BUSINESS TO BUSINESS NETWORKS IN THE WASTE RECYCLING INDUSTRY

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Abstract. *The high living standards achieved by 500 Million people in the European Union generates up to 3 Billion tonnes of waste every year and require innovative forms of recycling. This study aims to analyze the "Sewage and refuse disposal and sanitation" industry (Waste) as a producer of services able to break down its negative externalities and transform them into an asset flow for competitive advantage. By adopting the Eurostat Input-Output (I-O) table database and applying the Natural Resource Based View (NRBV) as conceptual lens, the top-12 "valuable" ITCs have been made clear for EU-27 countries (2000-2007). Furthermore, by using the Ghosh I-O model, both direct and indirect (hidden) forward linkages have been enlightened. Finally, the Lorenz curve and the Gini indices have highlighted the concentration and rarity of the Intermediate Trade Contacts (ITC). Results here obtained allow public and private decision makers to increase their own awareness about the hidden potentials of specific Waste intermediate markets, identifying new markets and potential partners, managing their intermediate market-portfolio and setting-up strategic partnerships for both product and process innovation purposes.*

Keywords: *Waste recycling economics, business-to-business markets, input-output analysis, sale multiplier, natural resource-based theory, ecological economics.*

Introduction

This study analyzes the "Sewage and refuse disposal and sanitation" (55-Cod. 90) industry (Waste) as a producer of services able to break down its negative externalities and transform them into an asset flow for competitive advantage. The conceptual lens used for this analysis is the theory of Resource-based view of the firm (R-BV) and in particular the Natural resource-based view (NR-BV). The general theoretical approach is based on the pioneering work of Edith Penrose (1959) which focuses on the issue of long period enterprise development. The same theory underwent changes since the '80s through the contributions of important scholars (Wernerfelt, 1984; Barney, 1991, 2001). "The natural-resource-based view is then developed with the connection between the environmental challenge and firm resources operationalized through three interconnected strategic capabilities: pollution prevention, product stewardship, and sustainable development" (Hart, 1995, p. 987). The resource-based view of the firm has emerged, articulating the relationships among firm resources, capabilities, and competitive advantage.

Relevant contributions attempt an integration of the internal and external perspectives under the banner of the R-BV (e.g., Barney, 1991; Wernerfelt, 1984), but the theory still systematically ignores the constraints imposed by the biophysical (natural) environment (Hart, 1995, p. 986; Hart & Dowell, 2011).
This paper purports to verify Waste competitive capability to bring a defensible sustained development by verifying what follows: 1) its functional classification through the ratios of final sales to total uses and of intermediate input on production, able to reveal the role of this branch in the whole EU economy; 2) the valuability of business-to-business (B2B) sales and their relation with supply multiplier; 3) the rarity of intermediate sales (and their trends) using Gini index and Lorenz concentration curve for Waste clients.

The Waste issue

One of the most important drivers of new resource and capability development for firms lies in constraints and challenges by natural (biophysical) environment (Hart, 1995, p. 989). Even at present gross world product (GWP), which combines the gross domestic product (GDP) of all world countries, is currently approximately at US $83.12 trillion (IMF, 2012) in terms of purchasing power parity (PPP) and about US $71.83 trillion in nominal terms (CIA, 2013). Notwithstanding it may be necessary to increase economic activity from one and half time (for 2025) to fourfold (for 2050) just to provide basic needs (amenities according to another scholar) to the population (MacNeill, 1989; Ruckelshaus, 1989). This latter will rise from 6.5 billion (2012), to 8 billion (2025) and will arrive around 9.5 billion in 2050. In consequence, the level of economic production probably will not be ecologically sustainable using existing technologies and production methods to face the foreseen increase in resource use and waste generation would almost certainly stress the earth's natural systems beyond recovery (Hart, 1995, pp. 990-991). Waste formation is largely determined by both population and production/consumption patterns (Chang and Iseppi, 2011). The last, as known, depends on per capita GDP. The above trends will drive the increase of the waste volume and contextually the formation of negative externalities which need an appropriate waste management to be transformed in resource-goods. Waste composition will keep changing due to production and consumption habit transformation and to the inclusion of more complex products in waste stream (Mavropoulos, 2011; Rossitto et al., 2017).

