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IMPLEMENTATION OF DEPOSIT REFUNDING SYSTEM IN SPANISH RETAIL MARKET

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TFG REALIZADO EN PROGRAMA DE INTERCAMBIO

TÍTULO: Implementation of deposit refunding system in Spanish retailer market.

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CENTRO: Kalciena iela

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Cinco palabras claves que describen el TFG:

Depósito, devolución, distribución, envases y rentabilidad.

Resumen en español (máximo 150 palabras):

El objetivo de este trabajo es estudiar la rentabilidad de la implementación del sistema de depósito para envases domésticos en el sistema de distribución español. Me he basado en experiencias de otros países como Alemania o países Nórdicos. A través de los costes iniciales y operativos de la implementación, se estudia en hipermercados y supermercados, ya que son los únicos con un volumen de venta de envases suficiente para amortizar el coste de capital, la rentabilidad que supondrá el sistema de depósito en 4 años. Los únicos ingresos provienen del sistema gestor que paga al comerciante una tasa de manipulación por cada envase de 3 céntimos.

El resultado final, es que para los hipermercados tendría una altísima rentabilidad y para los supermercados de 2.499m2-1000 m2 también presenta rentabilidad, pero menor. Para el resto de comercios es inviable económicamente porque no manejan un volumen suficiente de envases.
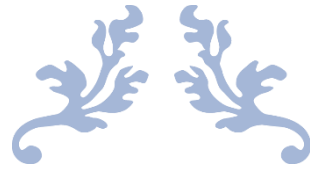
IMPLEMENTATION OF DEPOSIT REFUNDING SYSTEM IN SPANISH RETAIL MARKET

17/05/17

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1. Executive summary

"Polluters pay", with this premise this thesis aimed identifying real alternative measures for optimization of the current process of solid waste management in a crowded society and with greater consumption ratios.

Spaniards generates an annual volume of 485 kg of waste; only 33 % are recycled and can return to a normal flow. Specially concern with the increased of packaged product in recent years, mainly drink and food, their use has been duplicated in the last decade.

The motivation for this thesis was to highlight that sustainability, profitability and progress can go together.

During this thesis has been studied and analysed the ***economic feasibility*** of implementing a new model of deposit in the Spanish retail market and check if with adoption of this new system can achieve benefits for retailers and therefore, to the environment with ratios above 89% recycled. Concern for the environment is becoming a constant among Spanish consumers, and this concern is becoming influencer in purchasing decisions (eco, sustainability, etc..).

The main goal is to provide the principal distributors of the Spanish retail sector a system of deposit refunding for beverage containers capable of generating differentiation, innovation and profitability over the competition.

It has been analysed the distribution sector in Spain, especially the distribution of beverages. This is a highly competitive industry, which features various formats depending on the size of establishments (hypermarkets, supermarkets, traditional shops). The main distribution companies (Carrefour, Mercadona, Eroski, DIA) are in the process of strategic changes to attract more consumers to their stores, so that our approach can add value in influencing the decision of place shopping.

The main risks have been studied and different alternatives have been raised to be able to solve them if they occur.

2. Introduction

Deposit refunding System[1] (DRS) is a containers management system that associates value for each beverage container to increase recycling rates and reduce litter from the streets.

The goal is to change the mind of end consumers so they will perceive beverages containers as a consumer item and not as a waste.

Deposit means that there is an economic value associated with each package. It should be seen as an incentive to encourage recycling and not as a tax or a surcharge.

Refunding means that this economic value associated with each container will be refunded as soon as it is returned to the bottling line.

2.1. DRS cycle

We differentiate two parts of the cycle:

- External cycle: between consumer and trade. The consumer pays the price of drinks over the deposit associated with that type of packaging. This deposit will be returned to the consumer as soon as they return the container either in the trade where I buy it or any other.

If consumer do not return the container, consumer does not regain deposit. This makes compliance with the European principle ``***Polluter pays***´´ and it also helps to finance the system.

- Internal cycle: between bottlers, retailers, recycling plants and DRS management system.

- First step: Bottlers pay the deposit for each container that is launched into the market. This quantity is payed to ***DRS management system***.

- Second step: Retailers buy products packaged to bottler, paying the price of the product over the deposit.

- Third step: DRS management system returns the deposit to retailers for each container that consumers have returned plus the amount agreed upon by the management of each container. I.e. the system makes the trade-off between the agents of the cycle.

- Fourth step: DRS Management System sells collected containers to the recycling plants. The system is financed by this income.

- Fifth step: Recycling plants process these packages and sell them to the producers of container which in turn sell it to bottlers.
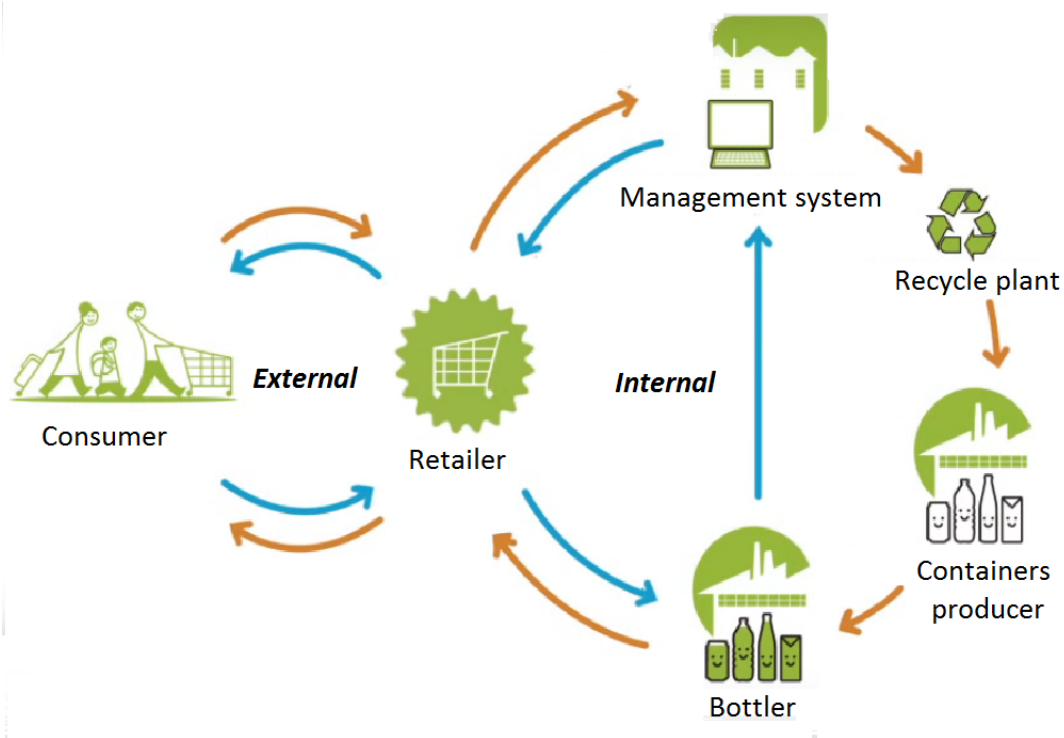
Figure 1: DRS cycle[1]

2.2. Collecting points

Collecting points will be the commercial areas intended for the sale of food and drink. It has been established two types of collection points according to the experiences of other countries:

- Manual: It occurs in small establishments that either by lack of space or not being able to install a RVM machine, shop staff will be responsible for the collection and reimbursement for each returned can.
- Automatic: It occurs in establishments in which a **RVM machine** can be installed. This is responsible for the collection, classification and compaction of containers. The store staff is responsible for returning the deposit according to the ticket issued by the machine.

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[1] http://www.retorna.org/es/

2.2.1. Reverse vending machine

They will be in charge of collecting, classifying and compact containers to make transport more comfortable and efficient. Containers are recognized using a video system for the recognition of shapes, barcodes, weight and type of material.

Figure 2: Reverse vending machine[2]

The capacity of one reverse vending machine is about 15-20 containers per minute. In each machine of "medium-sized" RVM fits 800 plastic bottles, 3.500 cans, 500 units of glass or 900 bricks.

The initial investment of the purchase of a RVM machine would be about 30.000 euros plus the installation at each centre that would be around 1000 euros.

RVM machines manufactures

The only manufacturer of RVM in Spain is TOMRA SYSTEMS ASA[2]. Headquartered in Spain (Tomra Spain), based in A Coruña. Other companies which represent TOMRA GROUP in Spain are TITECH Visionsort Spain, S.L., located in Girona, and Internaco, also located in A Coruña.

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[2] https://www.tomra.com/es/

- Titech:

It is pioneer in the automation of the classification of waste and is known as the world leader in this field. Established in 1993, TITECH[3] developed the first sensor of NIR (near infrared) for waste sorting applications in the world. With a strong focus on R&D (research and development), TITECH continues leading the development of this market offering technology for sorting recyclables.

