhood and flea markets.

6.2.5 Conclusive and comparative insights

Compared to similar trends in waste generation and collection, the French national context results overall more effective with respect to waste management, with particular regard to waste prevention, separate collection and waste valorisation. Notwithstanding, both the countries record a strong regional inhomogeneity in waste collection rates, and this is true for waste as well as for e-waste. Descending down regional scale, and referring to e-waste management, we saw that the Île-de-France region represents a negative exception within a national frame that successfully reached the target imposed by the first WEEE Directive, as it presents a collection rate strongly over the national average. Conversely, compared to an Italian average of e-waste intercepted slightly under what requested by the Directive, the Lombardy is amongst the best performing Italian regions. Again, the city of Paris records one of the worst e-waste collection rate in France, with just 0.9 kg per capita, and even lower than what registered on regional scale. Similarly, also Milan has a collection performance lower than its regional and national average, with 3 kg per capita, but this is not surprising given the specific problems posed by urban spaces in the field of environmental and waste policies (see sections 3.1.c and 4.2). Entering in the detail of waste take-back systems in the two cities, we notice that they both have been definitely introduced as they are today since 2001, but with some differences in their scheme. In Paris the vast majority of recyclable matters are disposed of at home via a multi-material bin, which, added to that dedicated to unsorted waste and to glass, implies an ideal configuration of 3 bins per condo, while we know that, for reasons linked to the lack of space, actually a portion of the urban population is left aside the service of separate collection. Instead, in Milan five bins are provided to citizens in condos, and no problem of space management occurs in this case. This difference lies on the geo-demographic features of the two cities: where Paris has 2,268,265 inhabitants on 105 km^2, Milan has almost half the Parisian population on a surface almost two times greater. Regarding that, the scientific literature already suggests that population density negatively affects waste management, as mirrored by the relative figures in the two cities. Further, with respect to the utility system offered by the Municipalities to dismantle refuses less frequently generated, they both present a system of landfills, while in Paris they are one per every 323,000 inhabitants and in Milan one per every 210,000 inhabitants. In Paris also two *clean points* are provided together with the yellow bin for small WEEE. Conversely, in Milan there is a mobile landfill. Via this channel, 0.7 kg per capita of e-waste are collected, compared to the Milaneses 3 kg per capita. Moreover, concerning the active implication of the other stakeholders involved in the official chain, in Paris retailers and SSE operators are actually engaged in e-waste management via a system of agreements with the two eco-organisms at work in the city. Instead, in Milan the SSE sector is not included in the chain and retailers are poorly engaged with just two regrouping points, two distributors in agreement with AMSA, and a residual amount of e-waste intercepted. Despite such different implication, already

evident on national scale (see section 6.1), the contribution made by the distribution and the solidarity economy to e-waste management represents altogether about 12% of the overall collection rate in Paris. We thus deepened the potential sources of e-waste drain in that case, and we found that, as it is the case in Milan, they are mostly due to illegal and informal handling represented by theft in landfills, e-waste damage and subtraction along the sidewalk. Indicative figures estimate such flows around 1,353,400 kg,[343]namely 0.6 kg per capita. Unfortunately, we couldn't provide an equivalent proxy figure in the case of Milan due to poor available data. However we know that theft in landfills is equally common in the Italian case. Furthermore, other sources of e-waste drain are represented in both the cities by citizens' e-waste mismanagement, domestic stock and preference for informal e-waste handling channels (recovery, gift and resale). Again, we have no accurate data about that, but we can cautiously smooth national average (see Figure 6.18). Moreover, retailers and SSE operators not involved in the official chain represents a further source of e-waste drain, while we consider that, given the different structural problems linked to the two chains in Italy and in France, such flows' escape is necessarily higher in the city of Milan, even if not quantifiable. Within such frame, small WEEE are the most intercepted among the five e-waste categories in Paris as well as in Milan.[344]This is probably consistent with the fact that they are not exposed to informal handling practices along the sidewalk, but also probably because in landfills they are not among the most valuable refuses compared to other e-waste categories, as large appliances, and consequently less subject to theft. In Paris small WEEE are collected for the most via the system of landfills (44%), secondarily by the yellow bin (43%) followed by the SSE sector (7.6%), and retailers (5%).[345]Conversely, in Milan they are almost solely collected by the municipality, which means via the system of landfills and the EMC. Here we see that the system of landfills is relatively efficient in both the cities, while the other channels present quite unsatisfactory collection performances. In particular, we see that in Paris the yellow bin intercepts a lower amount of e-waste volumes compared to municipal landfills, which is quite surprising given the comfort of the domestic bin scheme. We explained such issue by pointing the attention on the lack of communication campaigns concerning this channel, due to technical problems to treat them in plants, which apparently are now solved. Equally, retailers and SSE actors seem relatively low performing with respect to the related system of provision offered in Paris. We suppose that this is due to the lack of actual supporting information campaigns, to a poor active engagement amongst the various stores, and to citizens-consumers disposal habits. Table 6.16 offers a comparative synthetic view concerning the key-figures of the e-waste SC implementation in the city of

[343] Starting from our sources, we calculated about 50% the theft in landfills, plus 400 kg of e-waste damaged along the walkside and 100 tonnes subtracted along the walkside.
[344] Actually, in Milan TVs and monitors are the most intercepted category, but with a collection rate just slightly greater the C4.
[345] A residual contribution is made by further stakeholders in agreement to EcoLogic.

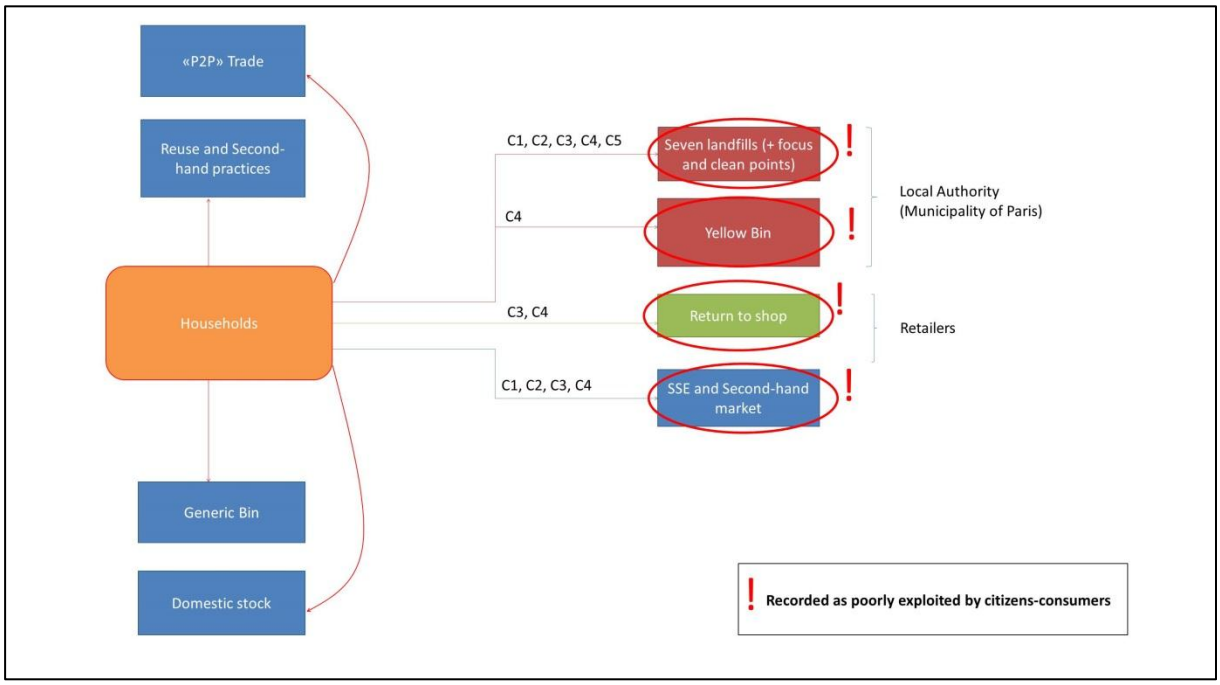
Milan and Paris. Table 6.17 presents instead a picture of small WEEE flows in Paris and related channels.

Table 6.16 The Milan and Paris case-studies: key-figures about e-waste management on urban scale

	Milan	**Paris**
Area in Km^2	180 km^2	105 km^2
Population	1,260,000	2,260,000
Population density	7,000 Hab./Km^2	21,200 Hab./Km^2
kg/year per capita of waste collected	542 kg/year per capita	502 kg/year per capita
kg/year per capita separate collection	190 kg/year per capita	65 kg/year per capita
kg/year per capita of e-waste collected	3 kg/year per capita	1 kg/year per capita (+ retailers)
Separate collection introduction	2001	2001
Introduction of e-waste separate collection	2001 (Big devices) 2007 (Implementation WEEE Directive)	2001 (Big devices) 2005 (Implementation WEEE Directive)
Collection scheme	Mono-material selective collection (paper, plastic and aluminium, glass, bio waste, unsorted waste) Specific collection points for uncommon refuses (expired medicines, batteries, e-waste,…) Door to door service for bulky items	Multi-material selective collection (paper, plastic, aluminium, e-waste) Mono-material for unsorted waste and glass Specific collection points for uncommon refuses (expired medicines, batteries,…) Door to door service for bulky items
Points of collection for e-waste	6 landfills 1 mobile collection point (Retailers)	7 landfills 4 collection points afforded by SSE operators Yellow bin Retailers (+230 CP)
Role of retailers	Poor (2 RPs + 1 CP + unknown number of retailers applying the one-to-one)	Relatively strong (260 CPs + unknown number of retailers applying the one-to-one)
Role of SSE operators	Difficult to investigate - Recorded as absent	4 Ressourceries

(Authors' own)

Table 6.17 - Small WEEE disposal channels in Paris



(Authors' own)

Here, on the side of the formal, informal and illegal supply chain we tried to fill in the unavailable figures by considering as proxy average data on national scale. Conversely, e-waste disposal behaviour of citizens-consumers represents the object of the following third and last part of the chapter.

Part III

6.3 E-waste disposal behaviour: findings from the Paris case-study

As in the case of the Italian section, this third part of the chapter illustrates the sociological insights deriving from the analysis of the interviews to the university students in Paris. With regards to the theoretical dimensions here investigated, and to avoid repetitions, we make reference to sections 4.3 and 5.3. The results obtained by questioning such dimensions are equally presented as in the Milan case-study, which means by illustrating the most recurrent items per each category, and then by providing a view on the profiles of e-waste recycler. Consistent with the other two parts of the chapter, the results are presented compared to the Italian case. The following paragraph opens the section by describing our findings with regard to the matter of attitudes.

6.3.1 Environment and attitudes

Consistent with the Italian case presentation, here the matter of attitudes is illustrated according to three dimensions: environmental issues in general, waste handling and e-waste. Let's start with environmental friendly attitudes.

1. French respondents, with few exceptions and similarly to Milaneses, tend to show a concerned attitude towards the estate of the environment and related topics. Indeed, typical responses are "It's a very important issue"[346] and "It's one of the most important value to live my life".[347]However, and it is also the case in Milan, it is commonly claimed that the willingness to accomplish sustainable objectives is too strongly challenged by a vast series of competing demands and practical needs. In particular, the economic compromise and the lack of alternatives which actually support green conducts, make sustainable habits very hard to achieve. Thus, French students declare to be environmentally concerned but not actually strongly engaged due to contextual causes.

Following B.:

> "I'm more interested in the quality and price of products… For the rest I try to make my best… I assess the pros and cons of my choice and I consider my budget… I like bio products… I appreciate all this stuff… However I'm not

[346] "*C'est l'une des questions les plus importantes*". Interview to N.
[347] "*C'est l'un des critères les plus importants de ma vie*". Interview to F.

> extreme… Life is already complicated and green purchase is too expensive… Notwithstanding I feel to be sensitive towards environmental issues".[348]

Again: "I buy environmental friendly products for household cleaning… I try to be attentive in this… But I cannot behave green eery time because green goods are more expensive".[349]

Starting from this shared view, two differences occur between Milaneses and Parisians, and they consist firstly in a more widespread tendency, within the French sample, to admit in case to not be very environmentally concerned. And secondly, within the same sample, in a greater arguing capability concerning environmental topics. With respect to the first item, a typical recorded response is the following:

"[Sustainability] it's important for me… that's for sure. However I think that it's not the case to be monothematic: there are other questions to think about".[350]This finding can be comparatively interpreted in the light of social norms. Namely, we can hypothesized that within the Italian sample the matter of environmental concern is perceived as more socially constrictive. Conversely, with respect to the greater ability among Parisians to talk about the main environmental issues, we propose two interpretations. The first lies on a hypothesized bias in the two samples, which derive by the different university backgrounds. In fact, for the most Parisians attend courses in economics, engineering and management, while Milaneses in social and human sciences. Actually, such different domains are not sufficient per se to explain a better understanding of environmental questions, notwithstanding we can suppose that these are more likely to be addressed in technical fields of knowledge. Secondly, we can conjecture that French students are more skilled in talking about environmental issues for reasons linked to the general level of the related public debate in France. Regarding this argument, Corona and Fortini (2010) put in light how the different historical characterisations of the environmental movements in the two countries contributed to bring about different public debates about the topic, which in turn differently impact the public opinion. In particular,

> "The contents of the environmental movements significantly impact the way the public opinion evolves. […] Within the Italian case, the environment is not

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[348] "*Moi après c'est plutôt des critères de qualité et de prix et puis bon j'essaie de faire un peu ...de voir le pour et le contre et je fais mes arbitrages par rapport à mon budget. Moi je suis sensible à tout ce qui est bio ; je suis sensible à tout ça. Après je ne suis pas exclusif non plus parce que je trouve que c'est aussi trop se compliquer la vie et puis aussi payer trop chère mais j'y suis très sensible* Interview to B.

[349] "*Les produits ménagers que j'utilise, j'essaie de prendre des trucs… pas tout parce qu'après il y en a c'est quand même plus cher et donc je ne vais pas tout prendre*''. Interview to A.

[350] "*C'est important enfin pour moi ça l'est c'est sûr. Après je pense qu'il ne faut pas non plus être monomaniaque, il y a d'autres enjeux*''. Interview to Al.

> conceived as a field of knowledge amongst others, but as an interpretative category of [political and social issues]".[351]

They further argue how, in Italy, the public debate about the environment mostly developed around political orientations rather around scientific and technical arguments.[352]On the contrary, the two authors state that in other countries, as Germany and France, such debate has more technical contents. In other words, the Italian public debate about the environment would be strongly politicized, while in France it would have a more technical characterisation.

If such argument holds also in our case, the different ability in the two samples would be generated by the different tenure of the media and political discourses about the environment in the two countries. Unfortunately, we cannot further explore such item.

2. With regard to attitudes on the waste topic and on separate collection, two main responses are recorded. The first is similar to what emerged in the Italian case, namely that waste handling is something important and easy to do. For instance:

> "I think it is not so hard to do the separate collection… And the Municipality of Paris also improved in this.... It is not very hard to take a bottle and put it into a bin... I think it's really just a habit to apprehend. You just have two bins and then you get... Once you get… that's easy!".[353]

Secondarily, respondents declare to be quite attentive towards waste handling, but not very attentive. Here they show a kind of more naïve attitude compared to the Italian sample, as they are more likely to admit to not be strongly engaged even if the topic is considered to be important. For example:

> "If I have the opportunity to do [the separate collection], why not? I do not get rid of my waste on the ground but within the dedicated bin... However, I'm not trying to change the world".[354]

And again:

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[351] "*I contenuti ambientalisti possono, a mio avviso, avere una ricaduta importante sulla costruzione del senso comune. […]. (In Italia) l'ambiente non è stato considerato come un ulteriore terreno di studio, che si è andato ad aggiungere agli altri, ma come una nuova categoria interpretativa (attraverso cui analizzare i problemi dello sviluppo, della distribuzione delle risorse, della giustizia sociale)".* (P. 79).

[352] They refer to the way environmental issues are conveyed amongst the vast public and to its acquisition as collective question.

[353] "*Moi je pense que ce n'est pas tellement dur de faire le tri sélectif, enfin ils ont pas mal amélioré en tout cas sur Paris(…) C'est pas très dur de plier une boîte de cartonne en deux et de la mettre de côté. Je crois que c'est vraiment juste un réflexe à prendre quoi. Il faut juste avoir deux boîtes: une pour chaque et puis c'est tout. Une fois qu'on l'a pris ça c'est facile*". Interview to B.

[354] "*Si j'ai l'occasion de le faire, pourquoi pas. Je ne vais pas jeter mes déchets dans la rue, je vais les jeter dans une poubelle… Mais je ne cherche pas non plus à faire des démarches pour améliorer la situation''.* Interview to M.

> "Anyway [the separate collection] implies a minimal effort as you are not always provided with bins… Thus, sometimes it's just laziness… I have some friends who do not separately collect any refuse as they are bothered by doing that".[355]

Parallel to such common view, another recurrent item emerges, which is quite opposite, and that is the waste handling is an annoying and complicated task to accomplish: "That's the opposite of ordinariness!".[356]However this is a minority position. Thus, as Milaneses, normally French students declare to be concerned about waste handling. Notwithstanding, there is a component into the French group which is more likely to admit to not be engaged as the separate collection is an uncomfortable task. Finally, a further interesting argument emerges, which is the recurrent opinion that inaccurate waste handling won't affect the overall quality of waste collection as refuses are recollected in any case in the treatment plants, since the multi-material scheme already implies a re-selection of waste after citizens' disposal. Here, the confidence in the treatment technology is supposed to counterbalance a sort of deliberate negligence in waste handling, which doesn't occur among Italian respondents, who notably have a mono-material collection scheme.

3. With regard to the environmental concern of Parisians towards the e-waste topic, we record the most divergent responses compared to the Italian sample. In fact, with respect to a common poor ability to argue about the issue in general terms, French respondents are however able to provide clear opinions about how used equipments can be handled, with particular attention towards their residual economic value. E-waste disposal is then referred to as a potential little source of profit, which is completely absent from the Italian sample. For instance:

> "There is a financial aspect… Even beyond the environmental aspect… For example when I dispose of a computer, I consider it has a monetary value: even if the product does not work, all its components will be reused… It will be fixed, another product will be created… And I think it is recycled as well as plastic or other refuses… So I think the financial incentive is the best way for me to educate people".[357]

Thus, Milaneses struggle to identify any item concerning e-waste question and its disposal, as they are poorly skilled about that. Conversely, Parisians tend to identify such question in terms of economics

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[355] "*Enfin c'est juste des flemmards en même temps... Enfin j'ai des amis qui ne trient pas et c'est littéralement parce qu'ils ont la flemme''*. Interview to Al.

[356] "*Bon déjà ça demande un petit peu d'efforts parce que c'est pas à côté ça c'est le contraire au quotidien*''. Interview to M.

[357] "*Je pense que oui, de toutes façons le recyclage pour moi c'est… Il y a quand même un aspect financier. Au-delà même de l'aspect environnemental je pense que du coup par exemple quand je jette un produit informatique, je prends ça comme une valeur : même si le produit ne fonctionne plus, tous les composants qui sont dedans ben ça va être réutilisé ; ça va être... Enfin voilà. On va le réparer, il va y avoir un autre produit qui va être créé et là je pense que ça participe au recyclage au même titre que le recyclage de la nourriture ou que les produits plastiques. Donc je pense que l'incitation financière c'est le meilleur moyen pour moi de sensibiliser les personnes en fait*''. Interview to B.

and as opportunity to save resources and money thanks to reuse and second-hand market. In this, the e-waste question is rarely represented as environmental issue, but rather more as monetary one.
Furthermore, in Paris another recurrent idea relates to the matter of privacy as key-factor in orientating e-waste dismantling. Indeed, private data contained in many electronic equipments, like computers and mobile phones, are recalled as driving elements in impacting related disposal behaviours. In particular, they are supposed to justify domestic stock or informal management. In the words of A.:

> "You never know; I cannot get rid of an electronic device by putting it together with unsorted waste… No way! One thing I do is, for example, breaking an old appliance before throwing it away... Well, if they are chips I always break them so they won't be reused... I've nothing special inside my appliances but I anyway prefer to break them to be sure that none will acquire my data".[358]

We hypothesize that the different approach to the e-waste issue in the two groups can be linked to three sets of questions. The first already recalls the different university background of the two samples: may be a more technical knowledge is linked to a major tendency to treat waste (and e-waste) topics as matter of economics and technology rathen that a merely environmental and ethical question. Secondarily, we suggest that French respondents are more accustomed to EEEs use compared to Italians. Here, consumption patterns are in question. We try to have a look on statistics issued by Eurostat concerning various analysis on the usage of ICT in European member countries, and actually we found that in France ICT products are normally more diffuse and used, also among young population.[359] We can further suppose that the pervasiveness of ICT goods within the market has an effect on the specific related knowledge about its EoL handling. But this is just an hypothesis which cannot be verified here. Thirdly and lastly, the different attitude in the two samples can be explained by the different prevailing housing conditions as we saw that Parisians leave for the most alone, while Italians live at home with parents. We thus suggest that the two groups have also different lifestyles with regard to their economic expenditure. Following B: "Paris is a really expensive city and so people seek to make some little profits as long as they can."[360]Such finding is also consistent with what already hypothesised about the significant role of the informal sector in intercepting e-waste flows in Paris (see section 6.2.4.c): we knew that in the city specific consumption patterns occur with regard to second-hand market and resale of used goods which can support our hypothesis. Again, these

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[358] "*On se dit qu'on ne sait jamais ; mais jeter comme ça dans la poubelle non. Par contre il y a un truc que je fais c'est par exemple s'il y a un truc numérique, je vais le casser en fait… Enfin s'il y a des puces je les casse toujours en fait. Pour pas que ça ne soit réutilisé… Enfin je ne fais rien de spécial mais je préfère casser les trucs et au moins je sais qu'il n'y aura pas une utilisation derrière par quelqu'un d'autre quoi*''. Interview to M.
[359] We considered "Internet access and use in 2010", 193/2010 - 14 December 2010, Eurostat and "ICT usage in enterprises 2011", 65/2011, Eurostat. Both available on http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/publications. (Last consulted on September 2014).
[360] "*Lorsque la ville est très chère, on cherche toujours de faire des petits profits''.* Interview to C.

are just hypothesis that could not be verified in this study, notwithstanding they represent useful reflections for further insights, coherently with the explorative aim of the present research.