R-BV Main concepts

Business-to-Business (B2B) trade contacts (ITC) are based on Eurostat definition of intermediate consumption: «the value of the goods and services consumed as inputs by a process of production, excluding fixed assets …; the goods or services may be either transformed or used up by the production

process» (Eurostat, 2008, p. 261). For the purposes of this paper, the "B2B market" can be defined as the "intermediate competitive environment composed by the set of sales and purchases achieved by organizations (private, public and no profit) through the use of technological and other means, expressed by data whose standards of quality are as high as possible, in terms of statistic reliability, homogeneity, accessibility and usability" (Droli, 2013). ITC are considered by the Resource-based view (R-b) as the transactional capital resource of a firm and in this study are dealt with in order to evaluate their impact on the 'sustained' competitive advantage (Wernerfelt, 1984, p. 172; Droli et al., 2014). The R-BV identifies the importance of competitive advantage defensibility (Porter, 1985, 1980; Grant, 1999; Valdani, 2003). Through a significant methodological development (Wernerfelt 1984), it is emphasized that not all resources under the firm control can be a source of defensible competitive advantage (Piccinini et al., 2015). Therefore R-BV stipulates the following four attributes which should be owned or embedded in the resource to allow the enterprise to detain such competitive advantage: valuability, rarity, inimitability and non-substitutability (Barney, 1991). The last attribute implies that another firm is not able to implement the same strategy. The problem of "Natural" R-BV of the firm (NR-BV) is highlighted in the above cited essay (Hart, 1995) which incorporates the key concepts of R-BV, of which it is a conceptual spill-over. The R-BV indicates that the ownership of some strategic business capabilities in the environmental field becomes central to the enterprises seeking to defend their competitive advantage in an environmentally sustainable manner. This paper is part of a series of studies concerning the discovery and development of new resources for the purposes of Natural R-BV (Wernerfelt, 2011; Maritan & Peteraf, 2011; Sirmon et al., 2011). However, R-BV did not yet focus on the type of "resource" examined here (waste) that is instead considered to be a public spending burden.

Methodology: the horizontal supply-driven or 'mirror model'

The Ghosh supply-driven model aims to reveal downstream or forward rather than upstream or backward linkages of the traditional Leontief demand-driven model. For this purpose, the horizontal or market share matrix B and the inverse of [I-B] is used instead of Leontief vertical or input coefficients matrix A and the inverse of [I-A]. The horizontal inverse matrix is also denoted [I-Q]-1 and called Ghosh inverse matrix (Ghosh, 1958, pp. 58-64). Direct horizontal coefficient matrix is also called "intermediate scale" matrix (Droli et al., 2014). It expresses the ratio between the sales of one branch to any other branch and the total deliveries of products of the same branch in the economic system (Chang, 1994, p. 91). Therefore, [I-B]-1 allows the decomposition of the total branch products use into its direct and indirect content of primary costs: Wages and salaries, Consumption of fixed capital, Operating surplus – net and gross,

Value added and imports. In addition it permits the measurement of the direct and indirect contribution that these primary inputs do to total uses. Given a change in primary inputs, the direct and higher-order impacts on domestic output can be determined. Rows sum of horizontal inverse are supply multipliers, representing the total output change in the entire economy given by a unit change in primary inputs (Chen and Rose, 1986, p 3). Such rows sum of Ghosh inverse are used to define downstream or sale linkages. This study considers only sale intermediate market trade contacts over a specific threshold (1/2n) where n is the number of branches (n=59), considered valuable from a R-BV. Following Ghosh, the supply-driven model should consider forward causal relations which take into account the economic rationale of the production process, from primary inputs to final goods (Ghosh, 1958).
Supply-driven is also named mirror model since it implies the inversion of the causal flow with respect to more classical demand-driven model. Actually, the vertical model emphasizes the hierarchy of upstream flows (input purchases), while the horizontal model focuses itself on the hierarchy of downstream flows (intermediate sales).