- Internaco:

In 1969 Manuel Concheiro García access to the exclusive distribution nationwide of Husqvarna, world leading manufacturer in forestry and gardening. Recently, Internaco S.A.[4] has been diversifying its activity into new lines of business with the addition of exclusive brands, as the European leaders of compaction and recycling: Tomra, Orwak and Runi and the German brand of Professional cleaners Kraenzle.

2.3. Experiences in other countries

There are already more than 40 regions in the world where DRS is implanted and many others who are thinking about their implementation. Nordic countries and Germany are pioneers and the have shown that it possible to implement DRS with efficient results.
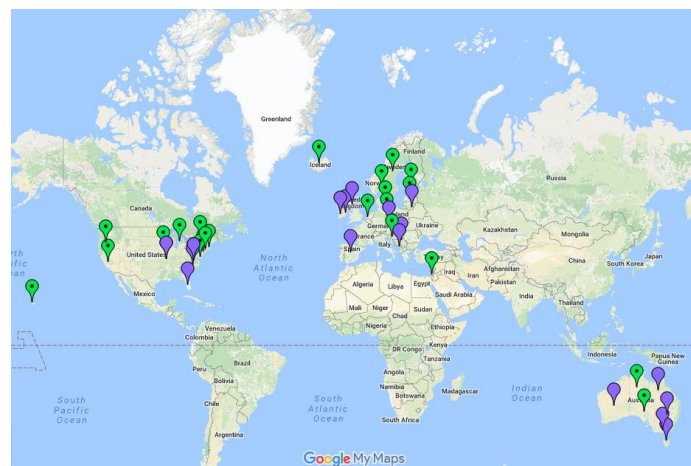

Figure 3: Countries with DRS

In the map, countries with de green dot are the ones with DRS already implemented while the ones with de purple dot are trying to implement it.

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[3] https://www.tomra.com/en/solutions-and-products/sorting-solutions/recycling/products/combisense/
[4] www.internaco.com

➢ Germany

Germany had a well-functioning market for refillables until the 1990s when the refillable quota fell below 72% for the first time. This triggered the introduction of a mandatory one-way deposit system in 2003.

In 1978, industry and government made an informal agreement to preserve the refilling systems that were operating at that time. In 1989, the beverage industry and government again made agreements to preserve refilling, with the understanding that regulations would follow if industry failed to fulfil its obligations.

Should recycling targets for non-refillable containers (glass: 90%; aluminum: 90%; plastic: 80%) not be met by January 1, 1995, deposits were to be required for all non-refillable liquid containers. The government was to set mandatory deposits.

Drink container deposits were set to be implemented on January 1, 2003 but the deadline was extended to Oct 1, 2003. Originally, the deposit was 25 Euro ¢ for containers under 1.5L and 50¢ for larger containers, but that distinction was dropped after an amendment in 2005, and now the deposit for all containers is 25¢.

Retailers were originally only required to take back the brands that they sell, but the law was amended in 2004 to require them to take back all containers that are made of the same material as containers they sell.

The deposit for refillable containers, which make up a significant portion of the beverage market in Germany, is not defined by law in order to promote this type of containers, but carry voluntary deposits of 8 cents for beer bottles and 15 cents for noncarbonated beverage bottles.

Federal Environmental Agency says that re-usable bottles account for 45.7 per cent of all drinks sold in Germany. The advantage of these bottles is they are refilled 40 to 50 times, and are therefore more environmentally friendly than single-use bottles.

The introduction of the deposit on beverage packaging was a considerable success with 98,5% of **refillable** bottles being returned by consumers –***highest*** in the world-.

The value of the containers has helped remove 1-2 billion one-way containers from Germany´s bins and streets since 2003.

• Management:

DPG Deutsche Pfandsystem GmbH[5] is a private association established in the year 2005. The shareholders are 50% the German Retail Federation e.V. (HDE) and the Federation of German Food and Drink Indrusties e.V. (BVE).

All of the above enterprises or organisations have to sign a contract with the DPG to be authorised to take part in the management of the German deposit and return system. The DPG is financed by the membership fees paid by all the above-mentioned organisations

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[5] http://www.dpg-pfandsystem.de/index.php/en/compulsory-deposit-for-one-way-drinks-packaging.html

> ➢ Sweden

The deposit system was introduced in 1984 for cans and in 1994 for PET plastic bottles and it reached recovery rates of 86% for cans and 77% for PET in 2005.

The current system was established in 2006, by the "Ordinance (2005:220) on the return system for plastic bottles and metal cans." This new law join cans and PET in a unique law.

The law requires a financial incentive to return containers to the system, but does not explicitly require a refundable deposit. It is up to the entity running the system to decide the exact nature and amount of this incentive. For example, Returpack, the primary deposit organization in Sweden, has set the following deposits:

> ➢ Aluminum cans: 1 Swedish Krona (SEK) (0.11€)
> ➢ PET bottles up to 1L: 1 SEK (0.11€)
> ➢ PET bottles over 1L: 2 SEK (0.22€)

Currently, the recycling rates[6] for cans and PET bottles affected by the deposit are 91% and 84% respectively. For the glass bottles the rate is around the 95% depending on the size of the bottle.

• Management:

Returpack[7] is a privately-owned company, established in 2006, which aims to increase the recycling of metal cans and PET bottles in Sweden.

> ➢ Finland

Finland has two laws dealing with beverage container recycling. One levies taxes on non-refillable containers, and one offers a refundable deposit as an alternative to the tax.

Among the European countries that promote or require refilling, Finland has become one of the most successful by implementing a simple levy on one-way beverage containers. Refilling is almost a necessity in Finland, in fact, because recycling is an expensive and impractical option for managing used beverage containers. The prevalence of refillable containers and the prevention of waste are measures of Finland's success with refilling.

The amount of the levy is based on the method for managing the containers:

> ➢ No recovery of packaging waste, 0.67 Euro per litre.
> ➢ Recycling, 0.17 Euro per litre.
> ➢ Refilling, no tax.

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[6] http://www.bottlebill.org/legislation/world/sweden.htm
[7] http://pantamera.nu/om-oss/returpack-in-english/

Glass bottles have almost 100% recycling and are refilled 33 times on average. In practice, most of beverage manufacturers and importers are members of return systems managed by *PALPA[8]* so they are exempted from the beverage packaging tax.

For one-way containers deposits on aluminium cans were introduced in 1996 and on PET bottles in 2008. Aluminium cans have a recycling rate of about 94% and PET bottles 92% (2016).

> ➢ Aluminium cans: 0.15€
> ➢ 0.33L glass bottle: 0.10€
> ➢ 0.33L non-refillable PET bottle: 0.10€
> ➢ 0.50L non-refillable PET bottle: 0.20€
> ➢ 1L or more non-refillable PET bottle: 0.40€

- Management:

 The recycling is administered by Suomen palautuspakkaus Oy (abbr. **Palpa**), which is a private consortium of beverage importers and fabricators.

The scheme is, in technical sense, voluntary and Palpa does not hold a legal monopoly for container deposits systems. However, it is the only such system in operation. Those beverage containers that do not belong to a container deposit system are levied an excise tax of €0.51/L, regardless of the container size. The tax is so high that essentially all beverage manufacturers and importers opt to join the Palpa system instead of paying the excise tax.

➢ Norway

Automated recycling of bottles has been in use since the 1970s. The selling of aluminium beverage cans was forbidden in Norway up until the end of the 20th century. In 1999, a container deposit legislation was passed, which also abolished this regulation. Today, there are the following container deposits in Norway:

➢ Cans, glass and plastic bottles up to 0.5 L: 1.00 krone (0.11€)
➢ Cans, glass and plastic bottles over 0.5 L: 2.50 kr (0.27€)
➢ Bottle crates are also reverse vended.

- Management:

Norsk Resirk[9] is the non-profit system founded 3 May 1999 and co-owned by various organisations in trade and industry that handles the depositing and recycling non-refillable plastic bottles and beverage cans in Norway. The Norwegian system works in such a way that the excise tax decreases as the returns increases, meaning that for example 90 per cent returns for cans translates into a 90 per cent discount on the excise tax. This again allows drink products to be sold at lower prices.

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[8] https://www.palpa.fi/beverage-container-recycling/deposit-refund-system/
[9] http://hornonline.com/norsk-resirk-as/

In 2015, according to this studio[10] 93% of all recyclable bottles and 80% of all drink cans in Norway returned into the deposit and recycling system.