6.3.2 The matter of behaviour: environmental indicators

Here the environmental behaviour of French respondents is illustrated compared to Italians. As in section 5.3.2, three subsections are proposed regarding, respectively, general green behaviour, collection habits and e-waste disposal.

1. Consistent with what emerged by questioning the matter of environmental attitudes, and similarly to the case in Milan, respondents struggle to actually integrate green conducts in their daily life, despite they declare to be concerned. This is because, once again, environmental goals are claimed to be too challenged by a series of competing demands (economic compromise, lack of alternatives, time optimisation, actual comfort of green alternatives, etc.). Thus, we find just a minority stating that green values are actually well integrated in their lifestyles, and this is for the most via consumption choices oriented to bio products and via other small details. For instance:

> "At certain extents [green choices] are integrated in my ordinary behaviour. However my efforts have some limits…I mean: I don't mind to spend some more time to address these issues… But they are integrated just like I pay attention to turn the light off when I go out for example…".[361]

Thus, we record a gap between environmental concern and ordinary behaviour also in the French sample. Notwithstanding, given that in general we noticed that Parisians are more likely to admit that they are not very concerned, here the gap attitude-behaviour is less significant than in Milan. Furthermore, in Paris respondents tend to attribute the responsibility of the environmental question to institutional actors and economical forces rather than individuals' willingness. And they do so also in order to support their own relatively poor engagement. This is a great difference compared to the Italian sample, where respondents tend for the most to approach the issue in terms of individuals' ethic. Following B.:

> "I think people are aware of the question… However it's not upon them to solve it, they have not the power. For example (…): it is upon the financial system –which works in place of many governments in the vast majority of countries- [to solve the

[361] "*C'est intégré dans une certaine mesure mais j'ai quand même conscience de mes limites. Enfin ça à beau être intégré ça ne me gène pas de prendre des bains de temps en temps et que.. mais c'est intégré dans la mesure où naturellement je pense à éteindre la lumière quand je sors*". Interview to M.

> question]. I think that's clear that it is upon financial institutions to put in place long-term policies to address the environmental question".[362]

Parallel to economic factors, also legislative elements are often recalled as driving factors which can foster personal conduct. For instance:

> "I think that the question lies in laws: there are not constrictive laws… Laws would impact individuals' behaviour because people do not have any alternative… They would be obliged. (…) I think that if we have some laws in France about that, may be me too… I'd be influenced, me and many others".[363]

Thus, we found that also within the French sample there is a gap between declared environmental concern and related behaviour, notwithstanding here it is less significant than amongst Italians, due to a more widespread tendency in Paris to admit to not be strongly engaged. Furthermore, Milaneses tend to pose the question of environmental behaviour as a matter of personal values, while in France they are more likely to refer to institutional actors to explain their own poor engagement.

2. Similarly to the case in Milan, French respondents declare to be attentive in waste collection. Notwithstanding, and this is another finding in common with Milaneses, when they come across a refuse which is dirty or uncertain in terms of consisting materials, they opt to approximate disposal rather than seeking information. Another recurrent response in common with Italians concerns waste disposal habits in public space and in social occasions: also Parisians tend to adapt their behaviour to contextual conditions. This means that in the absence of dedicated bins and/or depending on the perceived behaviour of others in different contexts, respondents adopt adaptive behaviours. Again, and this is a difference compared to the Italian sample, in several cases French students declare to not collect separately their refuses due to the lack of dedicated bins within their domestic contexts, as in condos. They are also more likely to admit to not be very attentive towards the way they dispose of waste. Such issue is linked to the idea that refuses are going to be reselected in the phase of treatment, which means that improper disposal amongst citizens is not perceived as prejudicial to the final quality of the separate collection. Thus, in general, French respondents result more (likely to admit to be) approximate in waste collection, and this is not only in case of little concern, but also in case of lack of dedicated infrastructures both in many public and domestic spaces, and due to the idea that refuses

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[362] "*Les gens sont résignés tout simplement parce que c'est pas les citoyens qui ont le pouvoir. J'ai l'impression qu'on a pas le pouvoir de changer quoi que ce soit ...je prends un exemple par ce que c'est vrai que là-dessus je suis extrêmement sensible à ça, mais le système financier c'est ce qui remplace tous les gouvernements dans la majeur partie des pays du monde; c'est clairement ces institutions financières qui ont ce pouvoir là de mettre en place les politiques et les stratégies à long terme*". Interview to L.

[363] "*Le problème je pense que c'est aussi une question de loi : il n'y a pas de loi. La loi permettrait d'influencer parce qu'on aurait pas le choix, on n'est obligés de le faire. (...) En france s'il y avait cette loi je pense que moi en tout cas ça m'influencerait forcément et beaucoup de monde d'ailleurs*". Interview to C.

contained into the multi-material bin will be reselected anyway, so that an accurate disposal is actually not necessary to guarantee a proper treatment.

3. As it is the case in Milan, also within the French sample it is not an easy task to draw respondents' profiles according to their e-waste collection behaviour. Indeed, the most of them presents a mixed conduct which varies according to e-waste categories and the availability of disposal channels. In particular, recurrent responses refer, as in Milan, to the impact of (W)EEE size, functionality, reparability, cost and emotional value on its end of life handling. With respect to such general findings, and to avoid repetitions, we make references to section 5.3.2 and we subsequently proceed by emphasising the differences occurring in the two samples. In particular, firstly Parisians are more able to argue their disposal choices, while we saw that in Milan students struggle to respond to the question of e-waste disposal as they focus the attention on the issue at the moment of the interview for the first time. Secondarily, in Paris as in Milan the most recurrent choice is the stock, while in Paris this is justified by the will to protect personal data and by the aim to resale the appliance as "before thinking about landfills, I think about the way to round my money".[364]Conversely, in Milan students tend to stock mainly for reasons linked to the lack of information about e-waste disposal and to the will to use appliances "just in case", which are however recalled also by Parisians but to a lesser extent. Again, compared to an equivalent lack of experience of the system of landfills,[365]in Paris it is more recurrent the reference to the one-to-one mechanism also with regard to small devices, while we knew that in Milan it is recalled just concerning large appliances. Another great difference between the French and the Italian group relates to the reference to informal channels in e-waste disposal. Indeed, with respect to a similar attitude to reuse old devices amongst family members and friends in both the samples, in Paris we record a more widespread tendency to resale (W)EEE by adopting alternative channels as on-line resale, internet café, small retailers that buy old appliances in place of applying the one-to-one, and gift options provided by the SSE sector. Such attitude is quite absent in the Italian group.

In sum, a typical response recorded within the French sample sounds like the following:

> "We recover old appliances between us. In general, when I buy a new appliance, I give the old one to a friend of mine… As I have some friends that frequently got their appliances damaged… Or which lose them very often. So, I've always someone to give my old devices. Otherwise my mom usually storage old

[364] *"Avant de penser à où sont les décharges, je pense à la façon d'arrodir''.* Interview to L.

[365] Similarly to the case in Milan, if respondents are not from Paris, normally they have experienced the system of landfills in their city of origin.

> equipments … Or again when I buy a new mobile phone I give the old one to an internet café to earn some money… 5 or 10 Euros…".[366]

And again:

> "Actually, the most of my appliances are not broken… So usually I resale them to actors of the flea market or similar… Or we recover them by making a gift… It's what I did with my old TV: I gave it to some friends… probably I also got rid of some little appliances (improperly)… It probably happened… Anyway we have a large cellar where we can stock a lot of stuff rarely in use".[367]

Again, with respect to large appliances, also in this case Parisians recall informal ways of handling, with particular reference to the practice of disposing of them along the sidewalk with no appointment with the Municipality, because these are expected to be collected by other citizens, in a sort of anonymous exchange which concerns also other goods as furniture. Lastly, within the French sample we record a less widespread tendency to delegate e-waste disposal to parents, but we read such finding by considering that respondents in Paris leave for the most alone or with flatmates. Thus, concluding, with respect to a similar lack of experience of the system of landfills, in both the samples respondents tend to stock (W)EEE for reasons linked to laziness and lack of disposal related skills, while we knew that in Paris they also do that for reasons linked to private data contained and to resale purposes. Further, in Paris the role of retailers and the SSE sector in contributing to e-waste collection is much more referred to and exploited than in Milan, consistently with the effective implication of these actors in the SC. Again, in the French capital a vast array of alternative ways are also recalled as useful channels to dispose of (W)EEE: internet cafés, on-line resale, small purchasers, informal exchange along the sidewalk, etc. Which all allow respondents to make a little profit in waste dismantling and which are absent in the case of Milan. Again, we interpret this finding by considering that in the city of Paris the informal sector is more diffuse than in Milan, and that two different purchase habits occur in the two contexts, as hypothesised in section 6.2. The next paragraph focuses on respondent's awareness concerning the waste and e-waste topic.

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[366] "*Mais on récupère pas mal en fait entre nous. Donc en général par exemple quand je vais acheter un portable, l'ancien je le donne à un ami parce que j'ai des amis qui cassent très régulièrement leur portable ou qui le perdent très souvent donc en général j'ai toujours quelqu'un à qui donner le portable et sinon ma mère stock beaucoup les anciens portables. Sinon quand je vais acheter un autre téléphone à un taxiphone dès fois j'en revends un pour gagner que ce soit 5 ou 10*''. Interview to M.

[367] "*C'est vrai que la plupart des choses ça casse pas, donc souvent on revendait en brocante ou ce genre de choses, ou on récupère par exemple mon ancienne télé du salon on l'a donnée à des amis; la petite télé qu'on avait avant elle est passée dans un studio qu'on reloue; souvent on récupère en fait.. On a cet optique de... C'est vrai que bon je ne sais pas si… Il y a dû y avoir quelques petites choses jetées mais ça va c'est assez minime. Parce qu'aussi on a la chance d'avoir une grosse cave donc on stock pas mal d'objets qu'on utilise une fois par an*''. Interview to Y.

6.3.3 Awareness on waste and e-waste topics amongst French students

With respect to the waste and e-waste question, the responses given by French respondents are quite similar to those recorded in Milan, with some slight differences. In particular, concerning the matter of waste, we notice that Parisians show to be aware as they provide an arguing capability which is normally greater than within the Italian sample. In this, the waste theme is widely known not only as environmental issue, but also in its economic and political implications. Conversely, with regard to respondents' awareness concerning the matter of separate collection, this is significantly lower, as it is the case of Milan. Indeed, in general, Parisians are not aware about waste management processes and secondary treatment phases concerning domestic refuses. And we also saw that such lack of awareness in some cases negatively impact disposal habits as some respondents believe that, due to the multi-material collection scheme, households' waste is anyway reselected by the Municipality. Secondarily, with respect to the e-waste question, we record that French respondents are quite more aware concerning the economic value of (W)EEE than the Italians, while they are not aware about the political and environmental questions related. Again, and similarly to the case in Milan, even if in absence of a specific knowledge about the e-waste question, also Parisians are aware that such refuses deserve particular treatment processes compared to other refuses. Following C.:

> "It's a kind of intuition… A kind of aversion to throw electronic equipments together with other refuses, as you actually do not know about the consequences of your choice. It's just a matter of consciousness, it's not always a reasoning but just an impression … It's intuitive that electronic appliances can be dangerous for human health if not safely treated".[368]

The following paragraph provides additional insights on the matter of respondents' knowledge concerning waste and e-waste handling.

6.3.4 Disposal skills

Here, behaviour specific knowledge in waste and e-waste disposal is illustrated. As in the case in Milan, the matter of disposal skills concerning the separate collection in general and towards the e-waste component is showed, followed by a focus on the main information retrieval channels adopted by French respondents, and by the most recalled educative context in the apprehension of waste handling. Starting from the disposal skills concerning the separate collection in general, responses

[368] "*C'est une sorte d'intuition, de répulsion qui fait que tu ne peux pas le mettre à la poubelle traditionnelle sans connaître vraiment les implications directes; une sorte de conscience aiguë qui sait que non ça va forcément y être. C'est pas forcément rationalisé, c'est ..on sait qu'il y a des composants qui sont...qui peuvent être dangereux tels que le plomb, en tout cas qui peuvent être dangereux pour la santé si jamais ils devaient être transformés*''. Interview to Y., Op. Cit.

result very similar to the Italian case. Indeed, with respect to a common ability to describe the local separate collection scheme in broad outlines, many refuses still result ambiguous in terms of their disposal (e.g. yogurt packaging, mixed materials, dirty waste, etc.), and they are not properly disposed of. For example: "It is true that when I do not know how to dispose of my waste, I don't seek information… It is negligence or unwillingness... I simply don't do it".[369]And again: "I'm pretty uncertain about my conduct in these cases… But I think I get rid of my waste by disposing of it together with unsorted refuses".[370]Again, and as well as in Milan, French respondents just rarely opt to seek information about the separate collection by institutional channels, while for the most they take these by asking flatmates, family members and by looking at the instructions posed on bins' lid and provided by the Municipality. Here a difference occurs between respondents living in Paris and those living in small towns of the hinterland. As in the case in Milan, these latter are more skilled regarding refuses' disposal. Furthermore, with respect to the most recalled educative contexts in which students apprehend to manage their waste, the familiar one has the leading role, followed by institutional events (initiatives at school, public meetings and other dedicated events organized by the Municipality), and by past experiences of life where the matter of separate collection was perceived as more socially compelling than in Paris (e.g. Erasmus in Germany or North Europe). Lastly, also within the French sample there is a broad reference to personal ethics to doing the separate collection, while it is however less significant than in the Italian case.

Conversely, with regard to e-waste disposal specific knowledge, again we record responses similar to the Italian case. In fact, normally French respondents are poorly competent about the institutional channels dedicated to e-waste disposal. For instance:

> "I think e-waste is something we do not really know where to dispose of. I think it is really a lack of information. (…) There is a lot of information about the separate collection in general… But not about electronic equipments' dismantling".[371]

Surprisingly, none among the students interviewed recalls the yellow bin as useful channel to collect small WEEE. Anyway, also in the French sample, municipal disposal channels are more broadly known with respect to large appliances, with particular reference to the withdrawal service and the one-to-one mechanism. However, to these the French informants add also the abandonment along the

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[369] "*C'est vrai que quand j'ai à faire à un déchet en fait, je ne vais pas le faire* (seeking information). *C'est de la négligence ou du manque de volonté… voilà je ne vais pas le faire''.* Interview to B.

[370] "*Je ne sais pas très bien ce que je fais mais je mets dans la poubelle ou je mets avec tous les détritus''.* Interview to M.

[371] *"Je pense que électronique c'est qu'on ne sait vraiment pas où mettre ses objets en fait. Je pense que c'est vraiment un manque d'information. C'est vraiment ça. Parce que maintenant les téléphones on sait on sait par exemple mais sinon les électroménagers ou quoi on ne sait pas du tout où le mettre. Au niveau du tri sélectif il y a quand même beaucoup d'informations enfin on sait ce qu'il faut trier et où mettre les déchets enfin, c'est dans une poubelle et c'est en bas de chez nous. Au niveau de l'électroménager on ne sait pas''.* Interview to A.

sidewalk of big equipments as "someone is going to withdraw them"[372]whatever they be: the Municipality or other citizens, while we saw that such practices do not occur in the Italian case. Instead, concerning small appliances, a slight difference between the two countries is then represented by the better knowledge amongst Parisians concerning the role of retailers in the supply chain. But then the greater difference lies on the significant ability within the French sample to recall informal channels to dispose of (W)EEE, which is quite absent amongst Italians (see section 6.3.2). Here, again, respondents are not used to seek information by adopting institutional channels, but just by asking information to friends and family members, or by noticing communication campaigns, which is the case for the one-to-one mechanism. Thus, concluding, within both the French and the Italian sample, waste collection scheme is just approximately known, and many refuses are not properly disposed of due to laziness in actively seeking information, which indeed are asked via informal channels. Furthermore, with respect to e-waste disposal, again both the samples are poorly skilled concerning the institutional channels offered by the official chain, with a common better knowledge in the case of large equipments' disposal. Given that, Parisians know very well a vast array of alternative disposal channels, which for the most belong to the informal e-waste chain, while we saw that in Milan informal handling is just represented by domestic stock, familiar gift and some episodes of recovery. Again, in both the samples the control group represented by students living in small towns of the hinterland is more likely to properly dispose of e-waste, and also more skilled in the related official channels. Lastly, in the two groups the most educative contexts to apprehend waste handling is firstly familiar, then institutional, thirdly linked to past habits and finally related to personal ethics. In this, institutional events are more broadly recalled within the French context. The following paragraph enters in the detail of respondent's opinion about the work of the stakeholders involved in e-waste management on local scale.

6.3.5 Individual behaviours and institutional actors

Here we deepen the relation between the interviewed students and the actors involved in the e-waste SC, even included the informal channels. First of all, the role of the municipality is questioned. Here, as it is the case in Milan, French respondents tend to show a positive opinion. It is indeed commonly recognized that the city is in general well administrated, with particular reference to the matter of urban hygiene and waste governance. In this, the only negative recurrent item refers to information campaigns: it is indeed claimed that these are not well implemented, with particular respect to e-waste management. We consider that such opinion is affected by the contingencies of the interview, as the vast majority of informants reveal to be poorly skilled in recalling e-waste disposal channels. Given

[372] "*On a surement quelqu'un qui vient le prendre*". Interview to E.

that, the channels offered by the Municipality to dispose of e-waste are, as seen, quite unknown, and this is true not only with respect to the system of landfills, but also to the yellow bin. Conversely, concerning the role of retailers, this is quite known, and in particular with regard to large appliances. Conversely in Milan we saw that their role is recalled just in this latter case, and quite disregarded about small WEEE. In this case, respondents knew about such service via informal channels and via promoting posters within the stores. Again, the SSE sector is in several cases recalled by Parisians as an useful way to dispose of used equipments, while in Milan such channel is quite unknown. French respondents normally know such service because they come across a dedicated initiatives or by hearsay. Several second-hand networks are broadly recalled also with respect to used goods also different from e-waste, as clothes, furniture, toys, etc. Finally, when Parisians are questioned about the attribution of responsibility in e-waste management disposal, they tend to consider EEEs producers as first responsible, followed by the Municipality and by individuals. Here we see that, differently to the case in Milan, French respondents point the attention to institutional actors rather than individuals' in attributing responsibility about the waste question management. In particular, elements like eco-design, monetary policies, stringent normative, etc. are referred to as the most significant driving forces in fostering sustainable lifestyles amongst the vast public. Conversely, we know that in Milan respondents tend to attribute the greater responsibility of waste management to individuals and related values. We try to explain such divergence in two ways. The first is related to the already mentioned greater ability, into the French sample, to argue about the environmental and waste topics. Thus, we can hypothesise that a major knowledge regarding the political and economic implications of the question can also generate a perspective which is more likely to emphasise the interrelations between social and institutional behaviours. On the other side, we can also suggest that this difference lies in the fact that French respondents are in general less performing in waste and e-waste handling, and also more likely to admit that. Here, attributing the responsibility of the waste question to institutional actors is also useful to remove such responsibility from themselves. Or may be both the arguments equally work.

Finally, we see that, in Paris as well as in Milan, students often opt to familiar gift and domestic stock to dispose of their (W)EEE. However, it is just in Paris that we find that the vast majority of respondents adopt informal channels for monetary purposes, in particular appliances' resale and recovery. We here continue to support the hypothesis that in the city of Paris there is a more diffuse and rooted offer for used goods to enters into a second-hand market, and that such economic and cultural configuration has a strong impact on e-waste disposal habits, which in turn means a diversion of e-waste flows from the official chain.

6.3.6 The social side of individuals' conduct: contextual and interpersonal influences on the act of disposal

This section illustrates how social norms and interpersonal influences affect the disposal behaviour of French respondents. Here, as in the Italian case, the first factor is addressed by presenting the most recurrent opinions with respect to a series of ideal-type situations of improper and proper disposal behaviour proposed during the interview. The second is then represented by the main common answers concerning the influence of family members (or flatmates) and neighbours' behaviour in affecting the disposal conduct of students.

1. This first part illustrates the main findings concerning the perception of social norms in waste handling within the French sample. This part follows the same order as in the Milan case-study (see section 5.3.6).

a. We first proposed to students to make comments about the matter of monetary incentives conceived to encourage green conducts among the vast public. Here the answers recorded are quite similar to those given by the Italian group. In fact, it is in general argued that financial incentives should not be considered as key driver to foster sustainable habits, as these should be accomplished as value per se. Notwithstanding, if they work, they are anyway "better than nothing". Following A.:

> "I think that's a very disappointing tool… We shouldn't have monetary incitation to behave properly. I think it's really disappointing. However : if it works, if it actually encourages people to behave as they should be… It's better than nothing. Anyway I think that's a pity that people are incentivised by this way".[373]

However, we can say that in general Italians seem to be more critical towards the economic incentives in the domain of sustainability, rather than French students.

b. As already anticipated in the previous paragraph, when respondents are asked about the attribution of responsibility in waste management between individuals, producers-retailers and municipality, the most responded that's up to producers to play a decisive role in preventing waste generation, followed by households and local authorities to guaranteeing a proper waste management. For example:

> "I'd say that producers are the first responsible… It's upon them to put on the market goods which are easily recyclable and more lasting. They are not directly implied in waste treatment but in its prevention… Then I'd say that's upon citizens to properly dispose of their waste and the Municipality is then responsible for

[373] "*Je pense que c'est bête d'en arriver là, et qu'il ne devrait pas y avoir d'incitation financière pour bien se comporter, je trouve ça bête. Maintenant si c'est le moyen pour motiver les gens c'est mieux que rien...mais bon ! Je trouve ça dommage d'en arriver là*''. Interview to E.