The database and Waste industry field of study

In this research, the horizontal model is applied to identify the structural relationships concerning sale intermediate trade contacts (B2B) in EU-27 countries (2000-2007). For this purpose, a complete set of macro-level data are needed, which can only be offered by intersectoral input-output tables. The use of these tables implies accepting an input-output scientific framework (Leontief, 1986), including Ghosh (1958). For the paper purposes, Eurostat symmetric (59x59) input-output tables of EU-27 countries have been used. This set of tables implements ESA-95 and CPA, NACE-Rev. 1.1. Up to now are available tables of EU-27 for 2008 as a whole, not comparable to the previous ones since they adopt the new classification NACE rev. 2 (Eurostat, 2008).
All the elaborations have focused on the "Waste" branch (Eurostat Code no. 90, NACE Rev. 1.1), named "Sewage and refuse disposal, sanitation and similar activities". Its field of competence includes: i) collection and treatment of household and industrial waste, not for a further use in an industrial manufacturing process, but with the aim of disposal and resulting a product of little or no value; ii) other activities such as street cleaning and snow removal, etc..
The branch also excludes: a) processing of waste and scrap and other articles into secondary raw material for which real transformation process is required. The resulting secondary raw material is fit for direct use in an industrial manufacturing process and is not a final product, see 37.10 and 37.20; b) wholesale (purchase and sale) in waste and scrap, including collecting, sorting, packing, dealing, etc., but without a real transformation process, see 51.57. For

the purpose of this study, the term of Waste is used to indicate the services offered by organizations operating within this heterogeneous field.

The functional classification of Waste

In the EU-27, the group of products called Waste has a domestic production of € 161.4 Billion in 2007, corresponding to 0.69% of the whole system. In the period 2000-2007, the weight of its output has been more or less constant. Intermediate sales amounted to € 101.5 Billion, representing 62.85% of the output at basic prices. Since the average of the economic system is 46.92%, Waste can be considered an intermediate production (I), selling to other economic branches more than the EU average (Chenery & Watanabe, 1958). Thus it is, with its forward linkages, a fundamental branch for the functioning of the economy. Conversely, the Waste provides final demand, below the economy average.

The importance of applying input-output tables and Ghosh model is well known for marketing purposes (Evans, 1952) especially for firms that supply the greatest part of their goods to B2B market as in this case. Following R-BV, sales, operationalized by Waste firms, should be considered valuable, being its B2B market share above the EU-27 average. Furthermore, the necessity to manage B2B *sale* relationships through *ad-hoc* strategies for the Waste organizations emerges.

From the purchasing side, Waste likewise buys as input from other groups of products around € 70.8 Billion corresponding to 49.42% of its production, and since the EU economy average is 46.92%, it can be classified as Manufacture (M). In fact, it purchases a share of input that exceeds the average of the system and can be defined as a branch capable of activating it with its backward linkages. Simultaneously the Waste is not capable of producing a value added over the EU average. It thus exerts activities of light manufacturing or processing of the purchased inputs.

Its functional classification is thus Intermediate Manufacturing (IM). The B2B purchase relationships are also valuable for R-BV, but their relevance is lower than that of the intermediate sales both in relative and absolute terms. As known, the value chain consists of the phases of the production-distribution process: Phase I) Intermediate Primary Production (IPP) – e.g. Agriculture, Mining etc.; Phase II) Intermediate Manufacture (IM) – e.g. Metal working, Steel etc., Phase III) Final Manufacturing (FM) – e.g. Food, Wood etc.; IV) Final Primary Production (FPP) – e. g. direct sale of horticultural products (Chenery and Watanabe, 1958). The Waste branch is placed, therefore, at the beginning of the value chain and specifically in Phase II: it buys a lot of input from other branches and after a slight transformation or manipulation sells the products / services to other branches placed in the later stages of the chain with prevalence for those localized in Phase III). On consequence, this branch is able to activate

the economy from the purchase-side with its backward linkages and to reinforce the effects produced by its forward linkages or sales (Hirschman, 1958).