➢ Denmark

In Denmark, the selling of aluminium beverage cans was forbidden between 1982 and 2002. However, this regulation violated European Union law. Therefore, the EU forced Denmark to replace it, and the new legislation, passed in 2002, was in fact a container deposit legislation. It established the following container deposits:

➢ Refillable glass bottles up to and incl. 0.5 L: 1 Kr (0.10 cents)
➢ Refillable glass bottles over 0.5 L: 3 kr (0.31 cents)
➢ Cans and glass bottles under 1 L: 1 kr (0.10 cents)
➢ Plastic bottles under 1 L: 1.50 kr (0.16 cents)
➢ Cans, glass and plastic bottles of 1 L and over: 3 kr (0.31 cents)

As Author´s thesis can check, Germany and Nordic Countries are working in the same direction to increase their recycling rates and promote refillable containers. ¿How are the closest countries to Spain working?
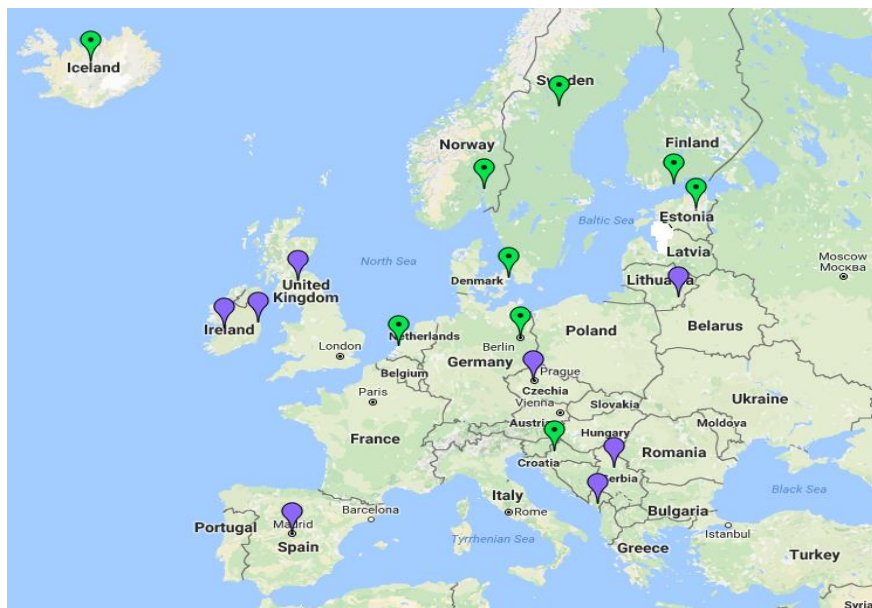
Figure 4: European countries with DRS

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[10] http://refillables.grrn.org/content/western-europes-experience-refillable-beverage-containers#Other%20Nations

> ➢ France, Italy and Portugal

In France, there is not specific law about DRS and the system is not implemented yet. There is an enterprise-organism, **Recyc-Quebec**[11], which is making several trials to check the response from people. They are in a similar situation as Spain, there are associations try to work in favour of DRS but bottlers and distributors have their own interest.

Author´s thesis has been looking for information about DRS in Portugal and Italy, as the countries more like Spain, but there was nothing found so it seems that implementation of DRS is far away for them.

2.3.1 Conclusion

As it can be checked:

- Recycling rates have been increased in all countries where the deposit system has been implemented.
- The countries with deposit systems are closer to achieve the objectives set by the European union.
- Germany and Nordic countries should be the example to follow.
- DRS is a ***stable and recognized system*** in the countries with the highest recycling rates of the world.

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[11] https://www.recyc-quebec.gouv.qc.ca/

3. External Analysis in Spain

The external analysis is a marketing tool used to determine several aspects that could affect to DRS implementation in Spain. One of the multiple variants of an external analysis is PESTEL analysis, focused on distinct factors such as Political, Economic, Social, Technological, Environmental and Legal.

This analysis examines one by one these general conditions affecting the environment and the Society of Spain where the project will be developed.
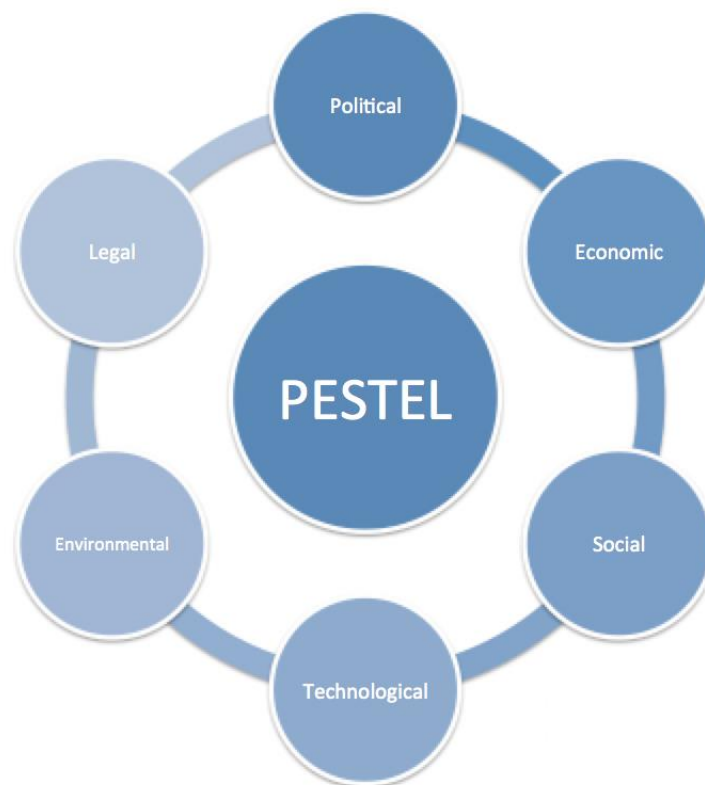
Figure 5: PESTEL analysis

3.1. Political factors

Spain is a country with a parliamentary monarchy established in 1978 and a member of the European Union for 15 years.

Power is highly decentralized; Autonomous Communities have an elevated level of legislative, executive and fiscal autonomy.

➢ Executive power

The King is the head of State and Commander in Chief of the army; his role is primarily symbolic and representative. Following legislative elections, the leader of the majority party or the majority coalition is named Prime Minister by the monarch and elected by the Parliament for a period of 4 years. His/Her executive powers include the enforcement of the laws and the management of the common affairs of the country. The Council of Ministers is appointed by the King on the recommendation of the Prime Minister. There is also a Council of State, which plays the role of Supreme consultative organ of the Government. However, its recommendations are not binding[12].

The President of each autonomous community belongs to the majority party or the majority coalition that won elections to the regional parliaments, which are held every four years. President forms a Government of advisers, supported by a Cabinet, which is responsible for the firms for which the autonomous community has competences[13] instead of the Spanish State (Administration only).

So, in terms

Spanish Constitution enumerates power and competence for the autonomous community, also the area that state Government remains as exclusive or shared with communities.

➢ Legislative power

 The legislative power is bicameral. The Parliament, whose official name is ``Cortes Generales´´, is formed by:

-Senate, which has 266 seats. It is in charge of representing the territories (Autonomous communities and Departments). Senators are elected by universal suffrage for 4 years.

- Congress of Deputies, which has a minimum of 300 seats and a maximum of 400 seats (currently 350). The deputies are elected by universal suffrage for 4 years from the constituencies. They are distributed in a minimal representation and the rest is proportional to their population. To avoid the ruptures that could affect the stability of the Camera, the D'Hont system is applied.

The executive branch of government depends directly or indirectly on Parliament's support, often expressed by secret ballot. Legislative power belongs to the Government and to both Houses of Parliament at the same time. The President of the Government has no authority to dissolve Parliament directly, although he may suggest its dissolution to the king. Spanish citizens enjoy considerable political rights. The 17 Autonomous Communities also enjoy

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[12] https://es.portal.santandertrade.com/analizar-mercados/espana/politica-y-economia
[13] https://es.wikipedia.org/wiki/Comunidad_aut%C3%B3noma

> ➢ Judiciary power

The judiciary Power of Spain is the set of courts and tribunals, composed of judges and magistrates, who have the power to administer justice in the name of the king[14].

Only the courts and tribunals corresponds to the exercise of jurisdictional power. In the exercise of this power, the courts and tribunals know and decide all the jurisdictional processes of the civil, criminal, contentious-administrative, social and military orders. The knowledge and decision of these processes consists in the processing and pronouncement on the merits of the matter that the parties propose to them, be these authorities or individuals.

There are 17 territorial superior courts, one in each autonomous community, 52 provincial supreme courts and several smaller courts dealing with criminal, labour and juvenile cases.

The other important court of the country is the Constitutional Court (TC) that controls the fulfilment of the Constitution.

Central Government

Currently, Mariano Rajoy of ``Partido Popular´´ is Prime Minister. In Spain, a change is given in traditional politics, so far existed the so-called "Bipartidismo´´ in which Partido Popular (PP) and Partido Socialista Obrero Español (PSOE), right-wing and left-wing respectively, got most the votes.

The discontent of society, caused mostly by corruption issues, results in the appearance of two new parties (Ciudadanos y Podemos). Therefore, in the las elections where the results were not so clear, it has had to reach a second vote to decide who would be the current President of Government. Even after the second voting period, they have needed 5 months for the formation of the new Government of the PP in coalition with Ciudadanos and the abstention of PSOE.