> providing adequate collection points and for motivating people to collect their waste".[374]

Here we notice that in the French group respondents tend to emphasize the role of producers in contributing to waste prevention, while we saw that Italians tend to give a sense of responsibility to most individuals. To comment such findings and to avoid repetitions we refer to what already stated in the previous paragraph.

c. For what concerns the trust in institutions as important driver to foster green conducts amongst the vast public, we record similar responses as in the Italian case. In fact, normally French students state that the lack of trust in institutions is reasonably an element which disturbs individuals' willingness to contributing to achieve goals of sustainability. Notwithstanding, none of them has actually experienced this type of situation, which is referred to as an extreme case typical of specific geo-political contexts. Thus, respondents concluded that, in general, the argument of a lack of trust in institutions as form of disincentive to act pro-environmentally, is rather more an excuse for those who are simply lazy. In the words of M.: "I think that's not an effective argument: I think that [Who talks like this] simply doesn't mind about the environment or he is not at all concerned about these issues… It's not really what does he think".[375]In reacting to such item, no differences occur between the French and the Italian group.

d. French and Italian respondents share also the same opinion with regard to the idea that every single person should do his part, whatever do others do. Here, we see that in both the samples the item of a proper conduct is commonly acquired as a value per se, even if we knew that, in practical terms, also French respondents admit to be influenced in their disposal behaviour by the perceived conduct of others. However, on the front of social sensitivity, it is widely considered that everyone should makes his part independently from external pressures. We cite Y. to propose an example:

> "It's too easy to say that [I don't contribute 'cause I'm just a sole person]… I think that the whole society is just an addition of people. If everyone does like that we'll reach all together our goals. It's not because the others do not contribute that you do not contribute too. It's in any case something more… If you contribute you are in any case making a little difference".[376]

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[374] "*Je dirais pour les producteurs d'assurer le fait que ce soit recyclable facilement, ensuite que ce soit un peu plus solide.. Enfin ça ce n'est pas forcément dans les déchets mais faire en sorte qu'il y en ait moins... Ensuite pour les citoyens, une fois qu'ils ont utilisé leur déchets de bien faire en sorte de le déposer au bon endroit, et la municipalité de à la fois permettre aux citoyens d'avoir des lieux de dépôt de déchets, et d'être aussi assez incitatif pour à fois les citoyens'*. Interview to M.

[375] "*Je pense que c'est faux. Je pense que c'est parce qu'ils s'en moquent ou ils ne sont pas du tout sensibilisés alors ils ne pensent pas à ça''*. Interview to Y.

[376] "*C'est facile de dire ça. Je pense que la société c'est une addition de personnes, d'individualité donc si tout le monde le faisait, il faut se dire dans la tête que si tout le monde le faisait on atteindrait quelque chose. Ce n'est pas parce que les*

e. When we proposed to French respondents to make comments about the improper disposal of those who, despite they are concerned, struggle to do the separate collection as it is not always an easy task, we normally found that they agree with such statements at a greater extent compared to the Italian group. For instance:

> "[The difficulties in doing the separate collection] are quite plausible. We really need to be educated to the separate collection : it's not always an easy task. For example when you have a cardboard box you cannot put other paper inside before you dispose of it, otherwise all the stuff then ends with the unsorted waste. But people have not always the time to fix this sort of things and not everyone know this kind of detail. So, it's true that we need some education about that".[377]

Here we notice that, even if also within the French sample we found respondents that discredited the statement proposed, however in general they judge inaccurate disposal as less severely than it is the case within the Italian group. Again, we can consider that such opinion has a self-justificatory role as we know that Parisian informants are not so attentive to do the separate collection, but also we can suppose that social norms about waste handling in their context are actually less compelling than within the Italian case. Or both the explanations either.

f. Interestingly, and similarly to the Italian case, a justificatory attitude regarding improper collection behaviours is even more evident in the case of e-waste handling, as it is widely considered that there is no information about the way to dismantle this type of objects. Following B.:

> "[The difficulties] depend on the refuses. I think that there are no problem about the way to dismantle packages, while there are a lot of problems with respect to e-waste. I think that people do not know the system of disposal of such appliances and so they get rid of their phones with unsorted waste. They have no idea about the ways provided to dispose of it".[378]

We can conclude that, in general, social norms that surround waste improper disposal are less constrictive within the French sample, while the two groups are instead in line when they make

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autres ne le font pas que toi aussi tu ne dois pas le faire. Ça fait toujours la différence parce que tu seras une personne en plus qui le fera''. Interview to Al.

[377] "*Elles sont véritables. Il y a un véritable besoin d'éducation et de formation pour faire le tri des déchets ; c'est pas toujours facile (...). Par exemple quand on a une boîte en carton il ne faut pas mettre du carton dedans avant de la jeter parce que sinon tout va finir à la poubelle commune, parce que les gens n'ont pas le temps de sortir tout ce qui est dans la boite en carton sur les chaînes de tri donc pas tout le monde ne le sait donc il y a un véritable besoin de ...enfin éducation*''. Interview to M.

[378] "*Dépend pour quel déchet. Je pense vraiment que pour tout ce qui est emballage non. (...) Pour les déchets électroniques oui c'est sûr qu'il y a un gros problème. (...) Donc je pense que les gens n'ont pas conscience de où va leur portable s'ils le jettent à la poubelle et ils ne savent pas non plus où mettre leur portable''.* Interview to C.

comments about e-waste improper disposal, which is commonly considered a hard task for citizens due to a lack of related communication campaigns.

2. This second subsection proposes the main findings concerning the perceived impact of interpersonal influences on the disposal behaviour of French respondents. As in the Milan case-study, two social dimensions are here proposed: the familiar (or alternatively that referring to people living in the same dwelling unit), and the dimension of neighbours, as the space dedicated to the separate collection in condos is normally shared.

a. As already mentioned when the French sample was described (see section 4.4), here there is a greater number of students living alone compared to the Italian group. Obviously such difference does not allow us to have a perfectly corresponding view in the two samples. However, the number of French respondents which leave with parents or with flatmates confirm what already emerged in the Italian case, namely that they are influenced in their collection behaviour by the conduct of close people. In particular, also in this case the impact is normally referred to as positive since, in absence of a specific personal interest by them, the engagement of other persons living in the same domestic unit is a strong incentive in doing better. This is not only because respondents tend to adapt their behaviour to the conduct of others, in a sort of synergic social behaviour, but also because close persons considered as more skilled in waste handling represent also the primary source of information on this matter. Thus, the presence of others have an impact on individuals' waste collection both due to behavioural adaptive trends and to the opportunity to retrieve information via informal and easy channels. Equally, as in the case in Milan, such impact can also be negative, as if respondents have the impression that the general quality of waste collection is low due to others' mismanagement, they also feel to be discouraged, but this second case is referred to quite rarely. For instance:

> "If others are attentive, that's obviously something which affects our own behaviour… Our own attention. On the contrary, if they are not attentive, I know that's not cool, but [This also negatively impacts our behaviour]".[379]

Again, and this is another element in common to the Italian case, when respondents live with parents they are normally less personally engaged in waste handling, as this task is considered upon parents. In accordance with Y.: "Waste management at home and bringing it in dedicated bins in condominium is not my task... Normally I'm not at home… I just simply get rid of my waste at home…".[380]

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[379] "*Après si les personnes sont elles aussi attentives forcément ça renforce notre comportement, notre attention. En revanche si elles ne le sont pas, oui c'est vrai, c'est terrible mais […]*''. Interview to E.

[380] "*Ce n'est pas forcément moi qui descend les poubelles. Le plus souvent je ne suis pas chez moi donc je jette dans la poubelle mais après*. Interview to Al.

Conversely, when respondents live alone they feel to be more attentive towards waste handling, as this task is directly taken in charge by them.

b. For what concerns the impact of neighbours in respondents disposal act, we record similar responses to the Italian case, namely that this is not perceived as influencing. However, respondents living in university residences hold evidence that here common spaces dedicated to separate collection are commonly not respected, and that the general attention to waste handling is quite poor within such context. However, none within the French group admit to be negatively impacted by such a perception of neighbours' mismanagement. Furthermore, and differently from what emerged in the Italian sample, students rarely know if there is a doorkeeper in charge of waste management within their condos. More widely, we find that French students are less attentive to the separate collection than the Italian group.

The following section proceeds by approaching the relation that French students reveal to have with the (W)EEE object, and how it impacts e-waste disposal.

6.3.7 Features of electronic appliances and related act of disposal

This section illustrates the impact that (W)EEE intrinsic features have on the related disposal behaviour of French respondents. Here, we largely make reference to what already stated for the Milan case-study (see section 5.3.7), as quite similar findings do emerge also in Paris. In brief, we find that the size, functionality, price, private data contained and symbolic value of (W)EEE, all affect disposal behaviour. In particular, the largest the appliances the greater the likelihood it is disposed of via official channels. This is due not only to the perception of a more severe environmental impact of large appliances' mismanagement, but also to practical reasons, as "small devices perfectly go into the unsorted waste bin and the problem is solved soon",[381] while large ones need a dedicated effort anyway. Secondarily, respondents tend to storage, to give as present or to resale functioning appliances non in use. Broken EEE are instead often disposed of together with unsorted waste, as this act is perceived as not so seriously impacting the estate of the environment. Alternatively, broken appliances are also stocraged due to the symbolic value they can hold, to protect the personal data contained, and because they have a monetary value which can be exploited. In fact, we find that in some cases also broken appliances are sold to informal purchasers.

By exploring the relation between (W)EEE features and disposal behaviour of respondents, the only difference occurring between the French and the Italian group is represented by the greater tendency in Paris to resort to informal disposal channels, even included the anonymous exchange (as in the case of

[381] "*Les petits appareils vont parfaitement dans la poubelle, donc le problème dans ce cas-là est bientôt résolu*". Interview to Lo.

bulky items abandoned along the sidewalk). Here, that's the monetary value that EEE hold which impacts the related disposal. The following section analyses the impact of past behaviours and habits on the disposal act of respondents.

6.3.8 Routines and practices: the performative role of past behaviours in waste disposal

As in the case in Milan, here we offer a view on the disposal habits of French respondents, by adopting the theoretical paradigm proposed by the social practice theorists (see sections 2.5 and 5.3.8). This paragraph then consists of two subsections: the first shows disposal practices according to its three components: imaginaries, skills and artefacts. The second shows additional findings by addressing the concepts of discursive and practical consciousness as useful tools to read respondents' behaviour.

6.3.8.a The matter of practices amongst French respondents: main findings and comparative insights

According to the theoretical model already used to illustrate social practices in the Italian sample, also here our findings are presented according to the three dimensions: recurrent imaginaries about the waste and e-waste topics; skills in terms of competences in waste and e-waste disposal; and artefacts intended as relation between disposal behaviour and features of (W)EEE object utility system provided.

a. With regard to the main imaginaries which arise when French students are asked to talk about the waste question, responses are quite similar to those recorded in Milan. In particular, to justify a kind of broadly poor engagement towards the waste question, as Italians talk about a typical "Italic way", interestingly French students talk about a typical "French way", which is supposed to be naïf and inattentive to environmental topics. In this sense, respondents present a kind of dichotomised imaginary: from the one side they present the French people as poorly concerned, from the other they present the German and other North European peoples, as having a much stronger civility in the field of waste management. We have similar findings in the Italian case, even if in that case, added to the binomial Italy-Rest of Europe, we also find the binomial North Italy-South Italy, which is clearly linked to the peculiar territorial inhomogeneity of the Peninsula in terms of waste management, which apparently doesn't apply in the French case. The second most common imaginary again refers to proper disposal habits as a matter of politeness. As in the case in Milan, images linked to cigarettes butts on the ground widely recur. Here we see that waste handling tends to be more associated to questions of peaceful coexistence, cleanliness, respect of common goods, etc. rather than to the environment. Again, two last scenarios are often recalled: natural catastrophic events implying waste hyper-generation, mismanagement and consequent pollution, which for the most refers to media

communications (e.g. Naples, litter at sea, abusive open tips,…). Secondarily, waste handling recalls the ordinary and daily experience of the separate collection (bins, domestic tasks, etc.). Thus, as in the case in Milan, we see that the main recurrent imaginaries regarding the waste question refer to issues of local culture, politeness, natural pollution and ordinary home management.

Conversely, with respect to e-waste, respondents struggle to provide clear images, notwithstanding such difficulty is less significant than in the Italian case. We thus see that the main recalled scenarios relate to the monetary value of such devices, and the potential dangerous matters contained: e-waste is regarded as a very specific component of waste. Again, in some cases respondents can also offer further details regarding the link between (W)EEE and recovery, second-hand market, ethnic neighbourhoods, informal exchange, and other practices that arise when the matter of e-waste handling is discussed. This attitude is quite divergent to what emerged in the case of Milan, where very poor images are recorded about e-waste.

b. The matter of skills is exhaustively contained in section 3.4 of the present Chapter. To avoid repetitions we make reference to this section, while it is here sufficient to recall that regarding both waste and e-waste disposal channels, respondents show to be relatively poorly skilled. However, and similarly to the Italian case, the level of their competences normally depend on refuses' typology and (W)EEE intrinsic features. In this, and with respect to the e-waste component, they are quite aware of alternative disposal channels, which is not the case in Milan.

c. Artefacts are here recalled in the form of objects and utility system. With regard to waste and e-waste intrinsic features we make reference to section 3.7 of the present chapter. To reprehend it briefly we just reaffirm that the intrinsic features of ordinary refuses impact their disposal, with particular regard to dirtiness, type of materials and mixed materials. Conversely, e-waste disposal depends on refuses' size, symbolic value, original price, data contained, and functionality. So far French responses are quite similar to those given by the Italian sample. Secondarily, concerning the relation between respondents and utility system provided to dispose of waste and e-waste, the following findings emerge. First, normally Parisians know the service of landfills but they do not know their location. As it is the case in Milan, landfills are perceived as far and not easy to access but with a car, notwithstanding, actually they have never experienced them. This recurrent item represents a great difference compared to the control group, where instead all respondents know and have also experienced the municipal landfills of their cities. Secondarily, French respondents have an approximate but sufficient knowledge about the collection scheme proposed by the Municipality with respect to the vast majority of recyclable and unsorted refuses, but they never recall the yellow bin as useful channel to dispose of small WEEE, as apparently they do not know such channel. Ironically, in some cases students state that providing a domestic bin for small appliances would represent a key factor to solve the problem of their collection. Furthermore, retailers' role in e-waste collection is quite

known, mainly concerning large appliances' disposal. However, the one-to-one mechanism is recalled also for small devices, which is a great difference compared to the Italian group. Again, second-hand markets in different forms is also considered as a useful channel to dispose of EEE. In particular, often respondents refer not much to the network of solidarity economy, but rather to other more informal ways to dismantle or resell use equipments.

Thus, we can finally conclude that, as in the case in Milan, waste disposal amongst French respondents is normally perpetrated in accordance with the following driving factors:

1. Practical question related to home management.
2. A general awareness on waste topic.
3. Behaviour-specific knowledge for the most apprehended within family context or previous experiences.
4. Refuses' features.
5. Comfort of the tack-back scheme.

To which we also have to add:

1. Social norms.
2. Disposal behaviour of those living within the same context.

Conversely, e-waste disposal is related to:

1. E-waste features.
2. Previous experience of the take-back scheme.
3. Knowledge of the one-to-one mechanism.
4. Awareness concerning the monetary value of (W)EEE.
5. Habits to second-hand market.

We see that the attitude to second-hand market; being aware of the monetary value of (W)EEE; and being aware of the one-to-one mechanism, represent the main divergent treats compared to the Italian case. The following paragraph offers additional insights to the matter of practices.

6.3.8.b Discursive consciousness and disposal behaviour

This section offers a resuming view about the internal consistency between environmental concern, actual awareness and related behaviour. As in the case in Milan, this view concerns the matter of environment in general, the separate collection and e-waste disposal.

1. Compared to the Italian group, French respondents are in general more skilled in talking about the main issues related to the environmental question, in respect to which they declare to be concerned. Notwithstanding, on the front of conduct and similarly to the Italian case, they are normally poorly engaged. To explain such gap, they normally refer to contextual and situational restraints which are actually supposed as preventing individuals to act green. Here, the most recalled factors are: economic compromise, perception of a time squeezing, lack of alternatives, variables of comfort and convenience, need of optimising different activities and needs.

2. In the case of separate collection, we again see that respondents are quite aware of the major issues related, even if normally they have not specific knowledge about its treatment after disposal. Their attitude towards the theme is declared concerned, but they rarely engage in seeking information and in case of doubt they act intuitively. In this, we see that the attention posed to the separate collection is relative low and depending on refuses' features: if they are easily identifiable they are properly disposed of, on the contrary –if their disposal implies a specific effort in terms of information retrieval or energy demanded- they are more likely to be improperly disposed. Again, when French respondents argue about their conduct, they normally refer to three series of factors: personal laziness, difficulty in identifying the refuses' material, and trust in the treatment process, which is supposed to re-select what already collected by households. Except for this last argument, which is linked to the specific collection scheme of recyclable waste in Paris, the emerged findings are quite similar to the Italian case.

3. Despite the common intuition that e-waste deserves specific disposal processes due to its intrinsic features, rarely respondents could indicate at least one municipal channel to dispose of it, mainly in the case of small appliances. And this is quite surprising given that, in Paris, respondents are provided with a domestic bin to dismantle e-waste. They are however able to recall alternative ways to collect e-waste: the most of them are informal but also they make reference to the one-to-one mechanism and to the SSE sector. The widespread habit of (W)EEE resale is consistent with a general awareness that respondents demonstrate with respect to the monetary value of electronic equipments. Additional results repeat what emerged within the Italian group to which we make reference (see section 5.3.8.b).

The following section illustrates e-waste recycler profiles.

6.3.9 Comparing e-waste recycler profiles in Paris and in Milan

As it is the case in Milan, we propose three profiles of e-waste recycler according to the categories proper, improper and transient collection conduct. Before entering into the detail of these typologies, two considerations occur. First, as for the Italian case, the classification proposed is highly conventional, as we saw that all of the respondents interviewed present a mixed disposal behaviour, namely they adopt different collection conducts depending on the appliances and on other factors,

subsequently illustrated. Secondarily, we again classify our respondents by considering as *e-waste* just broken devices, since, as in the case in Milan, old appliances are ubiquitously storaged, given to family members or friends, and resold. Thus, with respect to this dimension, we record just a poor variability.

1. Proper e-waste disposal.

As it is the case in Milan, the first evidence concerning the group of *proper recyclers* is that they are represented for the most by the control group, which means that they live in small towns in the hinterland of Paris and not in the city. Added to them, we also commonly find that students who are not originally from Paris were used to dispose of e-waste in the municipal landfills of their cities before coming to the Capital, while they never experienced such service there. Again, we hypothesize that this evidence is due to two sets of factors:

1. People living in small towns are more accustomed to frequent municipal landfills since these are (perceived as) closer and more accessible than in city space. Here we talk about "perception" as respondents actually do not know where landfills are located in Paris, however they state that these are far and inaccessible.

2. People living in small towns are more accustomed to frequent municipal landfills since they are already more used to take the car for daily journeys (Colleoni, 2008).

Furthermore, proper recyclers within the French sample are also represented by Parisians who adopt the one-to-one mechanism to dispose of large and small appliances: they state to know such service as they were informed by retailers or by hearsay. Again, we find that some students living alone in Paris hold their e-waste to parents as these latter are expected to dispose of it in the municipal landfills of their city of origin. We get similar evidences also in the case in Milan. With respect to that we consider that waste management is often regarded by the young target chosen as a domestic task which is upon parents. Finally, we find evidences that the largest the size of (W)EEE, the most likely respondents to properly dismantle them, and this is apparently due to the willingness to solve a practical problem rather than a particular environmental concern. Indeed, as in the Italian case, we do not record evidences of a link between environmental concern and proper e-waste disposal.

Thus, concluding, proper e-waste collection in the French group is associated to:

1. An already rooted familiarity to the municipal system of provision.

2. The easy accessibility of collection points situated in spaces which are busy for various reasons but not related to waste management (e.g. retailers,…).

3. A synergic functioning within familiar units, where waste disposal is taken in charge by parents, which are also the major source of information retrieval regarding waste handling.

4. The will to solve a practical problem (this is the case for bulky items).

Such findings repeat what already emerged in the Italian group, while the only difference is represented by a greater likelihood amongst the French students to adopt the one-to-one mechanism for small WEEE disposal.

2. Improper e-waste disposal.

Students which get rid of e-waste into the bin of unsorted waste are a strict minority, as in the Italian case. We see indeed that students, in case of doubt, are more likely to storage (W)EEE rather than to improperly dispose of it, because they are commonly aware that this waste component deserves specific processes of treatment. Thus, mismanagement normally regards small and very small appliances (earphones, chargers, etc.) as these are perceived as low impacting. In the words of M.:

> "I think that actually people don't know how to dispose of these appliances, where are landfills situated and so on. They just have to get rid of an object and such object goes perfectly into the bin… So they throw it there!".[382]

Again, improper recyclers cannot be necessarily classified as poorly concerned with respect to environmental issues.

Thus, in general, and as in the Italian case, we can conclude that improper disposal is associated with:

1. Laziness.
2. Perception that the disposal act wont' bring about severe impacts due to the small size of appliances.

3. Transient conduct: e-waste stock and reuse.

As it is the case in Milan, this is an ubiquitous behaviour. Starting with the common treats between the French and the Italian samples, we can say that students storage old equipments because:

1. They hold affective and symbolic value;
2. They contain personal data;
3. Respondents do not know how to dispose of them and they can delegate the question to the future due to (W)EEE size.
4. Respondents want to cumulate a certain amount of equipments before disposing of them;

Furthermore, in both the groups respondents often give old equipments to family members and friends. However, just within the French group we see that students often adopt informal e-waste disposal channels, as for instance: resale, recovery and gift to the SSE sector. Here, the monetary value of equipments, together with a wide availability of second-hand channels in the city, and a broad

[382] "*Je pense que... Disons que... C'est un portrait type parce qu'on ne sait pas forcément où se trouve la décharge la plus proche; on doit jeter un objet et il rentre parfaitement dans la poubelle donc on le met dans la poubelle.*'' Interview to M.

habit to access private-to-private practices (for example in the university context) generate an ubiquitous propensity to (W)EEE resale and informal exchange. We have no trace of all that into the Italian case: we can thus conclude that in the French group also the monetary value of electronic equipments significantly affect the related disposal choice. Concluding, informal e-waste handling as resale is normally associated to:

1. The perception of the economic value of the appliances;
2. The widespread availability of informal and second-hand channels to dispose of e-waste.

The following and conclusive section hold final considerations and comparative insights.

6.3.10 E-waste disposal behaviour: conclusive and comparative insights

This final section proposes conclusive considerations about what emerged by the interviews to French students compared to the Italian sample. In particular, here two sets of reflections are offered: the first relates to the common findings emerged in the two cases, while the second focuses on further insights specifically issued from the French case.