Sale multiplier and valuable clients

In the period 2000-2007, the multiplier of sales has always been higher than the EU average. In 2000, it was 1.130 and increased progressively reaching 1.171 in 2007. The meaning is that a variation of € 1 in the use of production factors (labor, capital, land, entrepreneurship) in the Waste branch results in a change of its output for productive uses of € 1.171 (2007), while if the same variation is distributed over all branches, the output change in the economy is only 1.077. As underlined by a scholar (Schoemaker, 1990, p. 1179), the presence of a return systematically above the average indicates a competitive advantage. This happens in both expansion and recession cycles: if the primary inputs increase, the product also increases, and vice versa in case of decrease. The significance is that during the upswing of the cycle the sale multiplier acts in more positive sense, while in contraction phases of downswing it acts in more negative sense than the system average.

In a previous work, the authors have demonstrated the presence of a robust power relation of log-linear type between the number of Intermediate Trade Contacts (ITC) and the sale Multiplier with an elasticity β_1 around the unit for the complex of EU economy (Droli et al., 2013b). This law allows to add a 5^{th} characteristic to the 4 already identified by the R-BV called "predictability": the ability to predict future trends in market structure changes. Increasing the client diversification degree (with reference to clients of a certain weight - valuable), the multiplier and thus the sales increase approx. proportionally. Succeeding in attracting substantial portions of the market through business diversification does not prove, however, that will lead to greater profitability. This branch is capital intensive, the weight of gross capital formation on output is in fact 10.8% against 4.8% of the economy average. As a result, the gross operating surplus is also higher than the system average (17.3% versus 16.4%, respectively), but the net operating surplus is lower (6.6% versus 11.6% of the economy). The proportion of use of the work on the output is more or less similar (29% and 30.9% respectively). This branch enjoys a level of taxation slightly below the average. However, it emerges that the Waste has a quite inhomogeneous internal field of activity as e. g. that of the Collection of urban and hazardous waste. The former is very labor intensive. Therefore, nothing definite can be said, except that, on average, this branch is not so profitable for entrepreneurial activity, but makes a return to capital higher than the average and it is around the average for the labor remuneration. In fact, one cannot speak of net operating surplus reportedly to a single year as it depends on organization medium-term investment plans and is less predictable. It's normal that in periods of strong capital use, net operating surplus is correspondingly low. The accounting entry

of capital costs are variable, while in advanced countries the labor cost, of course, is more or less fix.
Waste has reduced in the period the diversification of valuable customers from 35 to 32 as well as in the economy. The latter, however, identifies on average about 25 valuable customers by industry. An inference is that the Waste registers a high heterogeneity of products treated that leads it to a stronger sale diversification or lesser concentration and then, by effect of the power law above, to a higher turnover per unit of specific product. Toward this overall effect, the ghost or indirect clients cooperate, recording the highest number of valuable ITC, 17 out of 32 totals (Droli et al., 2013a). In Fig. 1, 11 out of 12 main clients buy Waste services especially from other branches (2007). In B2B market, this result seems to indicate customer strong vocations to play an intermediation role that is important for the creation of a hub encompassing the intermediate sale network suitable for a value creation strategy. In perspective, that strategy will be useful to enhance partnership between sale organizations and the main indirect clients.
In the 2000-2007, the number of direct valuable main customers increased from 12 to 15, but that of indirect dropped considerably, from 21 to 17. The end result in Waste intermediate marketing has been a greater specialization in sales, the shortening of the value chain and the return to the core business, resizing the ghost clients and then the information asymmetry. In the market of Waste, this rapprochement to the competition rules has resulted in an increase of transparency, known lacking in the Waste management context (Piccinini et al., 2016).