Finally, there has been no change of policy, but the PP lost absolute majority so it must agree on decisions with other parliamentary groups.

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[14] http://hispanoteca.eu/Landeskunde-Spanien/Instituciones/El%20Poder%20Judicial%20en%20Espa%C3%B1a.htm

3.2. Economic factors

After six years of recession in Spain and part of Europe the recovery started in the second half of 2013 continued strengthening in 2015 and 2016, and growth exceeded the 2´5% of **GDP**. Growth benefited was the confidence of households and investors, in turn, stimulated by the creation of employment, deflation, better credit terms, the drop in the price of oil, the recovery in Europe, the depreciation of the euro and the implementation of reforms. A slowdown in growth is expected in 2017.

After two elections and 10 months of political blockade (2.1 Political factor) measures have been taken as the tax advance on societies increase and froze expenditure of ministries. In 2016, the profitability of companies has been recovered, public debt decreased (132% of GDP in mid-2016), bankruptcies continued to decrease, and the solvency of the banking sector was reinforced, as well as the quality of your portfolio. However, the banking sector remains fragile, lacking profitability and sovereign risk is still significant. **Public debt** is stabilized at a high level (100% of GDP).
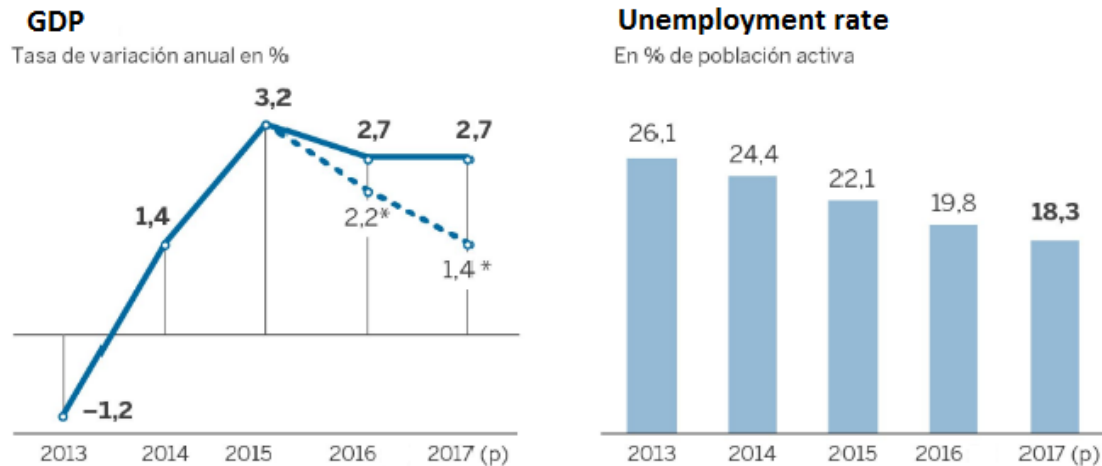
Figure 6: GDP and unemployment rate 2017 prevision[15]

Note: The dashed line shows the estimation of the growth if it kept the political blockade.

GDP has grown 3.9 points since 2013. The growth has been slowed down by the political blockade and it would have been even worse if the blockade didn´t finish.

The *rate of unemployment[16]* in Spain has dropped due to the reduction of the workforce and the creation of new temporary contracts, but remains very high (19.8%), and one-third of employees perceived 707 EUR maxima per month. The crisis has led to a general decline in the standard of living and an increase in inequalities.

In 2016, the budget allocated to the Ministry of the environment was of 10.279.490,36 € In 2017, it has grown by 17.7%. It means that Spain is allocating more money to the environment and therefore recycling to reach the objectives set by the European Union in 2020.

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[15] http://www.elcaptor.com/economia/programa-estabilidad-espana-graficos
[16] http://economia.elpais.com/economia/2016/02/10/actualidad/1455111162_649337.html

3.3. Social factors

Spanish society has undergone major changes over the period of crisis which has hit Spain over the past 6 years. A society faced with politicians because of numerous cases of **corruption**, where politicians put their personal interests above society. Precarity and job uncertainty characterized the ordinary state of many people, especially young people. Due to the high rate of **young unemployment** there is a mass emigration of young talents to other countries with more opportunities.
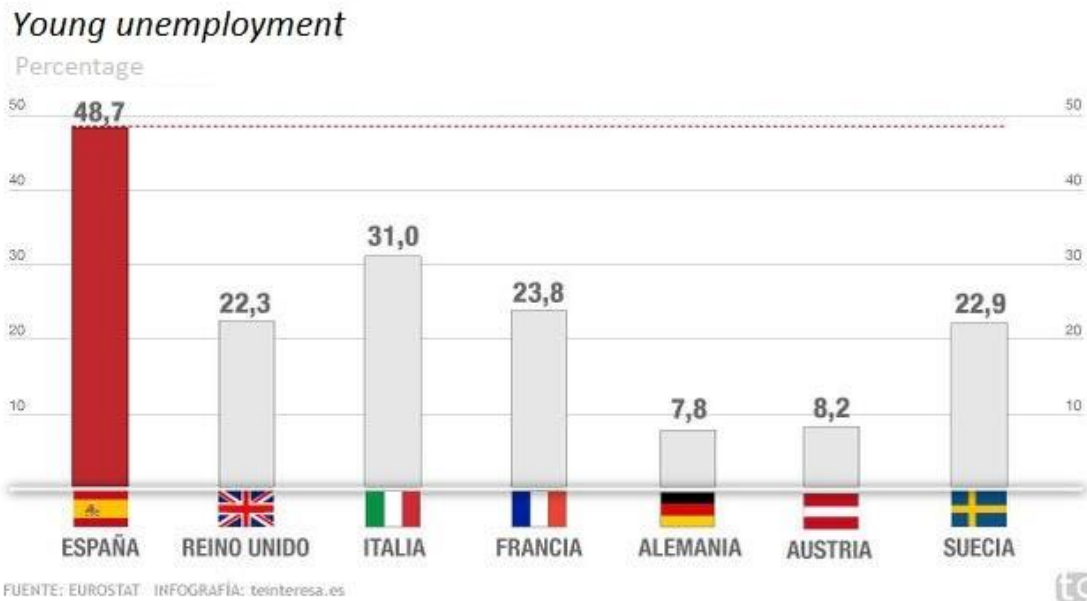
Figure 7: Young unemployment comparison[17]

Despite this, Spain has not been knocked out by the rigorous test that it has faced during the past 6 years. Spanish society has shown a surprising resilience. According to an analysis by several political scientists and economists[18], Spanish society is now more dynamic and creative, more enabled for improvement and change.

Spain today is a suspicious, less articulate and happy society than at the beginning of the crisis, but now appears ready to regenerate your system, to engage in the march of the policy, to monitor the functioning of its institutions. The society has been organized from below to return the virtue and honesty to public life.

To sum up, the Spanish society has suffered problems of unemployment, evictions, immigration and emigration, among many others, which has generated an increase in social inequality but also an awareness of solidarity at the worst moments.

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[17] http://www.teinteresa.es/empleo/Espana-Europa-salarios-contratos-temporales_0_659934623.html
[18] http://economia.elpais.com/economia/2016/03/11/actualidad/1457721956_511373.html

3.3.1. Demographic factors

Spain ended December 2016 with a population of 46.323.000 people, representing a decline in 122.828 people, 45.182 women and 12.771 men, on the same date in the previous year, in which the population was 46.445.828 people.

Figure 8: Spanish population evolution[19]

Spain reached the maximum population in 2012, just before the crisis, and since the population continues to decline. This is due to the high emigration of young Spaniards and the decrease of immigrants who came to Spain in search of work.
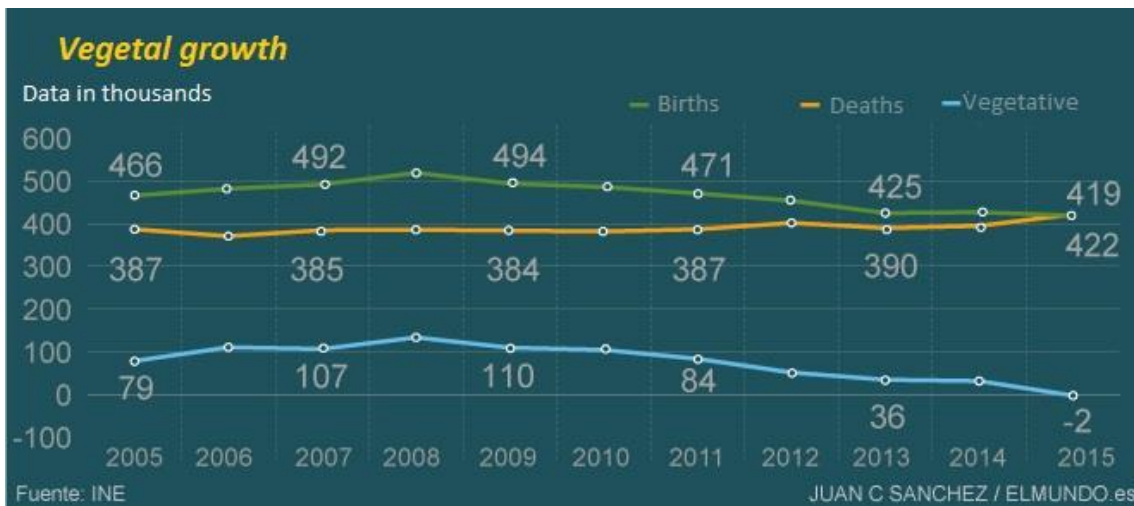
Figure 9: vegetal growth evolution[20]