1. We concluded the Milan case-study by providing six sets of reflections (see section 5.3.10), which can be definitely regarded as valid also in the case of Paris. Such considerations are here briefly reprehended:

a. The difficulty to extract e-waste recycler profiles according to the items *proper* and *improper* disposal. Indeed, various contextual and socio-psychological factors intervene in disturbing the relation between willingness to act and actual disposal. The general result is that in both the samples all of the e-waste disposal behaviours recorded are mixed, and the variability of the collection behaviour depends on:

- Intrinsic features of the (W)EEE object (size, functionality, emotional value, data contained)
- Awareness concerning the economic value of e-waste.
- Disposal specific-behaviour knowledge.
- Past behaviour.
- Social norms and interpersonal influences.
- Visibility and availability of collection points.

b. The weak association between environmental concern and e-waste disposal behaviour.

Actually, also in the French sample we found that all respondents declare to be concerned about the estate of the environment, while we record a gap between such attitude and the disposal behaviour.

c. The definition of *extra-ordinariness* and the limits of personal engagement in the separate collection.

As it is the case in Milan, we found that as long as the disposal act can be postponed, it actually is. In particular, it is considered as *extra* any effort made to seek actively information and any engagement to dispose of e-waste by a dedicated moment. Again, as in the Italian case, e-waste handling is instead regarded as *ordinary* when the following factors occur:

1. Disposal channels have already been experienced: we indeed see that past behaviours have a performative role with respect to actual disposal conducts.
2. Disposal channels are accessible without a dedicated effort.
3. An active engagement is already part of a rooted flows of domestic actions which are normally perpetrated within households unit. This is the case for example of those already used to frequent the service of landfills for refuses which can be also different from e-waste, as it is witnessed by respondents living in small towns.

d. Waste management as domestic task within synergic familiar unit.

Also in the French sample we see that family members and flatmates act in synergy regarding house management and related tasks, and that waste handling is normally considered as a domestic task, rather than a matter of environmental concern. Here, to avoid repetitions we make reference to what already mentioned in section 5.3.10.

e. The impact of social relations on individual behaviours. As in the case in Milan, we record that also the disposal behaviour of French students suffers from a certain instability depending on different social contexts. In particular the behaviour of *others* is useful as:

1. It is the most common source of information retrieval.
2. It can represent a factor of encouragement or discouragement in doing “the right thing”.
3. It tacitly gives proof of the social normativity of the disposal act in any context.

f. The utility system: features and effective channels.

Finally, we see that respondents are sensitive to the infrastructural system provided to them to dispose of waste. In particular, we notice that the familiarity to the utility system positively impacts the respondents’ propensity to adopt it, and also that the most visible and comfortable the disposal system is, the most likely it is to be adopted. However, the French case offers additional and problematic insights to this reflection as we knew that the yellow bin to dispose of small WEEE is quite unknown amongst our respondents. The following part notably goes into the detail of the specificities issued from the Paris case-study.

2. This subsection illustrates the main differences between the French and the Italian e-waste disposal behaviour which we could investigate by the interviews. Furthermore, it shows definitive considerations with respect to our hypothesis and explorative purposes.
First, with respect to the specificities of the Paris case-study, our reflections make reference to the following issues:

a. The impact of the informal sector on e-waste disposal in Paris.

b. The major implication of retailers and the SSE sector in e-waste management.

c. The surprising poor success of a comfortable way of disposal: the yellow bin.

d. Cities and nature: different impact on waste handling.

a. We see that one of the most significant differences recorded between the Italian and the French sample relates to the recurrent reference in this latter to the informal channel to dispose of (W)EEE, with respect both to working and broken appliances. The use of this channel is quite ubiquitous and we saw that it is related to the awareness of respondents regarding the monetary value of electronic equipments. But this is not all, indeed, respondents describe a general urban context where the opportunities to exploit such value by reselling old devices are apparently various and widespread (ethnic neighbourhoods, flea market, small purchasers,…). Here, we hypothesized that this habit is an important factor to interpret the disposal behaviour of e-waste amongst students in Paris, and that it can also represent a relative significant source of e-waste drain from the official chain (see section 6.2). We also proposed that such different attitude between the French and the Italian group is given by two factors:

1. A second-hand sector which is much more rooted and developed in Paris than in Milan.
2. A habit used to second-hand market which is much more rooted and developed in Paris than in Milan.

We consider such reflections as important findings issued from the explorative purposes of the research, and in this they are expected to deserving further analysis.
b. Secondarily, we see that the more effective implication of retailers and the SSE sector in the official SC has an impact on individuals' disposal behaviour. Indeed, the reference to such channels to dispose of e-waste is broadly greater in Paris than in Milan. We thus consider that the actual involvement of disposal channels alternative to those provided by the Municipality positively affects the general collection rate of the chain, as users are provided with diffuse and widespread collection points, which notably do not demand an *extra* effort to dispose unusual refuses.

c. We surprisingly apprehended that none of respondents know the yellow bin as useful channel to dispose of small WEEE. And this is even more surprising as in some cases respondents state that a dedicated domestic bin would be a key factor to improve small (W)EEE collection. How to interpret such finding, which is also proven by the poor collection rate that it records (see section 6.2) ? We here propose three explicative hypothesis:

1. Respondents do not know such service as it is deliberately poorly prompted by the Municipality (see section 6.2.4.c).

2. Respondents are used to adopt just two bins to do the separate collection at home: the multi-material and the unsorted waste bin. We here recall what already found by previous studies, namely that a negative association can occur between comfort of the waste take-back scheme and attention posed to the act of waste disposal by the vast public. We thus read such finding by considering that students interviewed just do not pay attention to the way they collect their waste, as they are used to consider just as *generic recyclable* and *unrecyclable* and e-waste is just considered as a component a part.

3. The lack of the yellow bin in part of the Parisian condos can then be regarded as an element which concur to discourage a proper disposal act because:

   - Users can have doubts about the actual necessity of the service.
   - Users can have doubts about the actual efficacy of the service.
   - Users can be not very used to separately collect they refuses.

d. We finally want to pose the attention to a further element which recur in the French interviews as well as in the Italian, namely the reference to a certain variability in the disposal act due to factors linked to the urban space compared to the countryside. In particular, we record that the vast majority of respondents in the two samples admits to be more attentive towards waste handling when they are not in city spaces (e.g. during holidays or in a second-home in the countryside). In the words of L:

> "[Handling waste] is a habit… However, it is much harder to achieve such habit in urban contexts compared to the countryside. I think that in cities we are more likely to lose this habit… And we tend to be less attentive… This is because in city we have all comforts, and we don't need to ask about where the waste goes... But when you go to the countryside, where the utility system is not always easily accessible, then you say "I have to dispose of my waste… I have to act" and this why we are more responsible".[383]

We try to explain such attitudes in two ways:

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[383]"*Est une habitude mais elle est beaucoup plus dure à avoir en ville qu'à la campagne en fait. Je trouve que en ville on peut la perdre facilement cette routine et se laisser aller parce qu'on a tout le confort qu'il faut et qu'on a pas à se poser la question sur où sont les déchets...c'est vrai que quand on se retrouve dans une situation où on est à la campagne et où il n'y a pas forcément de possibilités à disposition de la municipalité parce que tout est loin, ben là on se dit « moi j'ai des déchets il faut que j'en fasse quelque chose » et c'est là qu'on se retrouve plus en face de cette responsabilité.''* Interview to L.

1. That's the general result of an adaptive behaviour to the estate of the environment: when a context is perceived as clean and respected, individuals tend to adapt their own conduct. This explication lies again on the matter of social norms.

2. According to the literature of political urban ecologists (Kaika et al., 2006), in city spaces the matter of nature is alienated, which means that, for example, citizens struggle to link their consumption patterns to the related environmental impacts, as actually the urban landscape facilitates such psycho-social oblivion. Conversely, a direct contact to a more natural surrounding strongly impacts the perception of the estate of the environment, which in turn fosters a greater attention in its treatment. This explication is quite ambitious, as it recalls not only the matter of environmental impacts, but also more *slippery* concepts as those of *beauty* and *landscape*. We just suggest this key to the reading by considering that it deserves more specific deepening.

An overall resume about what so far described is offered by Table 6.20.

Table 6.18 – A resuming picture about the profiles of waste and e-waste recyclers in Paris

	Endogenous variables		**Exogenous variables**	
	Generic refuses	**E-waste[384]**	**Generic refuses**	**E-waste**
Proper handling **(even included reuse)**	Environmental concern Habit	Ethic and economic Willingness to avoid wastage and to valorise a resource	Family education A recycling scheme easy and not too much time/energy spending informative brochure Flatmates' influence	A previous experience with landfills The already rooted knowledge of disposal/recovery options made possible by informal channels and *one-to-one* advertisements
Improper handling	Trust in the recycling scheme Laziness Lack of awareness and/or knowledge Lack of interest in the topic	Laziness Lack of awareness Lack of knowledge Perception of a low impact	Intrinsic features of refuses (not recoverable) Perception of a general cultural indifference of the surrounding	A system of provision perceived as not easy to reach Lack of information campaign Perception of a general cultural indifference of the surrounding

(Authors' own)

Thus, according to our hypothesis, explorative proposals and provisional findings (see section 5.3.10) we can now offer more robust results.

F1. We found no evidences that environmental friendly attitudes are associated with proper e-waste disposal.

F2. Social context impacts e-waste disposal as:

- Social surrounding is the first reference for information retrieval compared to official institutional channels

[384] Limited to small EEEs.

- Respondents adapt their collection behaviour according to the perceived social normativity of the action in different contexts.

- Domestic unit works synergistically, it means that the act of disposal has not to be forcedly referred to individuals, while familiar contexts and flatsharing imply social roles amongst individuals such as they are supposed to be differently involved in the domestic tasks.

F3. Domestic habits impact e-waste disposal as past behaviour and previous experience of institutional disposal channels are associated with proper disposal.

F4a. Collection scheme and system of provision impacts e-waste disposal when:

- Collection points are visible in already frequented spaces.

- They are differentiated according to the population target.

Notwithstanding, we found evidences that also a very comfortable collection scheme is not recognized by users as an useful disposal channel if:

- It is not widely prompted by communication campaigns.

- It is not ubiquitously provided.

F4b. The actual involvement of retailers and the SSE sector in the e-waste SC impacts the disposal behaviour of users, as they are more likely to recall such channels as useful ways to dispose of e-waste, since they are provided with a more busy, diffuse and user-friendly collection points.

Notwithstanding, we found evidences that the disposal channels provided by the institutional actors involved in the e-waste SC suffers from an e-waste flows drain due to the informal chain, which has a relative high interception capacity due to:

- The opportunity for users to make a little profit by dismantling old appliances

- The diffuse and easy opportunity for users to access second-hand and informal market

F5. Factors related to opinion and trust of citizens on institutional stakeholders involved in e-waste SC do not seem to impact e-waste disposal.

F6. The relation do consumers have with EEEs goods impacts the related act of WEEE disposal.

F7. The level of public knowledge on e-waste disposal channels impacts e-waste disposal.

F8. General waste collection habits impacts e-waste recycling behaviour to the extent that respondents result already used to take actively in charge and via a dedicated moment their general waste.

The following final chapter offers a conclusive discussion about our overall findings.

Chapter 7

7. Discussion

This chapter proposes a final debate concerning the overall conclusions that we can draw from the study. It consists of seven sections, composed as follows:

1. A discussion concerning the acceptability of our three hypotheses in the light of what emerged during the research. Here we emphasise the link between our findings and the theoretical assumptions from which we started.

2. A discussion concerning the main findings referring to the dimensions that we approached in an explorative perspective: what useful cues do emerge with a view to further studies?

3. A discussion concerning further interesting insights arose during the analysis and was not provided at the research design stage.

4. An overall picture about the contributions that the thesis brings to the theoretical literature on environmental and recycling behaviour and on the studies of urban ecology.

5. An overall picture about the contributions that the analysis brings to policy and waste governance on an urban scale.

6. A reflection about the limitations of the research, the affordability of the integrative approach adopted, as well as the opportunity to evaluate alternative research models to address the matter studied.

The following section opens the discussion starting from the hypothesis' test.

7.1 Testing the hypothesis: robust and provisional results

This paragraph consists of three subsections discussing the acceptability of our hypothesis in the light of the results emerged. We thus illustrate our final considerations with respect to:

1. The association between environmental attitudes and e-waste disposal.

2. The impact of social relations and past habits on e-waste disposal.

3. The relationship between system of provision and act of e-waste disposal.

Paragraph 7.1.a approaches the first hypothesis' test.

7.1.a Environmental concern and e-waste disposal

In Chapter 2 we see that part of the literature regarding the matter of environmental behaviour stresses the link between environmental concern and pro-environmental conduct. However, in the specific

field of recycling behaviour studies it is considered that, as long as recycling schemes evolve and the public debate about waste spread, the link between green attitudes and disposal behaviour has become increasingly complex, and its heuristic power partly loses its significance (Saphores et al., 2006). However, according to Darby and Obara (2005), we suggested that may be in the case of e-waste the association attitude-behaviour deserves a renewed interest, for two reasons:

1. The e-waste topic is not very well known in the general public compared to other environmental issues (e.g. global warning, air pollution, biodiversity losses, etc.), which makes us hypothesise that in a survey respondents' responses suffer less from the bias deriving from the effects of social norms.

2. The e-waste component presents specific features, which make the related act of disposal last longer and consume more energy compared to other refuses. Thus, we hypothesised that proper disposal may be more likely associated to environmentally friendly attitudes.

Starting from these arguments, but also bearing in mind the limited heuristic value attributed to environmental concern in the most recent studies about sustainable conduct, we considered that they were worthy a depth view but under a hypothesis of low explanatory power. We thus formulated our first hypothesis as follows:

H1. Environmentally friendly attitudes are weakly associated with e-waste disposal behaviour.

The analysis of the interviews enables us to avoid rejecting this hypothesis. In particular, our reasoning proceeds as follows. We see that, both in the literature and in our interviews, environmentally friendly behaviour is claimed by individuals as being challenged by a series of competing demands, which make it difficult or impossible to achieve. Here, contextual and situational barriers are regarded as the main obstacles to green engagement, despite a willingness to act pro-environmentally. Conversely, in the case of ordinary disposal, we found that, even when individuals were provided with quite a comfortable waste collection scheme, a gap attitude-behaviour again occurs, as the vast majority of respondents is not very attentive towards refuses' disposal, despite declaring to be concerned. How to interpret such poor commitment in the absence of strong external constraints to act properly? We refer to four sets of explanations:

- The perception of the social normativity of the topic discussed affected the responses given to the researcher. In this case the lack of commitment can thus simply lie in an effective lack of interest in environment-related questions.

- Attributing to others the responsibility of a proper waste management (parents, doorkeeper, employers of the waste sectors, institutions, etc.). Here, the attitude-behaviour gap is explained not only by an effective lack of concern, but by social habits or ideological assumptions.

- The perception that approximate collection behaviour will not generate serious impacts, as it concerns just a small percentage of refuses.

- A lack of self-consciousness and the perception that also approximate collection behaviour does give some proof of genuine commitment.

In the case of e-waste, things are also different, as handling such refuse implies having specific disposal skills and dedicated time for it. Thus, again the argument of competing demands is often claimed by respondents as a strong constraint to collect e-waste properly. Indeed, also here an attitude-behaviour gap arose. However, interestingly, such gap occurs not only in the sense of a poor commitment compared to a declared environmentally friendly attitude, but also as a proper conduct compared to a poor declared concern. We explain this in two ways:

- Often (W)EEE is not regarded as a waste component. Indeed, its specific features make the related act of disposal actually disturbed by various intervening factors linked to its size, functionality, economic and emotional values, etc. Thus, old and broken appliances are considered and handled as *waste* only in the very last resort. It makes us consider that the act of e-waste disposal firstly responds to practical and psychological needs rather than to pro-environment beliefs.

- We see that also when e-waste is disposed as *waste* - which notably is, after storage and alternative handling, one of the ultimate choices in the case of small appliances - a proper or improper collection conduct is once again linked to practical factors rather than to environmental concerns. For example, we knew that proper recyclers share the common characteristic to be normally used to car usage for their ordinary travel and to already frequent landfills for dismantling refuses also different from e-waste. Or again, we found respondents which were classified as *proper recyclers* and whose act of disposal was linked to the fact that they came up to a collection point with no need to dedicate a specific effort to that (e.g. in EEE stores). In other words: commonly, small WEEE proper recyclers adopt an institutional collection channel when their disposal act did not represent an extra-effort in terms of time, and moved along their ordinary flow of actions.

Our empirical findings are supported by the theoretical insights proposed by the practice theorists (see section 2.5), where indeed environmental engagement is explained on the basis of recursive habits and by a practical match between contextual and personal needs, rather than on the basis of psycho-attitudinal factors. We thus go further by approaching our second hypothesis.

7.1.b The impact of social relations and past behaviours on e-waste disposal

Our second hypothesis was formulated as follows:

H2. Social context and domestic habits are strongly associated with e-waste disposal.

In particular we understood *social context* as social norms and interpersonal influences, and *domestic habits* as past behaviour and practices, in the sense attributed by Shove and Pantzar (see section 4.3.a). Here we present our findings in two subsections: the first one relates to the impact of social context on e-waste disposal, and the second to that of past behaviour.

H2.a Social norms and interpersonal influences are strongly associated to e-waste disposal.

Our findings allow us to not refuse such hypothesis, with the following specifications. The impact of social norms on the act of disposal is more evident in the case of general waste rather than e-waste handling. We suppose that this is because waste disposal is an ordinary action, more likely perceived as being exposed to others' judgment in the domestic and public spaces. Here, we apprehend that respondents normally adapt their collection behaviour according to the (perceived) behaviour of others. Furthermore, asking others such as family members and other close persons is the first means of information retrieval about how to separate refuses. Conversely, for what concerns e-waste dismantling, the direct impact of social norms is less evident, since it is a rarer act, less integrated in daily routines and social events. However, social relations are important in this case as well, as also here the social surrounding is the first reference for information retrieval with respect to institutional channels. Moreover, domestic units work synergistically, which means that the act of disposal does not need to be attributed to specific individuals. On the other hand, family and cohabitation contexts imply social roles according to which different domestic tasks are attributed to specific group members. In these cases, waste and e-waste handling have dedicated roles. In particular, in the family context, ordinary waste management is normally left to the mother, while e-waste handling is rather more a father's issue. Thus, we found that individuals who are not necessarily environmentally concerned can end up being proper e-waste recyclers, provided that they are embedded in a social and family context where waste and e-waste are properly handled to meet the rules of a co-operative house management. Consequently, our findings suggest that sociality impacts e-waste disposal because, depending on individuals' social surroundings, these feel more or less responsible for the act of disposal. Again, social context also influences e-waste disposal in a wider sense. In fact, the comparison suggests that people can be affected in their e-waste handling by their socio-cultural context, intended as a *container* of peer-to-peer practices of appliances' exchange and resale. In particular, we noticed that Parisians were much more skilled than Milaneses in accessing one or more informal channels to handle old and broken appliances. We hypothesise that this is so because anonymous exchange and informal resale practices were more constitutive of the urban sociality and culture in Paris rather than in Milan, and perhaps this is even more evident into the young sample interviewed. The second sub-hypothesis relates to past behaviour.

H2.b Domestic habits impact e-waste disposal.

Firstly we illustrate the case of general waste handling. We saw that past experiences, as for example Erasmus stays or secondary homes represented a decisive event in apprehending the act of disposal and in establishing new routines. Once users apprehend the act of disposal within a context they tend to repeat such action recursively without doing it consciously. Here, we noticed that any form of active commitment which departs from this routine is, as long as possible, avoided by almost all the respondents, and this is the case also for information retrieval. Thus, we realised that different contexts brought about different acknowledgments of waste disposal practices, and that this is hardly broken once a routine is developed. With regard to e-waste disposal, past behaviours matter as well. Indeed, once respondents experiment the act of e-waste disposal, their experience represents a kind of *imprinting event* or *breaking the ice event*, which will affect their future disposal behaviour. But we have to take a step back. We know that there is a general lack of knowledge about the ways to dispose of e-waste in the general public. According to Bartoleto (2014), we also see that a lack of disposal skills often generates forms of misperception about the task to accomplish in order to act pro-environmentally, which in the case of e-waste is generally perceived as too energy- and time-demanding, beyond any effective knowledge about the system of provision. Here, we acknowledge that the (mis)perception of a strong inconvenience or discomfort of the disposal system is a strong barrier to act green. That is what seems to happen in Paris: although students are provided with domestic bins for small (W)EEE handling, they have the perception that e-waste dismantling implies an unpleasant effort. According to Pieters (1991), misperceptions of inconvenience is a common problem often arising prior to the launch of a new waste management programme. Namely: until people do not test the effective implications of waste disposal efforts, they tend to reason according to prejudicial thinking. And such prejudice, in the case of e-waste handling, normally overestimates the effort to accomplish. Thus, past behaviours impact e-waste in two ways:

- They actually break the loop misperception-lack of commitment;
- They establish a prior experience which helps classify the e-waste recycling action as *normal*.

Thus, here the concepts of *ordinariness* and *habits* reveal being good tools to interpret waste handling. So far, once again practice theory offers us an appropriate base to frame environmental behaviour. Indeed, it seems that a proper or improper conduct in the field of recycling lie more in the matter of recursive habits and socio-cultural surroundings, rather than in purely psycho-attitudinal factors. The next section approaches our third and last hypothesis.

7.1.c Problematising the link between collection scheme and e-waste disposal

Our third hypothesis is formulated as follows:

H.3 Collection schemes and the overall system of provision offered to citizens have a strong influence on e-waste disposal

Our evidences make us not refuse such hypothesis, but with significant precautions since, as it emerged, we cannot count on the axiom *the most comfortable the collection scheme the most likely users are to adopt it*, as the Paris case-study demonstrates. Thus, which variables do intervene in disturbing this argument? As usual, we start by a reflection on the general waste disposal act. First of all, we see that in both cities, despite the fact that citizens are provided with a door-to-door service for ordinary refuses, the general quality of the separate collection is not so high, as local statistics and our interviews suggest. However, we also know that in Milan the separate collection rate is higher than in Paris, both for waste and e-waste disposal, even if the related collection scheme is much more demanding in Paris. Indeed, in Milan households are used to handle their ordinary refuses by using five domestic bins, and they can dispose of small (W)EEE via the system of landfills and the EMC. In Paris, a multi-material scheme is offered to citizens, which strongly simplifies their act of disposal so that Parisians have a maximum of three bins for all the waste they generate. Furthermore, they can handle small (W)EEE by adopting the domestic bin, the system of landfills, and the collection points supplied by the SSE sector and by retailers. Nevertheless, e-waste collected per capita in Milan is three times greater than in Paris. How to explain such paradox? We offer the following interpretative keys. The municipality of Milan collects higher volumes of e-waste per capita because:

- Citizens are more used to pay a greater attention to handle their refuses in general as:
  a. They have a more demanding take-back scheme regarding ordinary refuses.
  b. They have more favourable urban and dwelling conditions (there is no problem of space in condos).
- The EMC is targeted on the proper population sample (mothers and family members in charge of home management).