Rarity of intermediate sales and main direct and indirect clients

1. The first decile absorbs 54.09% of all Waste Sales (56.27% in 2000). The 6 biggest direct customers are as follows (Figure 1 left):
2. Waste intra-industry trade among internal enterprises caused by the branch heterogeneity;
3. Public administration and defense services (PubAm) that is the main Waste inter-sectorial client and performs intermediation works towards final users of Waste services;
4. Real estate services (R_Est) which buys the Waste services for property management companies;
5. Retail trade services, repair services of personal and household goods (Retail) which operates the intermediation of Waste retail services to users;
6. Health and social work services (Health) which makes use of the Waste for disposal of their waste;
7. Other business services (OBus) also oriented to the direct use of the Waste services for its professional offices.

Rank	EU-27 2007 WASTE Main Intermediate Direct Clients Direct Forward Linkages				Rank	EU-27 2007 WASTE Main Intermediate Direct Clients Indirect Forward Linkages			
	No	Cod.	Homogeneous Branches	% Sales /Total Sales		No	Cod.	Homogeneous Branches	% Sales /Total Sales
1	55	90	Sewage and refuse disposal services, sanitation and sim. Serv.	13.34	1	34	45	Construction work	8.11
2	52	75	Public administ. & defence serv; compulsory soc. security serv.	5.61	2	51	74	Other business services	5.75
3	47	70	Real estate services	5.44	3	9	15	Food products and beverages	5.61
4	37	52	Retail trade services; repair serv. of personal & household goods	4.45	4	55	90	Sewage and refuse disposal services, sanitation and sim. Serv.	4.64
5	54	85	Health and social work services	3.89	5	52	75	Public administ. & defence serv; compulsory soc. security serv.	4.54
6	51	74	Other business services	3.54	6	18	24	Chemicals, chemical products and man-made fibres	4.48
7	18	24	Chemicals, chemical products and man-made fibres	3.52	7	36	51	Wholesale trade and commission trade services	4.22
8	36	51	Wholesale trade and commission trade services	3.39	8	28	34	Motor vehicles, trailers and semi-trailers	3.92
9	34	45	Construction work	3.37	9	54	85	Health and social work services	3.80
10	9	15	Food products and beverages	3.30	10	37	52	Retail trade services; repair serv. of personal & household goods	3.60
11	38	55	Hotel and restaurant services	2.63	11	47	70	Real estate services	3.38
12	21	27	Basic metals	1.62	12	23	29	Machinery and equipment n.e.c.	3.11
			Total first and second decile	54.09				Total first and second decile	55.15
			Concentration Index C3	24.38				Concentration Index C3	19.47
			Concentration Index C5	32.72				Concentration Index C5	28.65
			Concentration Index C7	39.78				Concentration Index C7	37.35
			Concentration Index C10	49.84				Concentration Index C10	48.67
			Total first decile	36.27				Total first decile	33.12
			Total second decile	17.83				Total second decile	22.02

Figure 1. **EU-27 Waste main intermediate direct and indirect clients**
Source: Authors elaboration on Eurostat Data

The following 6 direct customers (Fig. 1), placed in the second decile (7-12 position), just buy the 17.83% of output (17.70% in 2000). The inference is that the concentration in the first decile, found in the period, was achieved both at the expense of the second decile and the rest of the costumers. However, these differences may partially be due to changes in: a) buying and/or selling behavior of organizations; b) geographical location; and c) marketing strategies, etc.