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[19] http://sociedad.elpais.com/sociedad/2014/06/30/actualidad/1404121049_262083.html
[20] http://www.elmundo.es/sociedad/2016/06/23/576bab80e5fdea99418b457b.html

In addition, the vegetative balance in 2015 (births less deaths) was negative for the first time since 1941. According to the data of INE (National Statistical Institute) in 2015 were born in Spain 419.109 children, i.e. 8.486 less than the previous year (2% less). At the same time, killed 422.276 people, 6.7% more than in the previous year. This gives a negative growth of less 2.753 people.
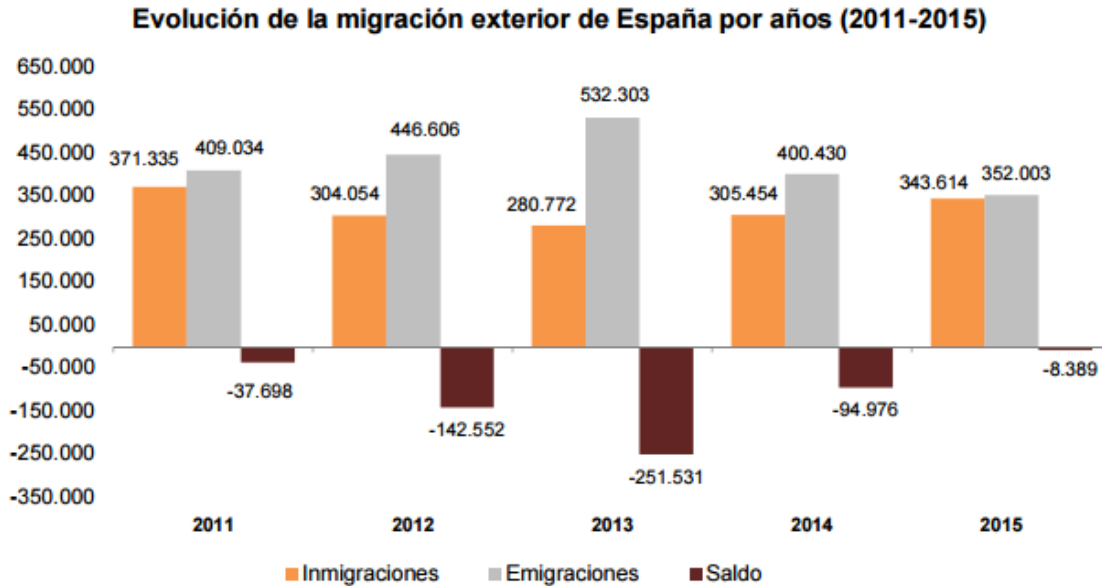
Figure 10: Migration evolution in Spain[21]

The migratory balance abroad increased during 2015, although it continues to be negative, to stand at - 8.389 people. This was due to 343.614 foreign people established their residence in our country, while 352.003 people left Spain destined overseas. In relative terms, from 2015 to 2014 immigration increased 12.5%, while emigration experienced a decrease of 12.1%. Spain is the 45th country in the world for percentage of immigration.

Spain has a density of 92 inhabitants per Km2, average population. This is interesting to check what percentage of the population would have access to the points of collection of the DRS.

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[21] http://www.ine.es/prensa/np980.pdf

3.4. Technological factors

Investment in R&D could make deposit refunding system more efficient and thus reduce the cost of it. Some technological innovation benefits are: increased capacity, higher standards of recycle, increment the number of containers accepted by DRS.

Spain is one of the countries of the European Union that less invests in innovation to adapt to technological changes, according to the Community Statistical Office, Eurostat. In this aspect is in ninth position, far from leaders such as Luxembourg, Denmark and Germany, countries in which is invested more money in R&D.
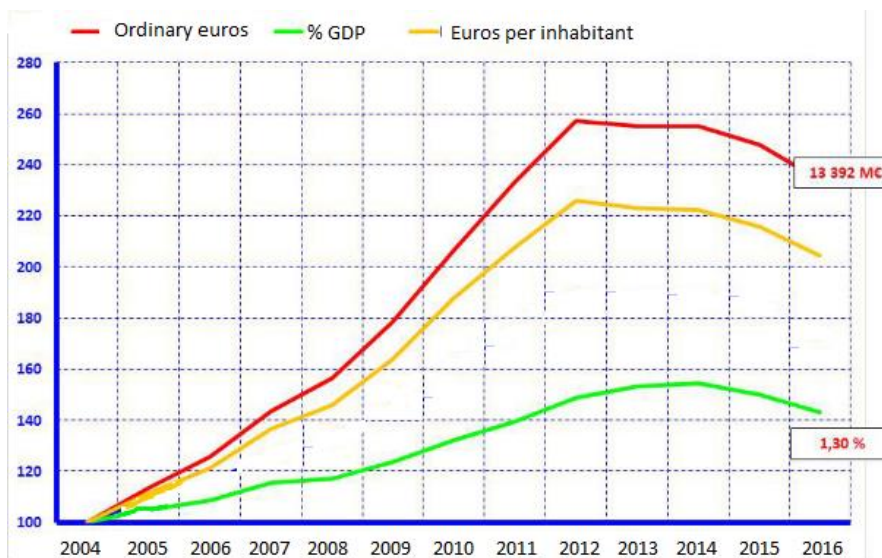
Figure 11: R&D investment in Spain[22]

3.5. Environmental factors

The environmental aspect is essential for the implementation of DRS in Spain.

The report's review of the environmental performance in Spain, prepared by OECD[23] presented at the beginning of March 2015, recognizing the great progress made by Spain in this sector over the past years.

Environmental awareness is growing among citizens. Prove it with the latest data from the barometer of the CIS[24] (Center of sociological research) of December 2015. 77% of the population says typically use containers of beverage containers, cardboard, paper or batteries. The percentage is 7 points higher than the same study in 2005. Also shows that 7 of every 10 Spaniards separating household waste while in 2005 it was only 5 of each 10.

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[22] https://facilypractico.files.wordpress.com/2014/11/pestel-espac3b1a.pdf

[23] https://www.oecd.org/spain/40806965.pdf

[24] http://www.cis.es/cis/opencms/-Archivos/Boletines/06/BDO_6_index.html

Finally, the number of Spaniards who used "usually" clean spots or call your town hall to get rid of appliances and electrical devices that do not already serve reached 71.7%; in 2005 only 48% did so.
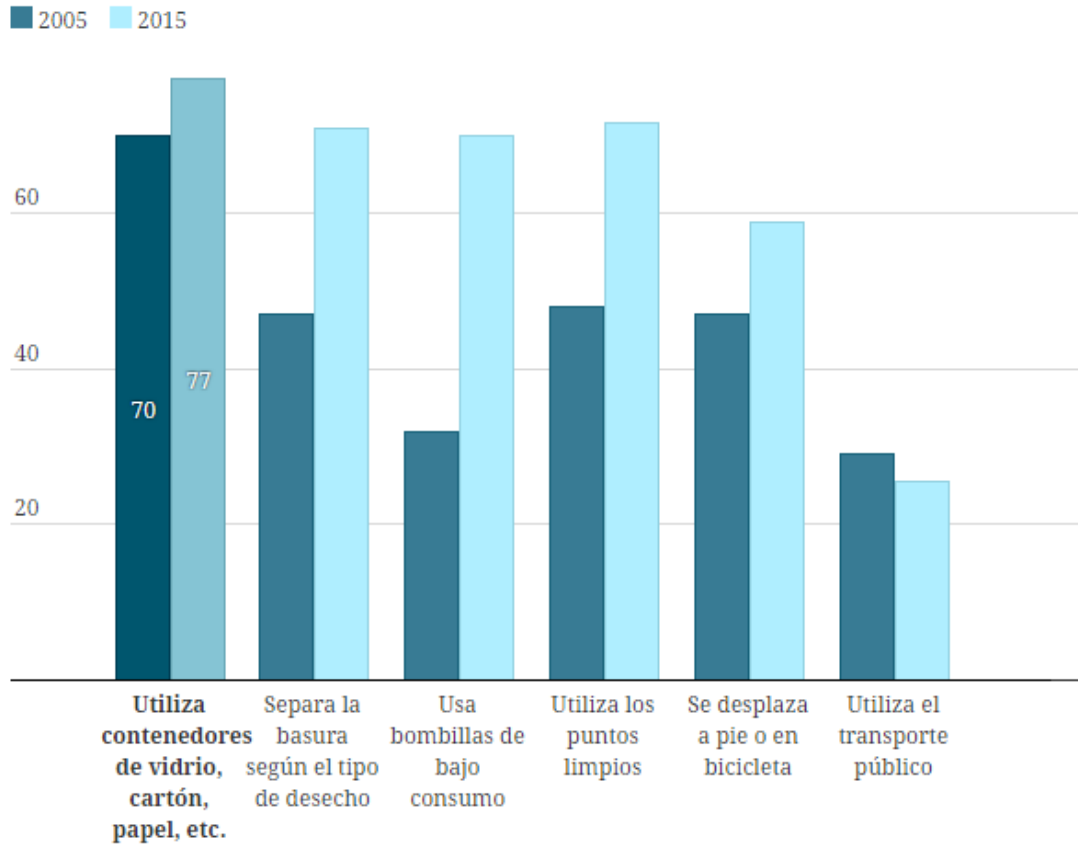
Figure 12: Use of recycling containers comparison (2005-2015)[25]