Thus, conversely, the city of Paris registers poor e-waste collection rate because:

- Parisians have a take back scheme regarding ordinary refuses which is very user-friendly, but in turn it demands less attention to waste handling.
- The multi-material bin generates the misperception that approximate handling does not cause serious damages to following treatment phases, as refuses are anyway reselected, and redirected to a proper treatment by the local authority.
- There is a stronger demographic density. It implies that many dwellings have problems of space, which in turn means that in several condos bins dedicated to separate collection are lacking. It has practical and psychological consequences (see section 6.2).
- The adoption of the yellow bin is not deliberately prompted by the municipality.

What can we conclude about the roles of retailers and the SSE sector in supporting the collection of e-waste from households? In which ways does their more of less effective implication impact the act of e-waste disposal? We see that, when they are not structurally involved in the SC, as in the Italian case, their absence is obvious in local statistics as well as in the testimonies of our respondents. Conversely, in Paris, their effective involvement in the e-waste SC clearly emerges: their contribution is included in local reports about e-waste collection, and their role is more broadly recalled by students. However, urban statistics record a relative poor contribution by them, despite a widespread network of collection points in city space (see section 6.2.4). How is it possible? We hypothesise that the contribution that retailers and the SSE sector can provide to the local e-waste collection rate is highly disturbed by alternative channels of informal handling and P2P practices. Thus, we state that the e-waste SC and its local implementation on urban scale have an impact on e-waste disposal, but that the effect of such association is strongly mediated by the following additional factors:

- Urban and demographic features of the city space.
- The effectiveness of communication campaigns and the promotion of disposal channels.
- The collection scheme provided for general refuses' disposal.
- Socio-cultural practices as:
    a. The opportunity for users to dismantle old appliances by making a little profit thanks to informal and alternative disposal channels.
    b. The diffuse and easy opportunity for users to access second-hand and informal markets.

The following section illustrates our findings with regard to the explorative goals of our study.

7.2 Explorative insights for future deepenings

Parallel to the hypothesis testing stage, the study also addresses the matter of e-waste disposal calling into question four further series of factors, which were investigated with an explorative approach. Our aim was to frame their possible impact on the act of e-waste disposal (see section 4.1). Such dimensions are subsequently apprehended as:

1. The opinion and trust users have about institutional stakeholders involved in e-waste management.
2. The relationship users have with EEE goods.
3. Users' awareness and specific disposal knowledge concerning e-waste.

We also proposed to investigate the relationship between general waste handling habits and e-waste disposal. However, we already exhaustively addressed such issue in section 1.c of the present chapter, to which we make reference. The following sections illustrate our insights for specific dimension.

7.2.a (Im)proper recycling and trust in institutions

Following Pellegrino (2010), we can read recycling behaviour as an interpretative key to citizens' relationship with institutions.[385]The original reflection of the author focuses on an extreme case of institutional mismanagement, the case of Naples, where the perception of this amongst citizens generated a negative spill over effect on their engagement and trust in institutions on long term. Does the matter of trust in institutions affect waste disposal and is it still the case in more ordinary contexts? Starting from our study, we can here state that no evidences emerged witnessing a significant association between the act of e-waste disposal and opinion on the concerned institutions. We have however some remarks.

1. All respondents declare having a good opinion about the work of the municipality or, in general, that they have nothing special to notice about their work. For this reason, they feel not to be affected in their disposal act by any perception of waste mismanagement. But neither do they state being more or less committed due to a feeling of trust in institutions. However, they unanimously recognise that individuals' disengagement is understandable if contextual conditions do not support their efforts.

2. We found that Parisians, which in general appear less attentive and less committed towards waste and e-waste disposal compared to their Milanese counterparts, are also more likely to attribute the responsibility of waste management on the basis of an institutional rationale rather than on a citizens' one. Conversely, we found that Milaneses tend to consider waste handling as a matter of individuals' willingness and ethic. Such finding can be due to a certain attitude amongst Parisians to justify a poor personal engagement, and in this case it would be due to the effect of the social desirability of response. Alternatively, we can hypothesise that their poor engagement is instead the outcome of an ideological assumption which considers individuals not to be the first actors in charge of waste management, as they are locked-in contextual constraints that override the opportunity for them to actually contribute to environmental achievements.

3. Another result also enriches this picture, and it refers to the effects that different take-back systems can have on the act of waste disposal. We indeed see in previous studies (Darby & Obara, 2005) and in our interviews that a very user-friendly take-back scheme can have the side effect of making people less used to paying attention to the way they handled their waste. We notice that in Paris, where

[385] She investigates the relation between political thinking and waste disposal behaviour in Naples after the catastrophic events in the Twenty-first Century.

citizens are provided with the multi-material bin, it is often claimed by our respondents that refuses are going to be resorted anyway by the Municipality, so that an approximate disposal will not generate severe consequences. We can here hypothesise that personal disengagement is due to a form of hyper-trust in the phase of technological waste treatment after citizens' collection. Conversely, in Milan we found students who declared being confused and to some extent demotivated in the act of disposal because different collection schemes coexisted in the same territory. And thus they asked themselves about the actual opportunity to select refuses in the way they were requested to by their municipality. Here, disengagement can conversely be read as a form of mistrust in waste processing schemes.

Despite these remarks, that give us some insights about the role played by the matter of trust in our case, we can conclude that no evidence arose about a significant relationship between trust in institutions and e-waste disposal.

7.2.b EEE use and WEEE disposal

Our findings allow us to stress that the relationship consumers have with EEE goods impacts the related act of WEEE disposal. Indeed, we often find that intrinsic features of (W)EEE objects are determinant for users to handle their end-of-life. In particular, the following features result being the most significant:

1. Size.

   We find that objects' size is strongly significant in impacting e-waste disposal. In particular, large appliances are more likely to be properly disposed of via institutional channels, while, as long as EEE's size decreases, they are increasingly subject to improper and informal handling as well as to storage practices. We suggested that variability could be explained by the perception of disposal impacts and by practical needs (see sections 5.3.7 and 6.3.7).

2. Functionality.

   There is not a linear linkage between e-waste disposal and equipment functionality. Indeed, we see that old appliances can be left aside due to fashion design needs that push consumers to buy new appliances. Conversely, broken objects can be stored for reasons of affection or because private data is stored in the equipment. Thus, in the eyes of consumers the identification of what "e-waste" is does not forcedly correspond to institutional definitions: cultural, social and psychological variables intervene in making people attribute peculiar meanings to material goods.

3. Price.

   The economic value of (W)EEE impacts the related disposal behaviour, and this is in two senses. Firstly, users are less likely to get rid of costly equipment: they tend to store costly appliances whatever their actual functionality. Secondly, costly appliances are more likely to be resold rather than dismantled. Here, the perception of the monetary value associated to refuses prevents their generation, as they are treated as useful goods.

4. Private data.

   Privacy-related factors often represent a constraint in the eyes of consumers to get rid of appliances with digital memories. Here users have the perception that, in case of disposal, their private data run the risk of being violated. The general consequence of this attitude is normally (W)EEE storage.

5. Symbolic value.

   Linked to the above, affection and emotional variables also often intervene in orientating consumers' e-waste disposal. In fact, appliances such as mobile phones, mp3 players, old walkmans, etc. are normally regarded as holding sentimental meanings and personal memories. In this case, they are stored beyond their actual use and functionality.

6. Recoverability.

   Design and material goods also impact the act of e-waste disposal. Indeed, the ratio between the price of recovery and the price of new products often makes consumers more likely to purchase new appliances instead of recovering old ones, as this is not convenient. Thus, in many cases students discard old devices because of partial malfunctions, as repairing is deemed too costly. This recurrent consideration inevitably encourages hyper-consumerism patterns and waste generation.

Thus, what can we learn from all this? We already know that refuses' generation has strong cultural implications: the way a society, as well as an individual, relates to material goods is one of the most significant indicators about its economic, technological and socio-cultural profile (see section 3.1). Here we see that the e-waste component holds particular meanings in the eyes of consumers with respect to ordinary refuses. In particular, small e-waste is clean, odourless, storable, and potentially valuable and anyway linked to specific uses (work and leisure). Then, the definition of *e-waste* already varies depending not only on appliances' features but also on individuals' psychologies and socio-cultural models. Many studies already deepened the relationship between material stuff and psycho-social identity (Mead, 1934; Latour, 1998; Jelsma, 2003), and we consider such link relevant to read e-waste disposal behaviour (see section 2.5.1). We thus conclude by stating that:

1. (W)EEE objects, and in particular small ICT consumables, due to their intrinsic features and due to the function they hold in the life of consumers (communication, linking, memories, leisure, work, etc.) hold strong psychological and socio-cultural meanings, which affect the related act of dismantling. In particular, we see that this is the case whatever the local e-waste management policies, as personal needs keep e-waste disposal -once again- away from the matter of environmental concern, but closer to practical reasoning and emotional spheres. In this, individuals' logic transcends the willingness of policy makers, which instead frame the question as an environmental service.

2. The matter of (eco-)design strongly affects the act of EEEs' (hyper) purchase and WEEE disposal. This is particularly evident in the case of small WEEE as the ICT is a rapidly evolving sector. In this, as long as technological change is not accompanied by a sufficient concern for eco-design, appliances' reparability, inter-modality of electronic components, etc., e-waste generation continues to grow.

The following section concerns the role of awareness and knowledge in the act of e-waste disposal.

7.2.c Aware citizens and e-waste handling

Our research allows us to conclude that the level of public awareness and knowledge on e-waste and e-waste disposal channels impacts e-waste handling. In particular, we noticed that:

1. E-waste is not widely known for its geo-political implications. However, respondents easily recognise that it deserves a specific treatment compared to ordinary refuses. Such perception often prevents e-waste mismanagement, as users feel concerned about e-waste impacts. All this contributes to e-waste storage.

2. E-waste disposal skills strongly impact its handling, as the vast majority of respondents does not know which the institutional channels are to dispose of their e-waste. Not only, as already seen in section 1.b of the present Chapter, the lack of knowledge often brings about misperception about the actual system of provision offered to citizens, as it is erroneously perceived as inaccessible, whatever it actually is.

3. Another type of knowledge at stake is affecting the act of e-waste disposal. This type of knowledge refers not to the official system of provision offered to citizens, but to a more specific type of *tacit* knowledge, which relates to the very local system of informal e-waste management. We indeed see that being skilled in alternative channels of e-waste disposal (e.g. ethnic stores, informal exchange, on-line resale, etc.) makes people likely to handle (W)EEE in an alternative way.

We thus conclude that the matter of awareness and knowledge is a strongly impacting factor on e-waste handling. In particular, the lack of knowledge represents a kind of barrier in its disposal, as a general misperception renders the related handling too demanding. Filling such gap, both by apprehending the *right way* and by directly experimenting disposal channels, positively affects the act of e-waste disposal. Interestingly, here we are back to a rationalist approach, as indeed filling an information gap emerges as a useful tool to encourage proper disposal. The following section offers a picture about new emerging insights that our study provided and which were not given at the beginning of the study.

7.3 Additional evidences: the act of disposal under an innovative spotlight

By questioning the matter of e-waste disposal, we stumbled upon some recurrent evidences, which were not part of our initial provisions. Such emerging findings made us formulate new assumptions and conjectures, which, even if they could not be deepened during the study, deserve further studies. In particular, subsequently we see three new cues descending from the thesis:

1. As already mentioned in chapter 6, we noticed that users interviewed in Paris were much more likely than Italians to access second-hand market and the informal e-waste chain. Such recurrent finding makes us hypothesise two scenarios:

a. Important volumes of e-waste are diverted from the official chain to the informal chain, which is mostly represented by peer-to-peer social practices. Such diversion, together with the purely illegal channel, is supposed to be at the source of poor e-waste collection rates in Paris.

b. The common habit to adopt informal channels to dispose of used goods is deemed consistent with a *second-hand culture*, which is supposed to be more broadly developed in the French, and Parisian, context, rather than in the Italian one.

Thus, we hypothesised that a link can exist between *second-hand culture* and e-waste disposal (Lallemen, 2012; Grange, 2012), and that this relationship consisted in an important diversion of e-waste flows from the official chain, which is not forcedly due to illegal management, but to social uses and market practices at a very local scale.

1. As already mentioned in various ways in the study, previous research have already highlighted that population density normally negatively affected waste disposal (Berglund C. and Söde holm P., 2003). Here we want to suggest further details starting from the Paris case-study. In particular, we hypothesise a closer link between e-waste disposal and socio-demographic heterogeneity in terms of:

   a. Co-existence of different urban populations within the same city space (inhabitants, city-users, commuters, …).

   b. High percentage of *transient* and *seasonal* populations as students, migrants, etc.

We then suppose that a high socio-demographic heterogeneity can mean in turn:

a. The co-existence of different socio-cultural backgrounds and habits in treating the waste question, for example by migrants from different geographic contexts, which makes it harder for local authorities to provide a unique model of waste handling.

b. A not sufficiently rooted habit of the local collection scheme by all the city users, which can for example mean a poor knowledge about or a poor commitment to waste disposal.

c. A major rate of migrants from developing countries, which can affect the rate of people at risk of poverty or social exclusion in city spaces.[386] Such a trend may contribute to the development of various forms of *local economies* and social practices, which have a useful representation in the e-waste informal chain.

3. Thirdly, we see that proper waste and e-waste handling is more likely to be referred to small towns and the countryside, rather than to big cities. We consider that such finding is consistent not only with the geo-demographic features of small towns, but also with the logistical questions (e.g. related to mobility habits) and to adaptive behaviours (see section 5.3.9). But this is not all, as indeed we also found, amongst our responses, references to the matter of *beauty* and *natural landscape* in encouraging more proper disposal acts. (Frantz & Mayer, 2014)has already highlighted that a correlation exists between pro-environmental behaviour and nature connectedness,. In some ways the direct connection to a natural landscape seems to influence waste handling. We suggest that this is in turn due to a greater consciousness in nature-connected contexts of the environmental impacts of an unsound waste management.

[386] See http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Statistics_on_income_and_living_conditions_by_degree_of_urbanisation#People_at_risk_of_poverty_or_social_exclusion (Last access on September 2014).

The following sections reconnect the research findings with our initial purposes, which were both theory- and policy-oriented.

7.4 Pro-environmental and recycling behaviour: contributions of the research

The present study, by adopting a multi-scalar and trans-disciplinary approach, allows us to provide some theoretical insights and final considerations, which enrich the theoretical literature on environmental and recycling behaviour, with particular emphasis to the specificities of e-waste. In particular:

1. The study confirms the explicative value that the following factors have in interpreting e-waste disposal:

a. Social relations in the forms of social norms and interpersonal influences.

   The role of *others* is recognised as the first source of information retrieval, and as source of inspiration of adaptive behaviours. Conversely, the role of psycho-attitudinal factors are confirmed as holding poor explicative power in the case of e-waste collection. Here, the reflections proposed by Douglas (1990) and by social practice theorists (see section 2.5) prove to be more convicting with respect to the methodological individualism.

b. Specific disposal knowledge.

   We see that e-waste mismanagement and storage is often related to a poor knowledge about related disposal channels, which usually translates into a sort of widespread misperception about the actual user-friendliness of the collection scheme. Here, we come closer to a more rationalist and individualistic approach, as such finding supports the idea that filling an informative gap encourages more ecological behaviours.

c. Consumption patterns and the *material culture* (Mead, 1934).

   These two elements that link up individuals to ICT appliances also prove being good tools to read the related disposal behaviour. Indeed, the relationship occurring between consumers and devices' purchase, use and disposal is complex and responds to various psychological and social needs (identity, affection, memories, …). In this, the features of material goods imply not only symbolic meanings but also practical and environmental consequences due to the matters such as (eco-)design, recoverability, treatment impacts, etc. Thus, the reflections proposed by actor network theorists and social practice theorists about the performative role artefacts play with regard to individuals' conduct is considered as particularly pertinent in the case of (W)EEE (see section 2.4.c).

d. Practical and logistical questions.

   E-waste disposal often depends on practical needs (economic profit, occasional use, data protection, etc.) rather than environmental concerns. Here, one more time our findings are consistent with the reflection provided by practice theorists, and with a more recent wave of studies which explain the matter of waste handling on the basis of logistics implied for households (Monnot et al., 2014).

e. Past habits and direct experiences from collection schemes.

In particular, previous habits concerning waste disposal affect the act of e-waste disposal too. Furthermore, the direct experience of e-waste disposal channels helps breaking the loop "lack of skills-misperception of the disposal scheme". Here, the matter of routines is regarded as a strong explanative factor in reading disposal behaviours. Again, the theory of practice, with particular regard to the work of Spaargaren (see section 2.5), finds some correspondences in our evidences.

f. Macro factors related to the context in which individuals act. In particular:

i. Legislative frame in the forms of:

- The local implementation of the e-waste MSC and the actual involvement of institutional stakeholders.
- Laws managing the status of *waste* and *used goods*.

ii. Economic trends, as we see that the rising value of secondary raw materials brings about a major diversion of e-waste flows from the official channel to the informal and illegal ones.

iii. Technological factors such as eco-design, planned obsolescence, … Since the intrinsic features of the vast majority of EEEs still does not encourage goods' recoverability and reparability.

iv. Geo-demographic and urban variables, as, in densely populated contexts, it is harder for local authorities to provide citizens with a uniform scheme of waste management.

v. Local take-back systems and related communication campaigns.

2. Consistent with the above, we suggest that the multi-scalar and integrative approach proposed at the beginning of the research is coherent with the object in study, as we see that the act of disposal is a complex event, which involves various factors, but interconnected ones. In particular, we here emphasise the reciprocal interrelation between the micro dimension of individuals and the macro level of policies, but in the sense of its problematisation. Indeed, we found that no correspondence necessarily exists between comfortable collection schemes and proper disposal behaviours, as the match between the two scales is subjected to additional variables which often respond to divergent logics. Thus, macro constraints lock individuals in such a way that they struggle to behave *green*, despite their willingness to do so. At the same time, user-friendly waste disposal schemes can suffer from achieving high collection rates, due to individual logics (and logistics). We thus conclude that:

a. E-waste disposal behaviour notably deserves a specific view in the literature on pro-environmental behaviour, and such view properly integrates different scales and factors. This might imply losses in terms of model parsimony, but it helps individuate those variables which seem to be more worthy of further analyses.

b. Any classification regarding what we referred to in Chapter 2, as *micro*, *meso* or *macro* is highly conventional. We could neither provide insights about individuals' attitudes without referring to socio-cultural trends, nor could we establish a deterministic relation from the latter to the former.

Consistent with the above, and with what has so far been presented, we believe that our study contributes to provide additional theoretical insights in the field of:

1. Pro-environmental behaviour in general.
2. E-waste disposal behaviour.
3. Urban ecology and e-waste governance in city spaces.
4. E-waste management supply chains.
5. Integrative models' approach to address environmental issues.

7.5 From theory to practice: recommendations and insights for e-waste governance

Consistent with the policy-oriented aim of this thesis, the present paragraph illustrates what the main contributions are to the domain of e-waste governance on urban scale and in the contexts investigated.

1. E-waste is a component of waste whose disposal act is relatively rare and so less routinised. This means that electronic equipment implies a specific extra effort to be discarded, and, even when this is not the case, as in Paris, typically the general public continues misperceiving e-waste dismantling as particularly time and energy demanding. Thus, to make citizens more likely to appropriately dispose of small WEEE one has to reduce their action into the ambit of *ordinariness*, which means for example strategically locating collection points in busy places. Here, we see how the effective role of retailers and the SSE sector can represent a key-factor in fostering e-waste collection, while the system of municipal landfills cannot be regarded as the primary way proposed to citizens for e-waste handling.

2. Communication campaigns concerning e-waste recycling conduct have to consider that individuals seldom actively seek information from official channels, since most information is retrieved by word-to-mouth. Thus, to make users know about the system of provision, it is necessary to carry out widespread and visible information campaigns in busy spaces (supermarkets, public places, universities, libraries, etc.). In this way, information reaches out to users even if the latter are not necessarily committed to e-waste recycling.

3. We see that the matter of *environment* is differently perceived depending on individuals' context, psychological needs, knowledge, awareness, etc. Thus, we potentially have different ideas of *environment* according to different people. Thus, it is suggested that green communication campaigns should target specific population groups.

4. We see that e-waste disposal is often conceived by users as a practical question rather than as a proof of environmental commitment, and we apprehended as well that waste handling is usually conceived as a domestic task amongst others. We thus suggest that communication campaigns aimed to encourage proper disposal should adopt ordinary images linked to daily life, rather than opting for images referring to natural catastrophic events, which are actually mostly perceived as far from individuals' control.

5. Social norms and interpersonal influences are found as intervening factors in impacting e-waste disposal. We suggest that this finding can be exploited to foster pro-environmental behaviour. In particular, collection schemes can be prompted amongst the general public by targeting middle- and small-sized samples, which can represent small communities such as condos or neighbourhood initiatives.

6. Due to the specific features of the ICT sector (high reparability costs, planned obsolescence, rapid innovation growth, …) EEEs are often purchased and rapidly replaced by more recent appliances. It is thus important to guarantee them a second-life, for example by strengthening the legislation which recognises a transient status between waste and good, and by supporting the SSE sector in taking part to e-waste management.

7. It is also important to strengthen the security system in landfills to prevent theft and e-waste damages. Moreover, some initiatives to prevent e-waste damages along the sidewalk can be equally put in place.[387]

The following section provides conclusive insights about the relevance of the approach adopted to conduct the study.