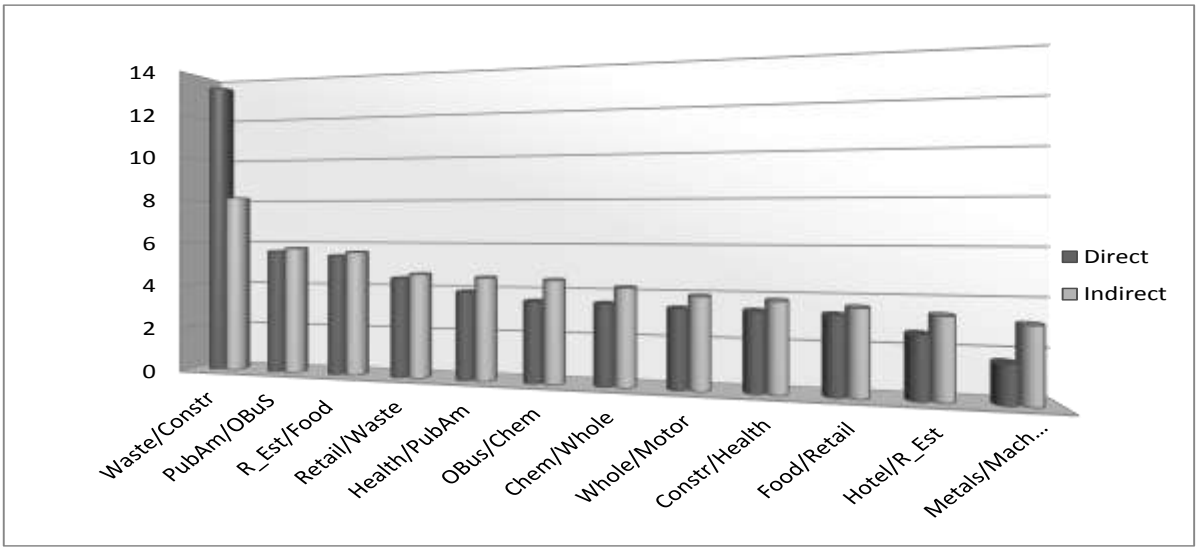

Figure 2. **EU-27 Waste % main direct/indirect clients (2007)**
Source: Authors elaborations on Eurostat Data

On the right side (Fig. 1), the main ghost clients are indicated, such as indirect customers, which buy from Waste in an indirect way via the direct customers. It is known that the indirect sale relationships vanish after the third passage. The first decile absorbs 55.15% of all indirect Waste sales (through other branches).

The 6 biggest indirect customers are as follows: 1) Construction work (Constr); 2) Other business services; 3) Food products and beverages (Food); 4) Sewage and refuse disposal services, sanitation and sim. Serv (Waste); 5) Public administ. Serv & defense; compulsory soc. security serv. (PubAm); and 6) Chemicals, chemical products and man-made fibers (Chim). It should be noted that the top 12 direct customers are also present in the first two deciles of the main indirect customers, a situation that does not frequently occur.

Hotel and restaurant services and Basic metals (end of the second decile) lose the status of main indirect customers, which is instead acquired by Motor vehicles, trailers and semi-trailers (8th place) and by Machinery and equipment n.e.c. (end of the second decile).

However, the hierarchical position of the main indirect customers changes (Fig. 2 - direct / indirect). In fact, 3 of the 6 main customers rise from the second to the first decile (Constr, Food and Chem), while three others remain, even in more backward positions, in the first decile (Waste, and PubAm O_Bus). All other major direct customers (excluding those two) drop markedly. Furthermore, excluding the first sale linkage, in the subsequent, the indirect connections dominate, in percentage of the total, the direct ones. Finally, from the analysis of valuable links it results that the number of indirect relationships is higher than that of direct. The indication is that, as expected, the main indirect customers have a different weight than the direct customers. Perhaps these latter ignore to buy indirectly by customers of the Waste, given the lack of transparency of exchanges, or hindered by various nature entry barriers: why should they buy with the help of intermediation when they could buy directly? In waste value chain, it could also be that the indirect customers are able to create value through the provision of complementary services to final demand. It is conceivable that in this branch insurmountable constraints exist, legislative and contractual obstacles to enter and buy directly from Waste beyond a certain limit (e.g. special or hazardous waste, etc.).