According to the latest report of Eurostat[26]:

- Spain earmarks 52% of its waste to landfill, unlike Germany which is less than 5%, the average in the EU is 41%.
- In terms of recycling, the percentage in Spain around 15%, while in Germany it reaches 48%, the European average is 24%.
- Incineration of waste in Spain levels are 10%, in Germany's 35%, and the EU 27 average 20%.

In Spain, the spill is therefore more extended treatment, compared with other more sustainable options system. Germany can be considered a country model in terms of waste management, recycling 48% and shows very low levels of landfill.

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[25] http://www.lavanguardia.com/vangdata/20160108/301268769497/evolucion-conciencia-ambiental-espana.html

[26] http://ec.europa.eu/eurostat/statistics-explained/index.php/Employment_statistics/es

Focused on containers, 51 million of non-returnable beverage containers are consumed each day in Spain. They are 18,000 million a year, like what is consumed in Germany, with twice the population.

In Spain continues to operate the integrated system of management or SIG (containers blue, yellow and green) managed by the company Ecoembes. According to the study[27] of the association Retorna.org to these containers only come 3 of every 10 non-returnable launched onto the market. The remaining containers accumulate in the environment or are incinerated in common Weirs.

These data show that the current management system is inefficient and, according to the latest report of the European Commission, placed Spain at 12 of European waste management.

The critical economic situation that our country is living is inescapable to mention what it costs them to administrations landfill or incinerated of those containers: 68 million euros. To that we add another 65 million euros which is the value that would have the raw material (glass, aluminium, metal, plastic) when those containers are collected selectively and could be re-used to create new packaging, it is that each year we are wasting 133 million euros.

Opinion of Author´s thesis is that if a deposit system is not already installed is due to bottlers currently only pay rates for containers that end up in containers for selective collection, which is much lower than that of the countries that have implemented the DRS.

3.6. Legal factors

The concern about the environment has been a key point from the conception of the **European Union**. Through the establishment of the common market and carrying out policies and common actions, the Treaty of the European Union had as objectives, inter alia, growth sustainable and non-inflationary States so that the environment is respected.

For this purpose, it was launched directive of the European Union **2008/98/EC** of the European Parliament and of the Council of 19 November 2008 on waste, whose objective was to control the cycle of waste from production to disposal, and focuses for this in the recovery and recycling.

To protect the environment, the Member States determined to adopt a series of measures to treat waste. Special mention is article 14 which is given responsibility for the management of waste to the producer of the waste:

"Any producer or holder of waste must make waste treatment by itself or order its realization to a merchant or an entity or company."

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[27] http://www.retorna.org/es/elsddr/situacion.html

Another item worthy of note, in Directive 2008/98/EC, is article 28, where waste management plans are developed. According to this article the competent authorities should establish *"one or more waste management plans, so that cover the entire territory of the Member State".*

The European Union propose:

➢ Boost for 2030 the reuse and recycling of municipal waste in such a way that you reach 70%;
➢ Increase the rate of recycling of **waste containers** to **80%**, by 2030 setting as intermediate targets 60% by 2020 and 70% by 2025, adopting further objectives for specific materials;
➢ For 2025 prohibit deposit in landfills of plastics, metals, paper and cardboard recyclable and biodegradable waste; Member States shall endeavour to eliminate virtually all the deposits in landfills to 2030;

However, many countries will find it extremely difficult to reach the targets set by the EU of recycling 60% of household waste by the year 2020. Spain is far from complying with European objectives to achieve, with a 30% recycling rate. Spain is currently between the EU countries less recycling and where more trash ends up in the landfill.

In Spain, there are few laws about packaging wastes. The management of packaging waste is regulated by the law **11/19974**, 24 April, packaging and packaging waste (LERE), and modification in the RD **252/20065**, of 3 March, whereby the objectives of recycling and recovery are reviewed.

Before December 31, 2008, and in subsequent years, settle the following minimum targets for recycling of materials contained in the packaging waste, according to the law:

• 60% in weight of the glass.
• 60 per cent by weight of paper and paperboard.
• 50 percent by weight of metals.
• The 22,5% by weight for plastics, counting exclusively material that becomes transformed into plastic.

To carry out these objectives, the law established the possibility of hosting two systems:

1. Deposit refunding system of containers, mandatory for packagers and distributors.

2. The possibility to benefit from an integrated system of waste management of containers (SIG).

Another law that is applied is the current *law of waste and soils contaminated **(22/2011**)* and its subsequent modification by Royal Decree on urgent measures for environment allows the autonomous communities to legislate on waste, since the government has transferred competences.

Beverage distribution systems are organized and choose the system they prefer, but if the results of that system are not satisfactory in terms of environment (% recycling), the AC has authority to legislate rules of environmental protection that improves the situation.

If the autonomous community considered that the chosen system does not work, it could legislate and force producers to use the SDDR because it considers that it is more effective and benefits environmentally.

3.6.1. Canary island example

The Parliament of the Canary Islands lived a historical day Wednesday 6 February of 2013 when its 60 deputies unanimously supported a proposition not of law [28](NLP) to implement a system of deposit, refund and return of beverage containers (SDDR) in the archipelago. A proposal of the Popular group, and favourable votes from the Canary Islands Coalition, the PSOE and the new Canary Islands, the archipelago thus becomes the first autonomous community in Spain to give a public and firm step towards the SDDR[29].

Basically, sets the obligation to remove its packaging waste from household waste through a system of deposit, and return (DRS) or where appropriate by the subscription of the extra-cost of collection separate local authorities through an integrated system of management (GIS) to producers of packaging[30].

When commercial and industrial packaging is not voluntarily accepted SIG and these become waste, their owners should be an annual statement of packaging and packaging waste as referred to in the order of 25 August 1999, by which the annual declaration of commercial and industrial packaging and its management.

Authorized integrated systems are the following:

- ECOEMBES for the home of paper-cardboard packaging and light packaging (bricks, plastics and cans).
- For household glass containers ECOVIDRIO.
- SIGRE for containers of medications.
- SIGFITO for containers of pesticides.

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[28] https://www.boe.es/boe/dias/1997/04/25/pdfs/A13270-13277.pdf

[29] http://www.retorna.org/news/es_ES/2013/02/07/0001/canarias-aprueba-por-unanimidad-una-hoja-de-ruta-para-la-implantacion-del-sistema-de-retorno

[30] http://www.gobiernodecanarias.org/medioambiente/piac/temas/RR/RR_RAP/envases/

3.7. PESTEL Conclusion

Spain is in times of growth after several years suffering the effects of crisis.

They are already quite a few Presidents of autonomous communities advocating in favour of the introduction of the DRS. For instance, Valencia[31] and Catalonia are thinking about the implementation of DRS.

In economic terms, the implementation of DRS would entail the creation of new jobs which would help reduce the unemployment rate. Moreover, it could mean a reduction of taxes for the citizens.

The implantation of the DRS is possible, in terms of law, in all Spain, but only in Canary Islands there is a decree about the implementation of the DRS. However, neither in the Canary Islands is currently implemented due to interests of bottlers.

Author thesis´ opinion is that Spain must change its current recycling model to achieve the objectives set by the European Union in 2020.

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[31] http://www.elmundo.es/comunidad-valenciana/2017/02/09/589b88e922601d25438b45fa.html

4. Marketing plan

The marketing model is to equip the main distributors in the Spanish retail sector with a DRS system, which is a tool:

- **Innovative**, since currently in the Spanish market no retailer has implanted it.

- **Differentiating**, because it attracts new profiles of customers more aware of the environment.