7.6 Approaching the environmental question: the relevance of an integrative model

When approaching the research question we chose to address the matter of e-waste disposal by adopting the integrative model of analysis proposed by Stern (2000b). Such choice was based on two assumptions. The first one was that the object of study was considered as deserving a multi-scalar and interdisciplinary view, consistently with its characteristics and with the most recent stream of studies addressing environmental issues (Uiterkamp and Vlek, 2007). The second one was that e-waste disposal behaviour is a poorly addressed topic within the literature on pro-environmental behaviour, while we instead consider that it deserves a specific theoretical treatment, due to its specific features (see section 2.8). We then proceeded by exploring the issue considering all together several and different variables. However, the theoretical literature on green behaviour offered anyway a basis for the analysis, together with previous studies and statistics on the e-waste topic in the context investigated. In this, the thesis consists of a series of hypothesis and of an explorative part. Here, we reflect on the effectiveness of the approach adopted, by comparing our expectations with our results, and by considering the theoretical works and empirical data that, as long as the study developed, have enriched our view and offered additional insights and suggestions to respond to the research question. As seen in the previous sections of the present chapters, our findings strongly confirm the interconnectedness of the variables at stake. This makes us conclude that the integrative and

[387] To prevent TVs damages along the sidewalk, the Municipality of Milan removes the service of its withdrawal by replacing it with a door-to-door directly provided in house.

multidisciplinary optic adopted is successful in its interpretation. Notwithstanding, two elements have to be highlighted:

1. In some passages our model results redundant. In particular, rebuilding the matter of habits according to the definition of Shove and Pantzar (2005) implies to re-adapt concepts already investigated as variables per se into a new definition. The overall outcome results quite unsatisfactory as we couldn't fully maximise the heuristic power of the model proposed by the two authors, due to a superimposition of contents.

2. Despite the Stern's model lies on the assumption that micro, macro and macro variables are strictly interconnected, however they are defined, considered and investigated in isolation. This of course responds to operative needs, as data analysis forcedly means conventional definitions. However, as long as the study proceeded, our empirical evidences have grew together with our theoretical knowledge, consistently with the abductive path embraced (see section 4.1). In this, the literature on the transition management suggests us an alternative model to read the societal attempt to evolve towards goals of sustainability(Geels & Schot, 2007; Geels, 2006; Kemp & Loorbach, 2003). Such approach consists of a huge array of works that analyse the green socio-technical transition by emphasizing the interconnectedness amongst macro, meso and micro variables. The interest of such optic is that it is conceived to valorising the co-evolution amongst the different factors composing the actual socio-technical configurations. According to this, the environmental transition is investigated by considering how socio-cultural, technical, economical, legislative and political factors co-evolve, and what are amongst these the breaking elements that drive the environmental transition, by getting a knock-on effect on the others. There is not room here to deepen such approach, which is notably composed by a heterogeneous array of works. However, it is regarded as an useful theoretical tool to look at our topic. In particular, the approach suggested by Geels and Schot (2007) allowed us, in a secondary phase from the thesis writing, to propose a second reading of our case-study via their interpretative proposal.[388]

The following section proposes a conclusive view about the object in study, by resuming the major factors that impact the act of e-waste disposal according to different scales of analysis. Such section also provides a definitive response to the research interest, namely what are the factors at stake in fostering pro-environmental behaviour among the general public, and what the actual opportunities are for them to contribute to the sustainability transition.

[388] See Bahers *et al.*, 2015.

Chapter 8

8. Conclusions

This final chapter briefly recounts the whole thesis with the aim to provide a synthetic view about its initial ambitions, theoretical and practical interest, methodology and case-study analyses. It then proceeds by illustrating a very final response to the research question.

With this thesis we expressed the ambition to address the matter of *environmental agency* in the form of e-waste disposal behaviour. We justified such interest on the basis of a twofold aim. The first objective was theory-oriented, as our study was supposed to be in line with the vast literature on green agency and to make a contribution to the latter. The second objective was on the other hand more policy- and practice-oriented, as the matter of e-waste collection was considered, given its growing interest and specific socio-environmental characterisation, a useful case to reflect upon for governance purposes. Starting from this double interest, we firstly proceeded by illustrating a theoretical rationale concerning *green agency* according to three main related approaches, which are methodological individualism, the structuralist approach, and practice theory. We also finally mentioned the most recent of studies addressing such matter but in a multi-scalar, pragmatist and transdisciplinary optic. Here, consistent with the fact that e-waste disposal behaviour is still a poorly investigated issue in the literature about environmental agency, and also given the specific features of the e-waste object, we gave up strongly theory-oriented assumptions and claimed the need to opt for an explorative approach and integrative perspective, which we individuated along the lines of Stern (2000).

After this primary framing concerning the overall research interest of the proposal and its theoretical context, we presented the e-waste topic in order to stress its theoretical and practical relevance from several perspectives. We started with the question of *waste* definition according to a geo-historical perspective, by which we highlighted to what extent the *history of waste* was in some way the *history of goods*, and how the waste question, in its contemporary urgency, is a very recent historical event. Starting from this acknowledgment, we proceeded by presenting a more technical definition of *waste* and of our object of study, that is waste of electronic and electrical equipments (WEEE). We described how, due to the intrinsic feature of such a component, -being hazardous waste, containing valuable matter, and being the fastest rising element among the total rate of Municipal Solid Waste (MSW)- it became in the very recent history a *hot topic* worldwide and from several standpoints: as an international political question, as an issue of economic business, and as an environmental and societal

problem. We then focussed on e-waste as a question of local governance for policy makers, with particular attention being posed to the European context. Our work indeed proceeded circumscribing the analysis to the European context, which represented the macro framework of the study, whose specificities were illustrated with a particular focus on the collection targets imposed by the European normative –the WEEE Directive- as they represent a very challenging goal for the vast majority of member countries in terms of e-waste governance and local management policies. In particular, we decided to situate our research within the Italian and the French contexts, as both apply the same supply chain model of e-waste management, namely the *clearing house model*. We further went to the heart of the methodology adopted to conduct the study. Here we discussed the theoretical and practical assumptions underpinning our work, its questions and hypotheses, together with the design strategies put in place to provide some responses and acknowledgments to the research questions. We explained the choice made to address the matter of e-waste behaviour by using an urban comparative case-study between the cities of Milan and Paris. We indeed saw that the two cities responded to the same macro regulatory framework, but that they opted for different local policies of e-waste management, in this generating interesting reflections in terms of citizens-consumers' contribution to the collection performance and efficacy of e-waste take-back systems. Furthermore, we justified the adoption of a double unit of analysis to conduct the research: individuals' standpoints and the e-waste SC, which consists of the WEEE Directive transposition on national scale and the related local implementation on urban scale, also considering the utility system provided to citizens to dismantle e-waste. According to these two units –micro and macro- the variables considered at stake and addressed during the empirical stage were defined together with the research methodologies adopted to capture them. In particular, the first unit of analysis was investigated with a qualitative survey on a sample of 40 university students, and the second one with a phase of archival data collection and face-to-face interviews with the key-informants of the supply chain on national and urban scale in the two contexts. After providing the theoretical and empirical tools which represented the assumption of the study, the comparative case-study was approached. The implementation of the clearing house model in the Italian context was presented first, with the objective of putting in light the most important parts of the Italian supply chain, liable to generate consequences on the local context examined. Secondarily, the Milan case was illustrated, with particular attention to waste governance, implementation of e-waste management policies, and related take-back and utility systems made available by local institutions to citizens. Here, we also stressed the effect that the so-called *informal* and illegal chains had with regard to e-waste flows' diversion from the official chain. Finally, a third part illustrated the results deriving from the analysis of the interviews to our sample of students. The objective of this section was to put in relation the previously described contextual framework with the more micro-social standpoint: what synergies, divergences, logics (and logistics) resulted as being at the forefront of the contribution to

the e-waste collection performance recorded in the city? To what extent could citizens-consumers actually contribute to such a performance? What emerged as the main constraints that disturb the *proper disposal* act? At that stage of the thesis we could just provide provisional responses to such questions, and then we proceeded further by presenting the comparative analysis with the French case-study, which followed the same outline as the Italian case.

A final discussion was finally proposed. Here the research question was definitively related to our most robust findings, with the aim to satisfy both our theoretical and practice-oriented interest. We then discussed the considerations issued from the explorative part of the study, with particular attention to new cues and paths of reflections eventually liable for further deepening. Finally we discussed the strengths and weaknesses of the approach adopted.

We here proposed a final debate around the main factors on which the attention has to be pointed in reflecting the matter of pro-environmental behaviour. In particular, our findings suggested a complex configuration of elements. We can thus state that pro-environmental behaviour is the eventual outcome of the complex interaction between the following factors:

9. Economic.

In the case of e-waste management, economic factors intervene in giving shape to environmental transitions in various ways. In particular:

a. The economic (and ecological) crises generated a growth of the monetary value of secondary row materials. This makes the official e-waste MSC more vulnerable to e-waste diversion by illegal and informal channels. In particular, an environmentally sound e-waste management is a costly process, which generates a relatively reduced profit margin for eco-organisms (Eco-systèmes, 2013), and anyway forcedly lower than what can be obtained by managing e-waste unsoundly. Within this context, the system of eco-organisms is even more strongly submitted to the unfair competition of parallel channels. Indeed, not only private individuals, but also institutional stakeholders such as retailers and local authorities, can more broadly opt to sell their e-waste to more profitable alternative channels compared to the official chain. This represents an important source of e-waste diversion towards uncontrolled and potentially hazardous destinies.

b. The economic question is also raised by the official e-waste MSC. Indeed, we noticed that the system of refunds provided by producers to local authorities, retailers and the SSE sector, has to be fair and actually compensating for the efforts made by the latter actors. In particular, we see that the case of retailers' implication in the official chain is quite critical, as indeed their primary vocation is to market. Thus, an effective financial support is necessary to encourage their actual involvement.

c. The economic value of used EEE and e-waste represents a further diversion of e-waste flows from the official chain, as private individuals often chose to exploit it by accessing second-hand and informal markets. However, this is not necessarily a source of e-waste mismanagement, as on the contrary it prevents WEEE generation. Anyway, it has to be recognised as a further eventual opportunity for e-waste to escape the official chain.

d. Actually, the relative low cost of many ICT and EEE consumables, compared to the cost of their repair, makes it more convenient for consumers to purchase new appliances rather than to repair the old ones. Clearly this affects not only EEE consumption patterns but also the related WEEE generation.

10. Technological.

Technological elements intervene in e-waste management in two ways:

a. Factors linked to innovation patterns and eco-design in the electronic sector affect the life span of EEEs, which in turn impacts the related uses by the general public and the consequent generation of e-waste.

b. Technology patterns also intervene in the phase of waste processing. Indeed, we see that the disposal logistics requested from citizens on different local contexts strongly depends on the local system of waste treatment. Thus, different households' disposal habits depend in turn on different collection schemes (e.g. multi-material or mono-material), and we see that such habits also impact the act of e-waste handling.

11. Legislative.

Normative apparatus strongly impact the matter of e-waste management, in various ways:

a. The WEEE Directive intervenes in different national and local contexts which integrate its dispositions following domestic law-making constraints. Here, we see that the way different normative proceedings work, can imply in the various contexts a rapid transposition rather than some delay and difficulties in smoothly applying the Directive. When national normative apparatus struggle to easily implement international laws, it can bring about internal inefficiencies and delay in the laws' effectiveness itself.

b. Recognising an intermediate legislative status between "good" and "waste" could contribute to give a second-life to many broken and used appliances still recoverable, but which have been discarded by their owners. Here, introducing elements of flexibility within the normative system is regarded as a useful tool to prevent e-waste generation.

c. A legislative binding should be upon local authorities to take part to the official supply chain of e-waste management. In absence of this, the official chain continues to be structurally affected by unfair competition due to e-waste flows drained towards informal and illegal channels, out of eco-organisms' control.

12. Policy-related.

a. Take-back system design, utility system and actual features of local waste and e-waste governance all contribute to affect the actual effectiveness of e-waste management in the way exposed in section 1.c of the present chapter.

13. Geo-demographic and logistical.

a. Demographic and urban density can bring about logistical problems for the municipality to manage waste and e-waste collection. It means for example that reduced spaces in condos do not allow the authority to provide all citizens with domestic bins. Furthermore, urban density

can affect the mobility capacity of dwellings, with consequent impact on the accessibility of collection infrastructures.

b. Equally, logistical questions as the lack of domestic space, the number of materials to collect separately, the size of refuses, the location in the city of collection infrastructures, etc. All affect the actual opportunity households have to feed the official collection scheme.

c. Logistical questions also involve institutional e-waste management stakeholders. Indeed, it is necessary that local authorities, retailers and SSE operators, all are provided with logistical support by eco-organisms, for what concerns the phases of e-waste withdrawal and transport.

14. Cultural.

Cultural factors affect the act of e-waste disposal in many different ways. In particular we distinguish between:

a. Cultural factors referring to individuals. Here, consumption patterns, ways to conceive the environmental question, fashion, lifestyles, etc. All affect the way in which the waste issue is perceived by the general public and consequently the way waste is handled.

b. Cultural factors referring to institutional actors. Here, business and organisations' cultures are at stake. Strong market oriented politics, corporate social responsibility profiles, actual implementation of the extended producer responsibility, internalisation of environmental costs, etc. All contribute to making industries more or less oriented to take in charge e-waste management.

15. Psycho-social.

We widely see that psycho-social factors affect e-waste disposal as individuals behave according to their personal beliefs, interests, ethics, knowledge, etc. as well as their socio-cultural surrounding.

Finally, in this light, what is the actual contribution individuals can make to e-waste collection? Our research suggests that socio-cultural patterns and factors such as legislation and economic trends minimise the effective capacity of individuals to behave according to green goals. However, we see that individuals' practices, perception and uses, collectively shared, can have in turn a significant impact on the orientation of the e-waste supply chain. In Paris, a very comfortable collection scheme dedicated to small WEEE failed to reach its collection goal, while in Milan the overall e-waste collection rate the almost uniquely intercepted by municipal landfills. From this we apprehend that e-waste collection performances are the outcome of an overall (dis)alignment of different factors, often responding to divergent logics, and just rarely all together oriented towards environmental aims. In this, in some cases, as it is the case in Milan, we can find individuals' habits counterbalancing the gaps of the e-waste SC. In others, as in Paris, individuals' habits and socio-economic coincidences can strongly disturb a properly implemented plan of local e-waste governance. We thus consider that macro and meso scales are the most appropriate dimensions in which situating a societal transition towards goals of sustainable development.

However, as our work has been conceived since the beginning as an exploration of a poorly investigated issue in the field of societal and management studies, we strongly highlight that, in addition to the evidences arose during the thesis, some of the aspects emerged also provided the ground for future insights.

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2. Websites

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AIRES (Associazione Italiana Retailers Elettrodomestici Specializzati): http://www.airesitalia.it/

AMSA (Azienda Milanese Servizi Ambientali): http://www.amsa.it/

ANCI (Associazione Nazionali Comuni Italiani): http://www.anci.it/

ARPA Lombardia (Agenzia Regionale Protezione Ambiente-Lombardia): http://www.arpalombardia.it/

Art and Recycle: http://www.recyclart.org/

A2A: http://www.a2a.eu/it/

Basel Actor Newtork: http://www.ban.org/

Censimento della Popolazione: Blog: censimento2011.blogspot.fr/

CNR (Centro Nazionale di Ricerca): http://cnr.it/

Corriere di Ragusa: http://www.corrierediragusa.it/

Ecoinfo: http://ecoinfo.cnrs.fr/

EcoLogic: http://www.ecologic-france.com/

Ecor'It: http://www.ecorit.it/.

Emmaus: http://emmaus-paris.fr/

Envie: http://www.envie.fr/

European Environmental Agency: http://www.eea.europa.eu/

Eurostat: http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/publications

E-waste guide: http://ewasteguide.info/

FIEEC (Fédération des Industries Electriques et Electroniques et de Communication): http://www.fieec.fr/

G20G8: http://www.g20g8.com/

Ilfattoquotidiano: http://tv.ilfattoquotidiano.it/

Ilsole24ore: http://www.ilsole24ore.com/

INSEE (Institute National de la Statistique et des Etudes Economiques): http://www.insee.fr/

Interloque: http://www.interloque.com/ressourcerie1.htm

ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale): http://isprambiente.gov.it/

ISTAT (Istitututo Nazionale di Statistica): http://www.istat.it/en/

La Petite Rockette: http://www.lapetiterockette.org/

Mairie de Paris: http://www.paris.fr/

Ordif (Observatoire Regional des Déchets Île-de-France): http://ordif.fr/

Osservatorio Nazionale dei Rifiuti: http://www.osservatorionazionalerifiuti.it/

Planète Écho: Association d'éducation à l'environnement et au développement durable: www.planete-echo.net/

Rejoué: http://rejoue.asso.fr/

Semantic: http://semantic.it/

SINOE: http://sinoe.org/

Smicval (Syndicat des industries de matériels audiovisuels et électroniques): http://www.smicval.fr/

StEP initiative (Solving the E-waste Problem Initiative): http://step initiative.org/

Syctom (Syndicat mixte de Collecte et Traitement des Ordures Ménagères): http://www.syctom.fr

Ticethic: http://www.ticethic.com/

WEEE Forum: http://weeeforum.org/

Zero Waste project: http://www.zerowastefuture.com/

3. Institutional Sources: list of interviewed key-informants and related affiliation

ADEME: E.F., Responsible for Extended Producer Responsibility and Recycling Service.

AIRES: D.R., General Director.

AMSA: L.A., Responsible for Waste Logistics and Management.

A2A: D.V., Responsible for Marketing in AMSA (at A2A).

CDCRaee:

a. F.L., General Director;
b. S.M., Technical Office.

EcoLogic:

c. B.R., Technical Director;
d. C.R., Responsible for Regional Operations in Ile-de-France;
e. P.G., Responsible for Market of Professional WEEE and Distribution.

Ecor'It: L.T., General Manager.

Eco-systèmes: R.V., Regional Responsible for Development.

FIEEC: AC.W., Responsible for Sustainable Development.

Municipality of Paris:

a. P.M., Responsible for Waste Collection and Management;
b. N.M., Technical Office for Waste Prevention and Management.

Other experts and professionals of the waste and e-waste sector:

a. M.C., Environmental Lawyer expert in e-waste management in Italy;
b. M.M., Academic expert of waste issue in the European and Global context;
c. F.M., Lawyer and expert of the Italian legislative system.

Semantic: A.M., Responsible for Marketing.

SYCTOM: N.F., Responsible for Waste Colletion, Valorisation and Transport.

TicEthic: V.B., Director.

Glossary

ADEME: Agence de l'Environnement et de la Maîtrise de l'Énergie

AMSA: Azienda Milanese Servizi Ambientali

CC: Coordinating Centre of the eco-organisms

CDC(R) or CDCRaee: Centro di Coordinamento Rifiuti da Apparecchiature Elettriche ed Elettroniche

CP(s): Collection Point(s)

CVC: Committee of Vigilance and Control

C1: Refrigerating equipments (1st e-waste category according to the WEEE Directive)

C2: Large household appliances out from refrigerating equipments (2nd e-waste category according to the WEEE Directive)

C3: TVs and monitors (3rd e-waste category according to the WEEE Directive)

C4: Small household appliances (4th e-waste category according to the WEEE Directive)

C5: Lighting devices (5th e-waste category according to the WEEE Directive)

EEE(s): Electrical and Electronic Equipment(s)

EMC: Environmental Mobile Centre

EoL: End of Life

EPR: Extended Producer Responsibility

ESM: Environmentally Sound Management

ICT: Information and Communication Technology

LCA: Life Cycle Assessment

MSW: Municipal Solid Waste (see also USW)

PoM: Put on Market

RCC: Reimboursed Compliance Cost

RG(s): Regrouping Point(s)

SC: Steering Committee

SSE: Social and Solidarity Economy

USW: Urban Solid Waste

WEEE: Waste of Electrical and Electronic Equipment

Appendices

1. Outline of the interview with students

1.1 Outline of the Italian version

a. Quanti anni ha?
b. Quanti siete in casa?
c. Che titolo di studio ha? In che facoltà studia?
d. Dove risiede a Milano (indirizzo o zona)?

1. Spesso sentiamo parlare in televisione, su internet, alla radio,… dei rifiuti come una questione di rilievo e di interesse per la collettività. Lei cosa ne pensa?
2. Accade spesso che le persone ancorché interessate al tema del benessere dell'ambiente, incontrino però difficoltà a portare avanti la raccolta differenziata in modo sempre accurato. Lei cosa ne pensa?
3. A tal proposito come ritiene di condurre la raccolta differenziata nel suo contesto abitativo?
4. Ci sono persone che sono portate a prestare o non prestare attenzione al modo di differenziare i rifiuti perché si sentono influenzate da variabili di contesto. Lei cosa ne pensa rispetto a:
    a. Le abitudini familiari e domestiche del suo contesto di vita (ad es. l'influenza degli altri componenti della famiglia)
    b. Fattori legati al comportamento percepito degli altri condomini dello stabile.
    c. La disposizione dei bidoni in ambito domestico e condominiale (lo spazio dedicato è appropriato, pulito, ordinato, agevole,…).
    d. Fattura, dimensione e caratteristiche dei rifiuti.
5. Rispetto a quest'ultimo punto: lei tende a buttare nell'indifferenziata oppure si informa? E se si in che modo?
6. Come ha imparato a gestire i rifiuti domestici?
7. Alcuni ritengono che eventuali errori nel differenziare i rifiuti possano anche essere dovuti a una difficoltà di accesso alle informazioni da parte del cittadino su questi temi. Lei cosa ne pensa?
8. Ritiene di essere bene o male informato sulle modalità di differenziazione che il suo Comune prevede? Quanto ritiene di conoscere sul tema?
9. Attualmente il settore delle tecnologie informatiche e delle telecomunicazioni è uno dei settori maggiormente in crescita. Infatti, tutti noi nella nostra quotidianità siamo sempre più abituati ad avere a che fare con strumenti tecnologici (es. cellulare, mp3, pc, rasoio elettrico, lampade a basso consumo, consolle di videogame, ecc.) che ormai sono perfettamente integrati con le nostre attività di routine. Allo stesso tempo, queste tecnologie hanno spesso durata di vita breve e ciò implica che, nel sostituirle, ci troviamo a doverci liberare dell'apparecchio vecchio. Nel fare ciò Lei come si è trovato a liberarsi di uno di questi oggetti vecchi? (elenco tipo: cellulare, tostapane, frullatore, telecomando, rasoio elettrico, giocattoli con componenti elettroniche, pc, monitor, cavi USB, ecc)
10. Qual' è il motivo per cui si è liberato dell'oggetto? Che caratteristiche di desiderabilità aveva perduto (es. era vecchio, fuori moda, inefficiente, rotto, non mi piaceva +, ecc)? Dopo quanto tempo dall'acquisto lo ha smaltito?
11. Qual è il motivo che l'ha spinta a smaltire nel modo descritto?
12. Le statistiche confermano che la grande maggioranza degli elettrodomestici di piccole dimensioni vengono buttati nell'indifferenziata [una buona percentuale viene tenuta in casa, e solo una bassa componente viene smaltita nelle discariche apposite. Come commenterebbe questi dati?]
13. Le è capitato di dovere smaltire un grande elettrodomestico (es. lavatrice, forno, frigorifero, ecc.)?