The Gini concentration index 0.714 (2007) confirms that Waste has a structure of direct sales very concentrated, which has been increasing over time (in 2000 it was only 0.697). Similarly, the Gini index of indirect B2B relationships has been increasing: it was 0.534 in 2007 and 0.520 in 2000 against EU system averages of 0.525 and 0.512 respectively. In general, the sale concentration index both direct and indirect tends to increase over time.

In contrast, the structure of the indirect sales relating to 'ghost clients' appears much more distributed than that of direct clients in line with the economy average.

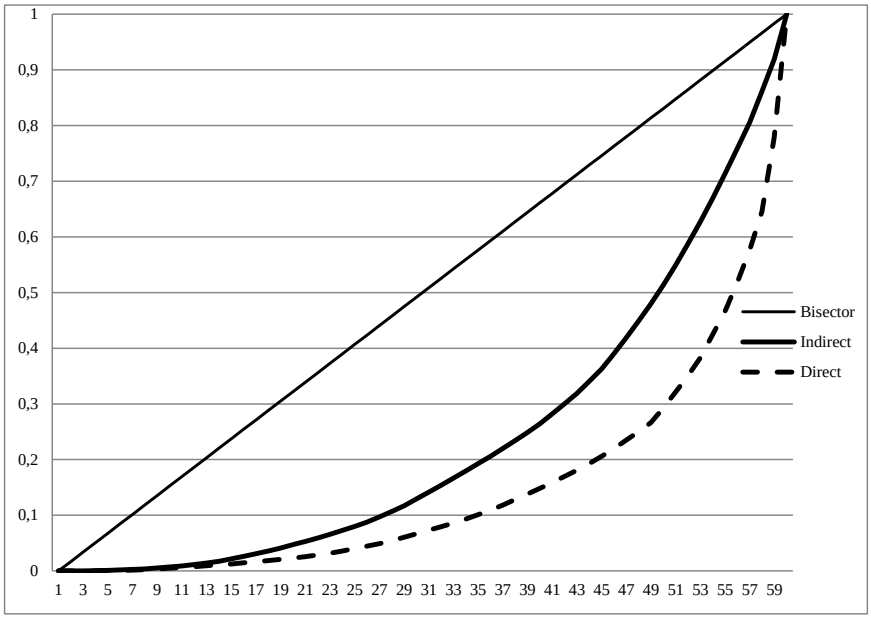

Figure 3. **EU-27 Waste Lorenz curve direct and indirect sales**
Source: Authors elaborations on Eurostat Data

The Lorenz Waste concentration curve (Fig.3) of intermediate direct sales is in fact very far from the bisecting line and quite close to the lower right angle of maximum concentration, as the Gini index signaled. Conversely, the concentration curve concerning indirect B2B sales is much closer to the bisector and this confirms the greater diversification of ghost clients than that of declared customers. In effect, the concentration of direct links is higher in the first decile compared to indirect one (Tab. 1) and the gap between them is gradually decreasing moving toward lower concentration indices, i.e. from C3 to C5 to C7 and C10 so much that in the second direct decile prevail, in % of total sales, the indirect B2B customers (22% versus 17.8% to direct clients). However, being the total of direct sales (denominator) greater than that of the indirect (€ 0.62 to € 0.54 for € 1 change in value added), it follows that, for each variation in € 1 in value added, the second decile direct sale relationships change of € 0.17, while those of the indirect ones varies only € 0.11. It remains valid that in relative terms the share of second decile, pertaining indirect linkages, exceeds the direct although in absolute value gives a lower impact.