- **Sustainable**, as it will be economically viable and amortizable during its lifecycle.

- **Influential** in the purchase decision, since it introduces the concept of "monetizing the Waste", the consumer itself tends to increase the frequency of visits to the establishment and to establish a greater loyalty with it.

Prior has been analysed the current situation of current model of separate collection (SIG) in Spain so that the reader can have a global vision of implanted collection model and its associated facilities.

4.1 Current situation

Several integrated management systems (SIG) operate in Spain, they are managed by non-profit entities that allow producers to fulfil their obligations following "polluter pays" principle, organizing specific waste collection systems, and financing local authorities when they collect these wastes.

As for the collection of packaging the system is managed by Ecoembes and Ecovidrio:

- Ecoembes[32] is a stock corporation non-profit made up of a group of companies in pursuit of recycling and waste management. It manages the recovery and recycling of plastic containers, cans, and the bricks (yellow container) and containers for cardboard and paper (blue container) in all Spain.

  More than 12.100 companies have acceded to SIG. Its shareholders consist of 57 companies and associations of companies which integrate all sectors manufacturers of raw materials and recyclers participating in the management of packaging, from manufacturers and packagers, distributors.

- Ecovidrio[33] is the non-profit organization who manages the recycling of all waste of glass in Spain. Born in 1997 covered by the law of packaging and waste packaging with one main objective: increase the rate of recycling of glass in Spain. Current Model: Integrated management system (SIG).

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[32] www.ecoembes.com
[33] www.ecovidrio.es

There are other SIGs, such as medicines (sigre), waste electrical and electronic equipment (Ambilamp, Ecolum, Ecofimatica, ERP, "..."), phytosanitary products (Sigfito), out of Use tires (signus), used oils (FOLLOWUS), etc.

According to the criteria established by the Ministry of agriculture, food and environment for the characterization of models of urban waste separation, the current collection model implemented in Spain is the type 5[5], where the separation is carried out in 4 fractions: light packaging (Bottles, cans, bricks, etc..) paper/cardboard, glass and other (Including organic).

To carry out this model's collection there are top, rear, and side-loading containers. In most municipalities, these containers are located on surface, but in some cases, they are buried.

SIG is based on a model in which each manufacturer /packer is charged per each container/product placed on the market, and SIG is responsible for later retrieval and treatment under current law.

SIG only recover and recycle containers that the user deposit in the corresponding containers, therefore, only will bear the cost for products correctly deposited into your container.

Therefore, if a user does not lead to the container his/her aluminium tin, Ecoembes charges manufacturers for each placing on the market can, while it only assumes the cost of recover and recycle those cans that user deposited in the yellow bin.

In this case the end user, that is not depositing the container in the recycling bin, is finally assuming the cost of reclamation, through their taxes.

According to Ecoembes[34], recycling rates grew by 3.3% in 2016. By type:

- Metal such as cans of soft drinks or canned, maintained its leadership with a rate of 73%.
- Paper/cardboard follow them closely with a recycling rate of 72,9%.
- Glass bottles with a rate of 59,7%[35].
- Finally, plastic bottles such us PET/HPDE with a rate of 53,8%.

To achieve the goals of European Union in 2020 (80% recycling rate in containers) it would be necessary to improve rates of glass and plastic.

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[34] https://www.ecoembes.com/es/ciudadanos/envases-y-proceso-reciclaje/reciclaje-en-datos

[35] http://www.elconfidencial.com/empresas/2016-10-14/ecovidrio-reciclaje-2020-espana-union-europea_1273211/

4.1.1. DRS versus SIG

The DRS offers many advantages for each of the actors that participate in the system, the following table summarizes the main benefits and the challenges which would have to address main stakeholder system.

		Benefits	Challenges
Packagers		The system is like the already existing, but since the system is self-financing by the quantity and quality of the product to handle, the current canon tends to go down.	Computer adaptation of the containers for the reading by RVM. This phase has been overcome by other regions without any problem.
Retailers		Retailers in regions where there is already DRS, have seen how the spaces dedicated to the recovery of packaging attract consumers, who end up choosing them for their purchases. On the other hand, once RVM are amortized, trade can perceive an income for the management of containers.	The first phase of implementation of the system will require an effort of adaptation - space and staff - by retailers
Consumers		Multiple, since less garbage in the streets, fewer polluting emissions, greater transparency in the management of containers, containers empty and clean in the towns and cities, less cleaning, CO2 savings municipal costs…	At first, the small outlay for the purchase of containers, then returned for the next purchase. We must also adapt to the new habit of returning containers.
Recycled plants		It increases the matter recovered premium offer	Search new high-end outlets for recovered materials
Management system		It is a non-profit entity, so the benefit is the proper functioning of the system	Establish a transparent and efficient system where the money flow is fast and quite reliable.

Table 1: DRS versus SIG

Other stakeholders

- It benefits districts: According to studio[36], the implementation of DRS assumes a zero for the central administration and cost benefits for municipalities from 57 to 93 million euros (from 1.4 to € 1.97 per capita in savings in collection and cleaning services).

- It supports trade: compensating him with an average of 3 cents per container collected. This means to distribute between 535 million of euros per year ranging from €300 for a small trade and the 300,000 a year for a large surface area.

- 100% recycled economically viable: is the only known system that getting close to 100% recycling quotas, and that has demonstrated its economic viability.

- It is the system of waste collection in containers with lower environmental impact (8): It can prevent 320 kg of CO_2 per tonne of containers deviated from the collection through the GIS collection through the DRR. This is because most containers are compacted before being transported. Thus a 47% reduction in contribution to the change is produced.

- It triples the indices of selective collection for containers subject to deposito9: to give economic value to the container, turns the waste into resource and increases of 35% current for beverage containers (lower than the average for drinking is partly outside catering and household) up to 90%.

- It improves the fulfilment of the objectives of the EU: to promote waste prevention, facilitate the reintroduction of reusable containers, the maximum level of recycling and reduce landfill and incineration.

There are many points in favour of implementation of DRS in Spain against the already implemented SIG. The objective of this thesis is to verify if the change would be viable and if it would need to completely replace SIG or both systems could live together simultaneously.

According to the studios previously quoted[37], the implementation of a DRS in Spain for single-use containers would bring ***461.222 to 547.375*** net tons to the recycling industry. This would mean 36,26% to 49,39% more material than with the actual system. Most of the increase would be due to the glass, followed by plastic, steel and aluminium.

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[36] http://www.uniondeconsumidores.info/uploads/Informe%20SDDR.pdf

The implementation of DRS involves an increase in the recycling of **glass** of *54.82%*, equivalent to 367.799 net tons.

The implementation of DRS involves an increase in the recycling of **plastic** of *37.42%*, equivalent to 88.884 net tons.

The implementation of DRS involves an increase in the recycling of **steel** of *16.37%*, equivalent to 30.445 net tons.

The implementation of DRS involves an increase in the recycling of **aluminium** of *12.35%*, equivalent to 14.346 net tons.

As it can be checked, implementation of DRS would mean an increase in glass and plastic that are exactly the types of materials that most need to improve their recycling rates to achieve the objectives of the European union.

4.2. Value proposal

Implement DRS for beverage containers within a hypermarket, supermarket or small grocery store is a big step in the search for new business opportunities and new customer segments.

Author´s thesis value proposal is focused in:

- Attract new segments of customers who are attracted by the concept of recycling and return.
- Loyalty to clients using different techniques.
- Strategy of differentiation with respect to our competitors.
- Be an alternative source of income for the distributor.
- It is a model of business without loss of cash, the cash flow is *self-sustaining*. The money given by the consumer with deposit and return will always stay in system, since it will be deducted from your next purchase.

In addition, it should be underlined that other environmental initiatives carried out by merchants, such as reusable bags or charging for plastic bags, accounted for a significant impact but they are currently well function and supposed a source of revenue for retailers and a support for the environment.

4.3. Market research

Currently, a high volume of drinks in non-returnable containers is consumed in Spain. Although this sector has a high heterogeneity, it can be divided in bottled water, soft drinks and beer.

According to the latest data published by the MAGRAMA[37] (Ministry of agriculture, food and environment) each Spanish consumed in 2012, a total of 126 litters of packaged products, which meant a per capita average expenditure of € 76.4 in its shopping basket.

	Consumption		Expenditure	
	Total(Millions of litres)	Per capita (litres)	Total(Millions of euros)	r capita (euros)
Beer	817	18,3	968,9	21,7
Water	2.518,80	56,5	525,4	11,8
Soft drinks	1.992,90	44,7	1562	35

Table 2: beverages consumption

It can be checked from the table above that most of the beverage is bottled water and soft drinks consumption. While spending is higher in beer and soft drinks because of its higher cost.