14. Come lo ha smaltito?
15. Riallacciandoci al tema dell'informazione fornita ai cittadini sul tema R4 dall'ente preposto, lei cosa pensa dei servizi offerti da AMSA su questo tema?
16. Lei cosa conosce del sistema predisposto dal Comune per smaltire i piccoli apparecchi elettronici? (Conosce le riciclerie? Sa dove sono collocate sul territorio urbano? Conosce il CAM? E il servizio *1 contro 1*?)
17. Alcuni ritengono che le persone siano portate a non prestare troppa cura a come smaltiscono i propri piccoli apparecchi elettronici perché questo le impegnerebbe eccessivamente in termini di tempo e risorse (ad es. spostamenti in macchina per recarsi nelle riciclerie). Lei cosa ne pensa?
18. Alcuni ritengono che sia una perdita di tempo impegnarsi nel differenziare i propri rifiuti perché pensano che quello che fa una persona sola non possa influire in modo significativo sui problemi dell'intera società. Lei cosa pensa?
19. Alcuni ritengono che le persone siano portate a non prestare troppa cura a come smaltiscono i propri rifiuti perché non hanno fiducia negli enti pubblici che si occupano di smaltimento o più in generale negli enti pubblici preposti per legge ad occuparsi dei rifiuti urbani. Lei cosa ne pensa?
20. Quali pregi e quali difetti del sistema di gestione dei rifiuti urbani a Milano individuerebbe?
21. In linea generale lei apprezza l'operato dell'amministrazione del suo Comune?
22. Che mezzo di spostamento predilige di norma per gli spostamenti quotidiani (es. casa-lavoro)?
23. Quando compie acquisti di prodotti alimentari a quali caratteristiche del prodotto presta maggiore attenzione (es. km, imballaggio, origine, stagionalità,…)?
24. Quali caratteristiche per il consumo di altri prodotti (es abbigliamento, abbigliamento sportivo, arredamento, tempo libero, vacanze)
25. Alcune persone ritengono che queste informazioni non siano accessibili/affidabili. Lei cosa ne pensa?
26. Nel consumo di acqua cerca di essere parsimonioso? Ripeti domanda per energia elettrica e gas.
27. Quanto ritiene che sia importante l'ambiente oggi? Ad esempio rispetto a temi come la crisi economica, l'equità sociale, l'integrazione etnica, ecc. (da contestualizzare meglio)
28. Quanto ritiene che questo aspetto sia importante nella sua vita? Quanto l'attenzione per questo aspetto ha modificato le sue abitudini quotidiane concretamente? È un parametro di orientamento della tua condotta?
29. Se dovessi compiere una riflessioni su ciò che è ordinario/abitudinario nella tua vita. Come collocheresti l'attenzione all'ambiente?
30. Talvolta accade che iniziative di sensibilizzazione in campo ambientale comportino un incentivo di tipo economico-monetario per spingere gli utenti nella direzione di comportamenti più *green*. Lei cosa ne pensa?
31. Vi sono persone che pensano che la responsabilizzazione del cittadino in campo ambientale sia l'unica via per *sistemare la questione*. Nell'individuazione di responsabilità e oneri nel gestire la questione ambientale come giudica che dovrebbe essere ripartita la responsabilità tra utente ultimo, politici, ente terzo (es. la municipalità)?

1.2 Outline of the French version

a. Quelle âge avez-vous ?
b. Vous êtes combien dans votre ménage ?
c. Quelle est votre formation universitaire actuelle ?
d. Vous habitez où sur Paris (adresse ou arrondissement) ?

1. On entend souvent parler à la télévision, internet, radio, ... des déchets comme une question d'importance et d'intérêt pour la communauté. Qu'en pensez-vous?
2. Il arrive souvent que les gens, même s'ils sont intéressés à la question du bien-être de l'environnement, sont en difficulté à conduire le tri sélectif d'une manière toujours précise. Que pensez-vous?
3. Comment jugez-vous le comportement des gens en matière de recyclage au sein de votre ménage ?
4. Il y a des gens qu'ils sont attentifs (où qu'ils ne sont pas attentifs) à conduire le tri sélectif parce qu'ils sont influencés par des variables contextuelles. Quelle est votre relation avec:
   a. Habitudes des autres personnes qui vivent avec vous
   b. Habitudes des autres habitantes de votre immeuble
   c. Espace domestique destiné au tri sélectif au sein de votre ménage et dans l'espace copropriétaire (est-il suffisant ? est-il bien pensé ? est- il propre?)
   d. Facteurs liées aux déchets (forme, dimension, matériel)
5. Quand vous trouvez un déchet qui vous ne savez pas comme éliminer, quelle est votre conduit ?
6. Comment avez-vous appris à gérer les déchets au sein de votre ménage ?
7. Certains pensent que des erreurs dans la différenciation des déchets peuvent également être due à la difficulté d'accès à l'information par les citoyens sur ces questions. Que pensez-vous?
8. Jugez-vous d'être bien ou mal informé sur le système de tri sélectif de votre municipalité?
9. Aujourd'hui, le secteur de la technologie de l'information et des télécommunications est un des plus grand. Quotidienne nous sommes de plus en plus habitués à avoir à faire avec des objets technologiques qui sont entièrement intégrés avec notre activités de routine. Dans le même temps, ces technologies ont souvent une faible durée de vie, ce qu'implique que, dans les remplacer, nous nous trouvons avoir à éliminer le vieil appareil. Ce faisant, comment avez-vous trouvez à éliminer un de ces vieux objets? (p.e. téléphone portable, grille-pain, mixeur, télécommande, rasoir électrique, jouets comportant des composants électroniques, ordinateurs, moniteurs, câbles USB, etc.)
10. Pourquoi avez-vous éliminé ce objet ? Combien de temps a t-il duré?
11. Quelle est la raison qui vous a convaincu à disposer de la manière décrite?
12. Les statistiques confirment que la grande majorité des petits appareils électroniques sont jetés à la poubelle, un bon pourcentage est conservé dans la maison, et seulement un petit pourcentage est éliminé à la décharge. Comment voyez-vous ces données?
13. Avez-vous jamais jeté un gros électroménager (e.g. machine à laver, four, réfrigérateur, etc.)?
14. Comment avez-vous disposé cet objet?
15. Que savez-vous du système prévu par la municipalité de disposer des petits déchets électroniques?
16. Que pensez-vous des services informatifs offerts par votre municipalité aux citoyens sur le système de disposer les déchets électroniques ?
17. Certaines gens sont amenés à ne pas accorder trop d'attention à la collecte sélective des déchets électroniques parce qu'elle prendre trop de temps et de ressources. Que pensez-vous?
18. Certaines gens pensent que le collecte sélective est une perte de temps parce que ce qui fait une seule personne ne peut avoir un effet significatif sur les problèmes de la société. Que pensez-vous?

19. Certaines gens sont amenés à ne pas accorder trop d'attention à le collecte sélective parce qu'ils n'ont pas confiance des institutions publiques chargés de traiter les déchets municipaux. Que pensez-vous?
20. A votre avis, quels sont les qualités et les défauts du système de gestion des déchets de votre municipalité ?
21. En général, appréciez-vous votre administration?
22. Quel est votre moyen de transport préféré pour vos déplacements quotidiens et pourquoi ?
23. Quand vous achetez un produit alimentaire, quels sont votre critères de sélection ?
24. Et pour autres produits (e.g. loisirs, sport, vêtements,…) ?
25. Certaines gens pensent que les informations sur le produits sont très difficiles à obtenir. Que pensez-vous?
26. Dans vos activités quotidiennes, faites-vous attention à la consommation d'énergie et d'eau ?
27. Pensez-vous que la question de l'environnement est importante? Et comparé à d'autres grandes questions d'aujourd'hui (e.g. crise économique in EU, égalité sociale, intégration ethnique,…) ?
28. Dans quelle mesure l'attention à l'environnement impacte votre vie quotidienne?
29. Est-elle l'attention vers l'environnement est-il un paramètre ordinaire où extraordinaire d'orientation dans votre conduite
30. Certaines gens pensent que l'incitation monétaire pour la bonne conduit environnemental est un moyen utile pour s'attaquer au problème. Que pensez-vous ?
31. A votre avis, comment la responsabilité en matière de gestion et d'élimination des déchets électroniques doit-elle être répartie entre citoyens/utilisateurs, commerçants et municipalité ? Pourquoi ?

2. Outline of the interview with eco-organisms' key-informants

2.1 Outline of the Italian version – 1st interview

1. Le chiederei di parlare dell'attività degli eco-organismi e del lavoro svolto dall'eco-organismo cui lei appartiene.
2. Mi può parlare della raccolta degli R4?
3. Come funziona la logistica e i movimenti di flusso dei RAEE dalla raccolta al trattamento ? In cosa consiste il trattamento ?
4. Avrebbe qualche dato particolarmente significativo o che ritiene di dovere citare a supporto di quanto è in discussione?
5. In che relazione sono gli eco-organismi e gli altri enti di gestione dei rifiuti? Che opinione ha sul loro operato?
6. In che relazione sono gli eco-organismi e i cittadini-consumatori? Che opinione ha sul loro comportamento di raccolta?
7. Che opinione ha relativamente alla raccolta porta-a-porta per gli R4?
8. Avrebbe rilievi particolari da segnalare in merito alle diverse tipologie di rifiuti che compongono la categoria R4 ?
9. Come si colloca la filiera Italiana dei RAEE nel contesto Europeo? E dal punto di vista dell'armonizzazione delle politiche di gestione in ambito comunitario? Vi sono esempi virtuosi in Europa che vorrebbe citare?
10. Mi può parlare del fenomeno del *dumping*?
11. Quali prospettive ed evoluzioni future immagina per la filiera Italiana dei RAEE ?
12. Vi sono rilievi che vorrebbe segnalare relativamente all'operato degli eco-organismi Italiani?

2.1.a Outline of the Italian version – Deepening: 2nd interview

1. Sull'assenza del Comitato di Vigilanza e Controllo, le domanderei di commentare i seguenti dati e testimonianze [Convegno ANDEC, 2012]
2. Esso è inattivo in quanto non è ancora nato il decreto attuativo atto a renderlo operativo;
3. Nel D. Lgs 151/2005 vengono descritte le sanzioni ma non i soggetti cui spetta di erogarle, dunque questo andrebbe in capo al prefetto, per il quale dovrebbe essere costruito un dossier caso per caso… Ma questo molto difficilmente può avvenire e infatti non è mai avvenuto e non è mai stata erogata una sanzione;
4. La Guardia di Finanza non interviene perché in questo momento non ci sono soldi;
5. Il D.M. 65/2010 non risolve tutti i dubbi relativi al ruolo della distribuzione nel sistema RAEE. Infatti vi sono alcune questioni che restano confuse, complicate o aperte.
    a. Tra queste una delle più impellenti è quella relativa alla relazione tra CDR comunali e distribuzione, nonché alla (auspicata) semplificazione in materia di istituzione di CDR privati.
    b. Le chiederei alcune considerazioni più dettagliate su questi temi.
6. Sulle modalità di recepimento della Direttiva WEEE da parte dell'Italia: la scelta di istituire un decreto ex-novo è un fattore che rallenta molto l'acquisizione delle nuove disposizioni.
    a. Quale iter alternativo sarebbe possibile (e viene praticato in altri paesi come la Francia) ?
7. Chi effettua raccolta e trasporto RAEE domestici dev'essere iscritto al SISTRI?

8. In Italia vi sono motivi di inefficienza nella gestione RAEE dovuti a contraddizioni tra normative interne inerenti il disciplinamento dell' usato e Direttiva WEEE sulla gestione RAEE ?
9. L'obbligo di iscrizione al CDCR è in capo solo ai produttori, distributori e importatori ?
    a. Se sì, è perfettamente lecito che vi siano Comuni, centri di raccolta e/o raggruppamento, impianti di trattamento e varie tipologie di broker che agiscono al di fuori del sistema CDC ?
10. I consumatori sono vincolati da un ordinamento comunale a smaltire i loro rifiuti secondo le modalità indicate.
    a. Nel caso ciò non avvenga si incorre in una sanzione che si traduce in un'ammenda addebitata al nucleo condominiale.
    b. La sanzionabilità del cattivo smaltimento può avvenire anche in capo ai singoli?
11. Il sistema CDC RAEE contabilizza anche l'economia sociale e solidale?
12. Leggevo che 'consorzio' è un termine impreciso per descrivere i vari sistemi collettivi, infatti ve ne sono alcuni che agiscono come consorzi ma altri che hanno status differenti (anche SPA).
13. I distributori possono vendere a terzi come i comuni?
14. I distributori possono o devono iscriversi al cdc?
15. Le statistiche CDC considerano anche l'ESS? Nei numeri che leggo è compreso?
16. Perché alcuni comuni dovrebbero decidere di gestire i flussi di RAEE in modo alternativo al sistema CDC? Visto che quest'ultimo ne premia la condotta e ne finanzia in buona parte l'operatività. Inoltre se un comune si rivolge a un trattatore 'outsider' cosa ne ricava? Non deve comunque pagargli il servizio? Oppure i rifiuti li può vendere?
17. Quanti sono i comuni iscritti al CDC?
18. Ma com'è possibile che i distributori possano non iscriversi al CDC? Cioè com'è possibile…allora il cerchio aperto dai produttori non si chiude mai…..
19. In Italia sui RAEE nuovi esistono sistemi di gestione individuali da parte dei produttori?
20. La distribuzione in Italia percepisce dei finanziamenti per l'1 contro 1? Se si da chi?

2.1.b Outline of the Italian version – Interview with CDCR's key-informant: 1st interview

1. Vorrei verificare con Lei lo schema seguente:
    - Il CDCR è l'arbitro di un insieme di sistemi collettivi/consorzi, presso i quali i produttori di AEE hanno la facoltà di iscriversi. Questi produttori pagano i consorzi affinché questi garantiscano la raccolta dei loro RAEE che avviene presso i Comuni (che si iscrivono al sistema identificato dal cdcr), e sulla base delle porzioni di categorie RAEE immesse sul mercato.
    - I consorzi pagano ai Comuni un premio di efficienza che si calibra sulla base della qualità e della quantità di RAEE raccolti nei centri di raccolta.
    - I consumatori pagano attraverso una tassa il servizio di gestione rifiuti al Comune, che comprende genericamente tutte le tipologie di rifiuto –escluse quelle per cui è direttamente chiesto un compenso da AMSA al cittadino, come nel caso di alcuni ingombranti…
1. Sul raggruppamento R4 come si calcola il tasso di raccolta minimo? E come la soglia di buona operatività? Che dati presenta Milano a tal proposito?
2. Sul ruolo della grande distribuzione: qualche commento sul suo reale peso nella gestione dei RAEE in Italia.
3. Vorrei conoscere il suo punto di vista sul comportamento del consumatore in relazione alle categorie di RAEE che registrano i minori tassi di ritorno come gli R4.
4. Come funziona il flussi di denaro nel sistema eco-organismi: Chi paga? Chi beneficia?

- E nello specifico: cosa può dirci dei premi di efficienza ? E dell'eco-contributo ?

5. All'interno della filiera ufficiale degli eco-organismi:
   - Chi vincola?
   - Chi controlla?
   - Chi gestisce?
6. Come funziona la TARSU (oggi TARES)? Essa include anche la gestione dei RAEE ?
7. La LCA sui raee in Italia è effettivamente rispettata ?
8. Perché non viene impostato il porta a porta sugli R4?

2.1.c Outline of the Italian version – Interview with CDCR's key-informant: 2nd interview

1. I RAEE raccolti nei Luoghi di Raggruppamento (ldr) hanno sia l'opzione di finire nel Centro di Raccolta) cdr comunale che quella (a certe condizioni) di andare direttamente nell'impianto di trattamento?
2. I RAEE raccolti nei ldr sono ugualmente soggetti al ritiro da parte dei sistemi collettivi? In sostanza: i sistemi collettivi effettuano il ritiro sia presso i cdr che presso i ldr?
3. Quanti distributori sono iscritti al CDC in Italia?
4. Quanti punti vendita applicano l'*1 vs 1* in Italia (anche una stima)?
5. In Italia vi sono accordi da parte degli eco-organismi col settore ESS come quelli previsti con gli altri soggetti quali distribuzione, Comuni, e trattatori?
6. C'è una qualche forma di contabilità del settore ESS? Vanno considerati flussi *paralleli* al CDC? Se ne conosce una stima?
7. Spesso si dice che la normativa che disciplina la materia dei RAEE sia contraddittoria rispetto ad altre normative vigenti (es. la materia dell'usato e del *second-hand*). Vi sono esempi o considerazioni da fare su questo punto?

2.2 Outline of the French version

1. Quel est le rôle des éco-organismes dans la gestion des déchets électroniques en France, et en particulier avec quels autres acteurs territoriaux vous dialoguez?
2. Il y la possibilité en France de gérer les déchets électroniques de façon alternative au système des éco-organismes?
3. Quelle est la relation entre producteurs, importateurs et revendeurs ?
4. Quelle est l'état de l'art par rapport à la vente en ligne?
5. Pouvez-vous expliquer la chaîne économique de la filière des DEEE en France ?
6. Est-ce que les autorités locales doivent-elles s'inscrire au système des éco-organismes ?
7. Quel est le status juridique de l' OCAD3E ?
8. Comment marche les contrôles sur le bon fonctionnement du système?
9. Quelle est la situation de la France par rapport aux objectifs de collecte proposés par les directives européennes?
10. Combien des DEEE sont collectés en France aujourd'hui ?
11. Est-ce que vous avez des observations spécifiques par catégorie de déchets électroniques ?
12. Est-ce que vous pourriez me parler de la filière parallèle?

2.1.a Outline of the French version – Deepening: 2nd interview

1. Au niveau de gestion des DEEE ménagers : quelle est la différence entre DEEE historiques (MsM avant le 15/08/2005) et DEEE nouveaux ? Est-ce que cela est-elle une distinction qui s'impose seulement dans le domaine des DEEE professionnels ?

2. Est-ce que le barème de contribution qui normalement est versé per les éco-organismes aux enseignes de la distribution partenaires est-il du même montant de ce qui est versé aux communautés locales ? Et même si cela est effectivement variable : est-ce qu'il est normalement comparable avec ce que l'on verse aux collectivités locales ?
3. Est-ce que des amendes ont été imposées contre des sujets de la filière DEEE en France (e.g. pour le phénomène du *free-riding*) ?
4. Est-ce que le montant d'argent qui est versé par les éco-organismes à leur partenaires (distribution et collectivités locales) est-il conçu en tant que récompense ou remboursement ?
5. Est-ce que cette contribution est versée en tous cas ?
6. Au de-là de la contribution financière qui passe des éco-organismes aux collectivités locales et distributeurs, est-ce que les éco-organismes ont aussi la possibilité de sanctionner les collectivités non performantes en termes de collecte ou qui présentent au centre de tri DEEE endommagés ou cannibalisés ?
7. L'OCAD3E peut sanctionner les éco-organismes en cas de mauvais conduite ?
8. Comment ça marche la question du stockage des DEEE chez la distribution ? Est-ce qu'il y a des paramètres ?
9. Est-ce que les collectivités locales peuvent-elles vendre les DEEE ménagers collectés directement aux centres de tri ?
10. Où la filière informelle agisse ? à travers quels canaux principaux ?
11. Quelle est la différence entre canal informel et canal illégal ?

2.1.b Outline of the French version – Deepening: 3rd interview

1. Est-ce que vous pourriez me donner quelques chiffres concernant le vol et la soustraction des DEEE sur le domaine publique à paris ?

2.1.c Outline of the French version – Deepening: 4th interview

1. Est-ce que vous auriez la possibilité de me donner les chiffres de la distribution (ou les enseignes en convention avec Eco-systèmes) sur Paris?
2. Est-ce que vous auriez la possibilité de me donner aussi les chiffres des ressourceries d'Eco-systèmes sur Paris (DEEE collectés et EEE récupérés)?

2.1.d Outline of the French version – Deepening: 5th interview

1. Est-ce que vous pourriez me parler du rôle de la distribution dans la filière des DEEE Française ?
2. Quels sont les contraints les plus récurrents que vous trouvez par rapport à l'implication des enseignes dans la collecte des DEEE ?
3. Est-ce que les magasins ont de règles particulières à respecter pour le stockage des DEEE dans le points de collecte en magasin ?
4. Est-ce que les magasins qui font la vente des EEE ont l'obligation de s'inscrire au système des éco-organismes ?
5. Quelle est la relation entre distribution et éco-organismes ? Comment ça marche la phase de la logistique et du transport des DEEE parmi ce des acteurs ?
6. Est-ce que vous pourriez me fournir un exemple de barème de contribution qui est versé par EcoLogic à l'un de vos enseignes de la distribution ?

3. Outline of the interview with the metropolitan agencies' key-informants

3.1 Outline of the Italian version

1. Dove si colloca A2A (AMSA) nel ciclo di gestione dei RAEE in termini di compiti istituzionali ?
2. Può chiarire il concetto di *premio di efficienza* ?
3. Quali peculiarità presentano gli R4 rispetto alle altre categorie di RAEE?
4. Qual è la sua opinione riguardo al comportamento di smaltimento dei consumatori Milanesi ?
5. Come mai non è previsto il servizio *porta a porta* per gli R4 nonostante un relativo basso tasso di ritorno?
6. Come funziona la TARSU (oggi TARES) ?
7. Mi descrive il sistema di gestione e controllo sulla filiera RAEE in Italia e per quello che è il suo punto di vista ?
8. I livelli di riciclo imposti dalla normativa su RSU e RAEE a Milano per il 2012 sono stati raggiunti?
9. Quali sono i canali informativi maggiormente utilizzati da A2A (AMSA) per divulgare informazioni sui propri servizi?
10. Vuole commentare le peculiarità concernenti la raccolta dei RAEE e legate alla realtà locale milanese?
11. Realtà virtuose in Europa e nel mondo per la raccolta degli R4: qualche spunto per il futuro di Milano?