Final considerations

From the above analysis, it was found that the Waste branch can be classified as an Intermediate Manufacturing and thus constitutes an important benchmark to test R-BV theory. Therefore, Waste plays a crucial role in the economy for its ability to activate valuable resource flows both upstream and downstream creating a relation network in which it is a main hub. Moreover, B2B is the principal Waste market and its sale trend in 2000-2007 is toward the reduction of valuable client diversification so shortening the value chain and return to the

core business. Waste sales are already quite concentrated (rare) to the point that the direct and indirect (ghost) customers of the first decile (the six largest ones) absorb more than 55% of them. This result suggests the necessity of developing initiatives that aim to strengthen the partnership and the direct-indirect relationships between businesses, as well as between customers and suppliers in order to enhance the sale-network profitability. Given the stable (inimitable) highness of the sale multiplier, persistently higher than the EU-27 average, the Waste branch can seize the opportunity to leverage the competitive advantage to expand its turnover. The net operating surplus is however very low, partly because of the heavy cost of investments ongoing in this branch. Finally, the fall in the number of sales of the valuable indirect customers may require the adoption of integrated strategies of marketing along the whole value chain. All economic and organizational partners are involved in the process of restructuring to alleviate the over-commitment in terms of capital exposition, enhancing the economies of scale in the supply chain. These strategies may be justified by contingent economic and organizational necessities, difficult to meet through individual initiatives, but that could be achieved by the cooperation among firms.

With a 500 million people, their activities and high living standard, EU generates up to 3 billion tonnes of waste every year. "All this waste has a huge impact on the environment, causing pollution and greenhouse gas emissions that contribute to climatic change, as well as significant losses of materials" being EU strongly dependent on imported raw materials (European Commission, 2010, p. 4). European Union has the most advanced waste management system, but it is going forward to a better, more expensive and more environmentally sound, waste management system (Grassmann et al., 2013). EU waste management policies aim to reduce the environmental and health impact of waste and improve its resource efficiency (Iseppi et al. 2015) . The long-term goal is to turn EU into a recycling society, avoiding waste and using unavoidable one as a resource whenever possible. The key element in ensuring resource efficiency and sustainable development is represented by a proper waste management (European Commission, 2010). The targets for EU countries by 2020 are recycling 50% of their municipal waste and 70% of construction waste. EU Waste policy includes landfill minimization, energy recovery especially from bio-waste, recycling, re-use and prevention. However the next decades, businesses will be challenged to create new concepts of strategy. It seems likely that the basis for gaining organization sustainable competitive advantage in the coming years will be rooted, according to Natural R-BV, increasingly in a set of emerging capabilities in environmental field, such as waste minimization, green product design, and technology cooperation (Gladwin, 1992; Hart, 1994, Kleiner, 1991; Schmidheiny, 1992; Hart 1995, p. 991; Hart and Dowell, 2011).

Summary

This study analyzes the "Sewage and refuse disposal and sanitation" industry (Waste) as a producer of services able to break down its negative externalities and transform them into an asset flow for competitive advantage. The conceptual lens used is the resource-based view (R-BV) of the firm, and in particular its spill-over, the "natural" R-BV. For EU-27 countries of the last decade, the Ghosh input-output model is applied to identify the valuable relationships concerning sale intermediate trade contacts (ITC). These latter have been proved to be an intangible resource flow capable, if Valuable, Rare, Inimitable and Non-substitutable, to engender positive effects on Waste sale turnover. In fact, it was found that there is a systematic log-linear relationship between the Waste valuable ITC and the sale multiplier which remained stable above the EU average. Furthermore Gini index and Lorenz curve demonstrate that Waste resource is quite concentrated and thus rare. This result suggests the necessity of developing initiatives aiming to strengthen the partnership between businesses, enhancing the sale-network profitability. Given the stable highness of the sale multiplier, the Waste branch can seize the opportunity to leverage the competitive advantage to expand its turnover. However in the next decades, businesses will be challenged to create new concepts of strategy. It seems likely that the basis for gaining organization sustainable competitive advantage in the coming years will be rooted, according to Natural R-BV, increasingly in a set of emerging capabilities in environmental field, such as waste minimization, green product design, and technology cooperation.

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