3.2 Outline of the French version

1. Est-ce que vous pourriez présenter le travail de Syctom en termes généraux (statut juridique, objectives, principales activités, territoire) ?
2. En quoi consiste le travail de Syctom concernant la ville de Paris ?
3. En ce qui concerne la gestion des DEEE, quelle est la relation entre Syctom et les autres acteurs de la filière, à savoir collectivités territoriales, éco-organismes, distribution, ESS et acteurs du traitement ?
4. En termes généraux comment jugez-vous la qualité du tri des ordures ménagères qui proviennent de la Ville de Paris ?
5. Comment les contenus du bac jaune de la Ville de Paris sont-ils gérés par Syctom ? Et en particulier, comment les petits appareils en mélange (PAM) sont-ils gérés ?
6. Est-ce que Syctom effectue aussi un service de reprise des encombrants ?
7. Est-ce que vous avez des données (aussi des estimations approximatives) concernant la quantité des DEEE issus de la Ville de Paris et interceptés par Syctom ?

4. Outline of the interview with Municipalities' key informants

4.1 Outline of the Italian version – 1st interview

1. Dove si colloca AMSA nel ciclo di gestione dei RAEE in termini di compiti istituzionali ?
2. Quali peculiarità presentano gli R4 rispetto alle altre categorie di RAEE?
3. Qual è la sua opinione riguardo al comportamento di smaltimento dei consumatori Milanesi ?
4. Come mai non è previsto il servizio *porta a porta* per gli R4 nonostante un relativo basso tasso di ritorno?
5. Come funziona la TARSU (oggi TARES) ?
6. I livelli di riciclo imposti dalla normativa su RSU e RAEE a Milano per il 2012 sono stati raggiunti?
7. Quali sono i canali informativi maggiormente utilizzati da AMSA per divulgare informazioni sui propri servizi?
8. Vuole commentare le peculiarità concernenti la raccolta dei RAEE e legate alla realtà locale milanese?

4.1.a Outline of the Italian version – Deepening : 2nd interview

1. Le chiederei conferma di un dato:
   I Comuni aderenti al CDCR vengono finanziati alla raccolta RAEE attraverso una quota di TARES dei cittadini e i premi di efficienza (qualora i loro carichi siano di buona operatività). Inoltre, possono ricevere ulteriori finanziamenti in virtù di speciali progetti avviati dal CDCR in collaborazione con ANCI (es. l'istituzione del Fondo 5 Euro/tonnellata premiata). Attraverso tali finanziamenti i Comuni portano avanti la raccolta primaria sui RAEE domestici.
2. Vi sono ulteriori forme di finanziamento alla raccolta RAEE domestici a Milano oltre quelle sopra indicate?
3. Quale percentuale di TARES viene destinata alla raccolta RAEE a Milano?
4. Che differenza c'è tra un impianto in ordinaria (es. Muggiano) e un normale centro di raccolta (ex DM 65/2010)?
5. Quali, a Milano, sono normali CDR?
6. Potrebbe entrare nel dettaglio (legislativo e gestionale) dell'empasse –attribuibile solo alla provincia di Milano- che ha sottratto la città alla possibilità di ottenere flussi di RAEE provenienti dalla distribuzione? Questo ha significato che Milano non ha raccolto RAEE dalla distribuzione fino al 1° settembre 2012?
7. A proposito di questo: Nel rapporto CDC- Lombardia si vede che nel 2011 Milano non aveva cdr aperti alla distribuzione mentre nel 2012 ne ha uno (Muggiano, appunto, dal primo settembre). Si vede anche che Milano ha preso premi di efficienza anche nel 2011. La domanda è dunque: i premi di efficienza possono essere elargiti anche quando complessivamente a livello comunale non vi sono CDR aperti alla distribuzione ?
8. Questo dato contraddice un'altra mia fonte, dunque ecco spiegata la questione.
9. Quali consorzi vertono su Milano ? (es. nel 2011 o nel 2012)?
10. Quanti RAEE sono intercettati dai diversi cdr a Milano per l'anno 2011 o 2012? E' possibile anche ottenere dati di raccolta relativi ai CAM?
11. Quanti dalla distribuzione?
12. Prima dell'entrata in vigore del D. Lgs 151 i RAEE (beni durevoli) comprendevano le stesse categorie di oggi? Attraverso quali modalità venivano raccolti?

Outline of the French version – 1st interview

1. Est-ce que vous pourriez expliquer quel est le rôle de la Mairie de Paris dans la gestion des DEEE ?
2. Avec quels acteurs (territoriaux et autres) dialogue-t–elle ?
3. Quelles sont les limites géographiques de votre travail ?
4. Comment s'articule la gestion des DEEE sur les plans institutionnel et territorial ?
5. Parlons maintenant du tri sélectif (en général) à Paris :
   - Quand a-t-il été introduit ?
   - Est-ce qu'il a évolué et comment ?
   - Quelles sont ses caractéristiques aujourd'hui ?
   - Est-ce que vous envisagez des changements importants à l'avenir ?
6. Je vous demanderais les mêmes choses en ce qui concerne la collecte de DEEE :

- Quand a-t-il été introduit ?
- Est-ce qu'il a évolué et comment ?
- Quelles sont ses caractéristiques aujourd'hui ?
- Est-ce que vous envisagez des changements importants à l'avenir ?

7. Pourriez-vous me décrire la chaîne économique entre toutes les parties concernées ?
8. Au sujet de la collecte de Petits Appareils Ménagers en porte–à-porte qui a été introduit dans la ville de Paris :

- Pourquoi vous avez fait ce choix ?

9. A propos de la taxe sur les déchets que les citoyens doivent payer: quel est le pourcentage qui couvre la collecte de DEEE ?
10. Est-ce que des primes de rendement sont versées aux autorités locales vertueuses dans la collecte des DEEE? Comment ils sont conférés par les écosystèmes ? Et il y a aussi des pénalités pour le manquement à atteindre les objectifs de collecte ?
11. Est-ce que le paysage urbain est perturbé par la présence des DEEE (par exemple, décharges illégales, abandon sauvage, actions illégales dans les déchetteries...) et de quelle manière ?
12. Combien de points de collecte (pour les déchets mais aussi pour le DEEE) sont présents dans la zone urbaine de Paris ?
13. Avez-vous conduit des études sur le comportement des consommateurs ? Si oui, les ménages sont-ils attentifs dans la gestion de DEEE ou les phénomènes de mauvaise gestion du tri sélectif sont communs ? Quelles différences sont observées entre les différentes catégories de DEEE par rapport au comportement de gestion des citoyens?
14. Les zones urbaines sont notoirement (plus) difficiles à gérer à l'égard de nombreuses questions : la gestion des déchets en fait partie.
    Je voudrais vous demander de commenter ce chiffre dans le cas de Paris, peut-être avec quelques exemples ou cas, si vous l'avez.
15. Vous avez quelques données sur la gestion de déchets et de DEEE concernant spécifiquement la ville de Paris ?
16. Quelles sont les autorités responsables de la surveillance du système de gestion des DEEE à niveau national?
17. Perspectives et projets pour le futur (e.g. des campagnes d'information, des projets spéciaux, ...) et commentaires.

4.2.a Outline of the French version – Deepening: 2nd interview

1. Par rapport aux DEEE : le taux de collecte enregistré par la Mairie (moins d'1 kg/hab./2012) contient aussi l'apport de la distribution et de l'ESS ?
2. Pour ce qui concerne la collecte des DEEE : est-ce que vous pourriez confirmer les systèmes de tri suivants :

- Pour tous les DEEE : 7 CVAE

En plus

- Pour les petits : 2 espaces propretés et le bac jaune
- Pour les encombrants : prise en charge gratuit au pied du domicile

3. Est-ce que vous pourriez confirmer les PAM qui peuvent être triés dans le bac jaunes :

Sèche-cheveux, rasoirs électriques, fers à repasser, robots ménagers, téléphones portables et leurs batteries, calculatrices.

On en a des autres ?

4. Est-ce que la TEOM contient une pourcentage destiné à la collecte des DEEE ?
5. On a des données sur les EEE Mise sur Marché à Paris ? Aussi des estimations approximatives ?
6. Est-ce que on a des données sur le vol des DEEE en déchetterie ?
7. Est-ce que on serait possible savoir les flux financier qui est versé par l'OCAD3E à la Mairie de Paris pour la gestion des DEEE ?
8. Par rapport au étude que je suis en train de conduire :

à travers une enquête destinée aux étudiant-e-s de Paris, j'en ai trouvé plusieurs qui disent d'avoir pas le tri sélectif dans leur immeuble (p.e. car on a pas le bac jaune). Les raisons qui sont apportés sont des raisons d'espace : des immeubles avec des espaces communs limités auraient pas la possibilité d'avoir les bacs du tri.

Est-ce que vous pourriez commenter ces données ?

9. Est-ce que on a à Paris un problème réel de gestion d'espaces dans les immeubles, qui peut éventuellement affecter la collecte ?
10. Est-ce que vous pourriez donner votre point de vue sur le rôle du secteur informel dans la filière des DEEE à Paris ?
11. On a des gens qui pensent que un déchet mal trié va pas causer des dommages car en effet la collecte est déjà pensée pour être multimatériaux et donc on va avoir également une sélection après le geste du tri des citoyens. Est-ce que vous pourriez commenter ces données ?
12. Est-ce que on des limites en termes de poids/fréquence des déchets que les citoyens peuvent amener aux centres de valorisation?
13. Qu'est que sont les libres services par rapport à la collecte des DEEE ?
14. Qu'est que s'entende avec appel à une société privée (coordonnées dans les pages jaunes) par rapport à la collecte des DEEE ?
15. Est-ce qu'on a le numéro des distributeurs actifs avec l'1 pour 1 sur Paris ? et des opérateurs d'ESS ?

5. Outline of the interview with retailers' sector key-informants

5.1 Outline of the Italian version

1. Potrebbe descrivermi il ruolo istituzionale della sua associazione e il lavoro dei suoi associati?
2. Le chiedo di commentare il ruolo che la distribuzione ha oggi in Italia per quanto concerne la raccolta dei RAEE.
3. Quali sono le maggiori difficoltà che la distribuzione incontra nel partecipare alla filiera degli eco-organismi?
4. Quali sono i motivi per i quali la distribuzione si è in qualche modo astenuta dall'applicare appieno il ruolo che le deriverebbe in base alla normativa Italiana che recepisce la Direttiva RAEE?
5. Quali prospettive immagina relativamente al ruolo della distribuzione nella raccolta RAEE in base alla nuova Direttiva ?
6. Quali immagina potrebbero essere gli incentivi atti a rendere maggiormente diffusa la partecipazione della distribuzione nella filiera RAEE in Italia?

5.2 Outline of the French version

1. Est-ce que vous pourriez expliquer quel est votre travail et quelles sont les caractéristiques de vos associés ?
2. Est-ce que vous pourriez expliquer quel est le rôle des industries electriques, electroniques et de communication par rapport à la gestion des DEEE en France?
3. Avec quels acteurs (territoriaux et autres) dialoguent-elles ?
4. Quelles sont les limites géographiques de leur travail ?
5. Comment s'articule la gestion des DEEE sur les plans institutionnel et territorial ?
6. Je vous demande le point de vue des IEE&C sur la question des DEEE par rapport à :

- R.E.P. : état de l'art et perspectives
- 1 contre 1 : état de l'art et perspectives

7. Dans la gestion de DEEE est-ce que les IEE&C trouvent des différences entre les cinq catégories? Et aussi en dialoguant avec les autres acteurs de la chaîne DEEE (consommateurs, institutions locaux, troisième secteur) trouvent-elles des différences (de comportement ou de performance) entre le cinq catégories ? [Par Exemple : Quelles différences sont observées entre les différentes catégories de DEEE par rapport au comportement de gestion des consommateurs?]
8. Avez-vous quelques données par rapport à la collecte des DEEE par les IEE&C ?
9. Le Petits Appareils Ménagers sont notoirement l'une des catégories les plus difficiles à intercepter par le système de gestion des DEEE: comment commenteriez-vous ces données? Pourriez-vous identifier des tendances sur cette question?
10. Est-ce que vous pourriez décrire la chaîne économique qui est liée à la gestion des DEEE de berceau à la tombe ?
11. Vous avez quelques données sur le rôle des IEE&C par rapport à la gestion des DEEE concernant spécifiquement la ville de Paris ?
12. Perspectives et projets pour le futur (e.g. des campagnes d'information, des projets spéciaux, ...) et commentaires.

6. Outline of the interview with SSE sector's key informants

6.1 Outline of the Italian version

1. Potrebbe descrivermi in cosa consiste il lavoro svolto dall'azienda presso cui lavora?
2. Come si rapporta con la clientela? Attraverso quali canali?
3. Che tipo di RAEE trattate?
4. Come funziona il vostro lavoro da un punto di vista della logistica?
5. Quali difficoltà incontrate nello svolgere attività di refurbishment in Italia?
6. Che relazione avete con la pubblica amministrazione e con le istituzioni preposte alla gestione dei RAEE?
7. Come risolvete la questione del brand relativamente al nuov immesso sul mercato?
8. Dal vostro punto di vista, come si comporta la normativa Italiana relativamente alla materia del rigenerato e dell'usato? E del trattamento del rifiuto?

Outline of the French version

1. Est-ce que vous pourriez expliquer votre activité en général?
2. Est-ce que vous pourriez expliquer quel est votre rôle dans la gestion des DEEE ?
3. Avec quels acteurs (territoriaux et autres) vous dialoguez ?
4. Quelles sont les limites géographiques de votre travail ?
5. Comment s'articule votre gestion des DEEE sur les plans législatif et territorial ?
6. Je vous demande une brève rétrospective historique sur votre travail:
   - Quand a-t-il été introduit ?
   - Est-ce qu'il a évolué et comment ?
   - Quelles sont ses caractéristiques aujourd'hui ?
7. Est-ce que vous envisagez des changements importants à l'avenir ?
8. Est-ce que vous pourriez identifier des cibles des consommateurs/professionnels et des zone géographiques qui sont plus (ou moins) sensible et réceptifs aux votre initiatives?
9. comment faites-vous connaître votre activités au public? Quels sont les principaux canaux de communication?
10. Vous avez quelques données concernant spécifiquement la ville de Paris ?
11. Perspectives et projets pour le future (p.e. des campagnes d'information, des projets spéciaux, ...) et commentaires.

7. Outline of the interview with experts of the waste and e-waste sector

7.1 Outline of the Italian version – *Juridical and technical aspects of the Italian e-waste supply chain*

1. Sull'assenza del Comitato di Vigilanza e Controllo, le domanderei di commentare i seguenti dati e testimonianze [Convegno ANDEC, 2012]
2. Esso è inattivo in quanto non è ancora nato il decreto attuativo atto a renderlo operativo;
3. Nel D. Lgs 151/2005 vengono descritte le sanzioni ma non i soggetti cui spetta di erogarle, dunque questo andrebbe in capo al prefetto, per il quale dovrebbe essere costruito un dossier caso per caso… Ma questo molto difficilmente può avvenire e infatti non è mai avvenuto e non è mai stata erogata una sanzione;
4. La Guardia di Finanza non interviene perché in questo momento non ci sono soldi;
5. Il D.M. 65/2010 non risolve tutti i dubbi relativi al ruolo della distribuzione nel sistema RAEE. Infatti vi sono alcune questioni che restano confuse, complicate o aperte.
    a. Tra queste una delle più impellenti è quella relativa alla relazione tra CDR comunali e distribuzione, nonché alla (auspicata) semplificazione in materia di istituzione di CDR privati.
    b. Le chiederei alcune considerazioni più dettagliate su questi temi.
6. Sulle modalità di recepimento della Direttiva WEEE da parte dell'Italia: la scelta di istituire un decreto ex-novo è un fattore che rallenta molto l'acquisizione delle nuove disposizioni.
    a. Quale iter alternativo sarebbe possibile (e viene praticato in altri paesi come la Francia) ?
7. Chi effettua raccolta e trasporto RAEE domestici dev'essere iscritto al SISTRI?
8. In Italia vi sono motivi di inefficienza nella gestione RAEE dovuti a contraddizioni tra normative interne inerenti il disciplinamento dell' usato e Direttiva WEEE sulla gestione RAEE ?
9. L'obbligo di iscrizione al CDCR è in capo solo ai produttori, distributori e importatori ?
    a. Se sì, è perfettamente lecito che vi siano Comuni, centri di raccolta e/o raggruppamento, impianti di trattamento e varie tipologie di broker che agiscono al di fuori del sistema CDC ?
10. I consumatori sono vincolati da un ordinamento comunale a smaltire i loro rifiuti secondo le modalità indicate.
    a. Nel caso ciò non avvenga si incorre in una sanzione che si traduce in un'ammenda addebitata al nucleo condominiale.
    b. La sanzionabilità del cattivo smaltimento può avvenire anche in capo ai singoli?
11. Il sistema CDC RAEE contabilizza anche l'economia sociale e solidale?
12. Leggevo che 'consorzio' è un termine impreciso per descrivere i vari sistemi collettivi, infatti ve ne sono alcuni che agiscono come consorzi ma altri che hanno status differenti (anche SPA).
13. I distributori possono vendere a terzi come i comuni?
14. I distributori possono o devono iscriversi al cdc?
15. Le statistiche CDC considerano anche l'ESS? Nei numeri che leggo è compreso?
16. Perché alcuni comuni dovrebbero decidere di gestire i flussi di RAEE in modo alternativo al sistema CDC? Visto che quest'ultimo ne premia la condotta e ne finanzia in buona parte l'operatività. Inoltre se un comune si rivolge a un trattatore 'outsider' cosa ne ricava? Non deve comunque pagargli il servizio? Oppure i rifiuti li può vendere?
17. Quanti sono i comuni iscritti al CDC?
18. Ma com'è possibile che i distributori possano non iscriversi al CDC? Cioè com'è possibile…allora il cerchio aperto dai produttori non si chiude mai…..
19. In Italia sui RAEE nuovi esistono sistemi di gestione individuali da parte dei produttori?

7.1.b Outline of the Italian version – The Committee of Vigilance and Control in the Italian e-waste supply chain

1. Le chiederei di spiegare qual è il ruolo giuridico che i comitati di vigilanza hanno secondo la legislazione Italiana?
2. Le chiederei dunque quale è il potere giuridico che è in capo ai comitati di vigilanza secondo la legislazione Italiana?
3. In che modo la mancata applicazione del Decreto tariffe lede il buon funzionamento della filiera dei RAEE in Italia? E in che modo il comitato di vigilanza e controllo è implicato in questa inefficienza?
4. Perché paesi come l'Italia tardano molto nella ricezione delle normative sovranazionali mentre altri paesi, come la Francia, risultano avere forme di recepimento più snelle? In cosa consiste tale differenza?

7.1.c Outline– Waste and e-waste management : an European perspective

1. Le chiedere i parlare dello Stato dell'arte relativamente alla normativa Europea in fatto di rifiuti.
2. Quali politiche e quali strategie oggigiorno sono portate avanti dalle istituzioni al fine di incoraggiare comportamenti green da parte dei consumatori ?
3. Quali sono secondo lei i fattori maggiormente coinvolti nell'aggravamento della questione rifiuti oggigiorno?
4. Mi può fare esempi di politiche di gestione dei rifiuti particolarmente virtuose in Europa?

7.1.d Outline– E-waste management: some insights on global scale

1. Le chiederei di descrivermi la questione e-waste nelle sue implicazioni geo-politiche globali.
2. In che stato si trova ad oggi la Comunità Europea rispetto a tale questione?
3. E l'Italia?
4. Come funziona la filiera da un punto di vista logistico e finanziario in Italia?
5. Quali studi o attività di reporting sono state condotte finora rispetto al ruolo che i cittadini-consumatori possono avere nel contribuire a migliorar ei tassi di raccolta dei RAEE ?

7.2 Outline of the French version: Some insights on the French e-waste supply chain

1. Est-ce que vous pourriez expliquer le travail ADEME et quels sont votre domaines d'intervention?
2. Est-ce que vous pourriez expliquer le role d'ADEME par rapport à la question des déchets électroniques?
   - Avec quels acteurs (territoriaux et autres) vous dialoguez ?
   - Quelles sont les limites géographiques de votre travail ?
3. Comment s'articule la gestion de DEEE sur le plan logistique ?
   - Les producteurs peuvent s'inscrire ou doivent s'inscrire au système d'éco-organismes ?
   - Est-ce qu'il y a pas la possibilité en France de gérer le DEEE d'une façon alternative au système des éco-organisme ?
   - Aussi pour les collectivités locales est-il possible d'avoir une filière alternative de gestion de DEEE ? Par exemple : est-ce qu'elle peut décider de vendre ses DEEE aux acteurs différents d'éco-organismes ?
4. Quelle est la relation entre ADEME et les collectivité (par exemple entre ADEME et SYCTOM) ?
5. Pourriez-vous me décrire aussi la chaîne économique entre toutes les parties concernées ?

6. A propos de la taxe sur les déchets que les citoyens doivent payer: quel est le pourcentage qui couvre la collecte de DEEE ?
7. Est-ce que des primes de rendement sont versées aux autorités locales vertueuses dans la collecte des DEEE? Et il y a aussi des pénalités pour le manquement à atteindre les objectifs de collecte ?
8. Quel est la pourcentage de collecte de DEEE à niveau national en France ?
9. Avez-vous conduit des études sur le comportement des consommateurs ? Quelles différences sont observées entre les différentes catégories de DEEE par rapport au comportement de gestion des citoyens?
10. Les zones urbaines sont notoirement (plus) difficiles à gérer à l'égard de nombreuses questions: la gestion des déchets en fait partie.
    Je voudrais vous demander de commenter ce chiffre dans le cas de Paris, peut-être avec quelques exemples ou cas, si vous l'avez.
11. Perspectives et projets pour le futur (e.g. des campagnes d'information, des projets spéciaux,...) et commentaires.