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[37] http://www.mercasa-ediciones.es/alimentacion_2016/pdfs/Alimentacion_en_Espana_web_2016_150px.pdf

Demand evolution[38]:

- Over the last five years, beer consumption has increased 1.2 litres per person and spending has experienced an increase of 1.5 euros per capita.
- During the past five years, consumption of bottled water increased 5 litres per person and spending has grown 1.1 euros per capita.
- Over the last five years, the consumption of sodas and refreshing beverages has fallen 1.8 litters per person and the expenditure has been reduced by 70 cents per capita.

The demand for bottled beverages is stable even with a small upward trend by which the number of waste will continue to be higher year after year.

Finally, indicate that beverage consumption is seasonal. There are clearly two periods of the year in which the consumption of bottled beverages increases: Christmas and especially in summer.

4.4. Sector

According to Espana Foundation of hospitality[39], Spain has more than 320,000 points of sale of beverages. Only around 84.000 points of sale could benefit from the deposit system since the others are not **containers domestic** and work through the HORECA system for restaurateurs.

Between these 84,000 retail outlets are found hypermarkets, large supermarkets, supermarkets and traditional commerce. Not everyone will be able to qualify to DRS and between the capables, some will do it automatically and the others manually.

Bottled beverage distributors are responsible for the sale of these, management of deposits and handling of containers recovered.

The others points of sale (Restaurants,cafeterias, bars, etc..) are managed by HORECA systems. Most of them already have a system of return of containers where is the own packer which collects them.

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[38] http://www.mapama.gob.es/imagenes/es/informeconsumoalimentacion2015_tcm7-422016.pdf
[39] http://www.fehr.es/libreria/detalle-publicaciones.php?publicacionesID=130

Tipo de minorista	Número de puntos de venta al por menor
Hipermercados (>2.500 m²)	538
Supermercados (1.000-2.499 m²)	2.996
Supermercados (400-999 m²)	4.891
Supermercados (100 - 399 m²)	8.890
Supermercados (<100 m²)	10.078
Comercio tradicional	26.494
Tiendas de alimentación	29.844
Total	**86.731**

Figure 13: Businesses likely to adhere to DRS[40]

Restaurantes y hoteles	57.640
Discotecas, bares y pubs	23.483
Otros bares	9.152
Cafeterías	137.302
Catering en el lugar de trabajo	12.223
Gasolineras/áreas de servicios/tiendas de alimentación	5.893
Total	245.693

Figure 14: businesses attached to the HORECA system[41]

The potential market for the implementation of DRS focuses then on ***86.731 potential customers.***

4.4.1. Sector segmentation

The demand for bottled drinks is offered in different channels or sale points depending on the choice of consumption (household or restoration sector), and currently also is gaining importance the online channel.

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[40] FLETCHER,Debbie, HOGG,Dominique,VON EYE, Maxime Evaluación de costes de introducción de un sistema de depósito, devolución y retorno en España. Eunomia Research & Consulting, Enero 2012.

In our case, we will focus on the consumption at home. According to MERCASA[42], company specialized in the development of the food chain, this is the market share in the marketing of drinks whose containers are included in DRS:
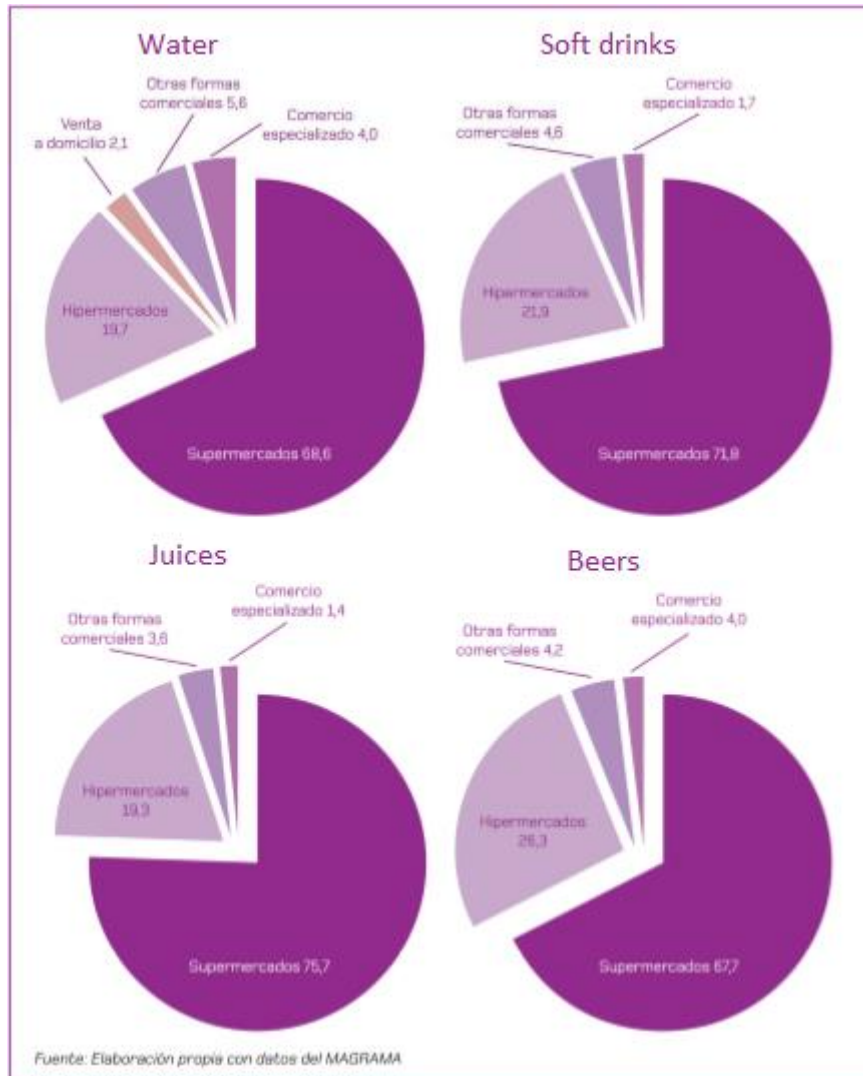
Figure 15: beverage market share[41]

As it can be checked in the graph, the supermarkets and hypermarkets have around 90% of the market in all types of drinks. Therefore, this thesis will be focused on supermarkets and hypermarkets as potential customers for the implantation of the DRS.

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[41]http://www.mercasa.es/files/multimedios/1378066306_consumo_bebidas_hogares_hosteleria_restauracion_44-54.pdf

Tipo de minorista	Número de puntos de venta al por menor
Hipermercados (>2.500 m²)	538
Supermercados (1.000-2.499 m²)	2.996
Supermercados (400-999 m²)	4.891
Supermercados (100 - 399 m²)	8.890
Supermercados (<100 m²)	10.078
Total	27.393

Figure 16: hypermarkets and supermarkets in Spain

The sector has scored a growth of 1.7% on its surface in 2015, the largest in the past five years. The year has also been marked by the operations of purchase and sale, who have had as protagonists to DIA, Eroski, Grupo Miquel and Carrefour. Carrefour just consolidate its leadership in the segment of hypermarkets to acquire 36 centres to the Basque cooperative group. In addition, online sales are increasing, above all, following the entry of the giant Amazon in power.
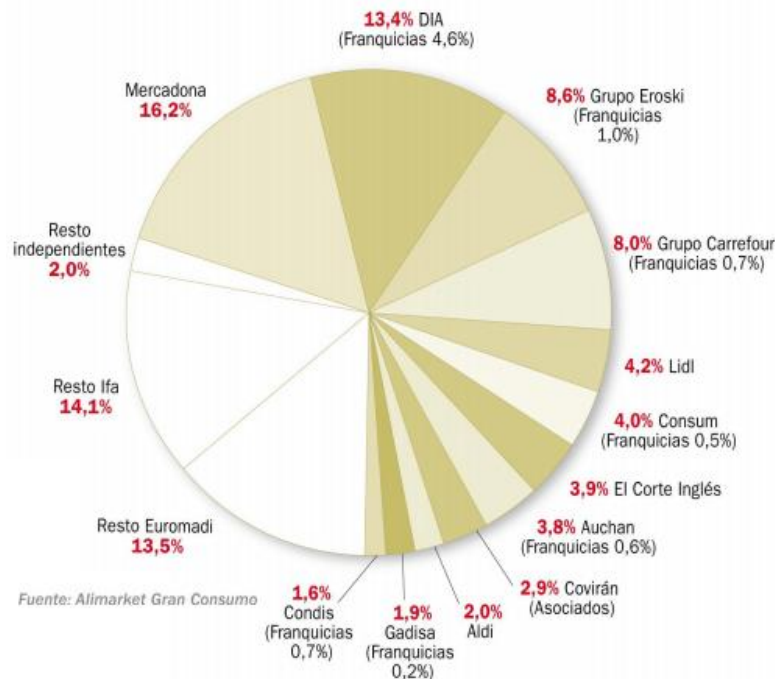
Figure 17: Main surface share (%) [42]
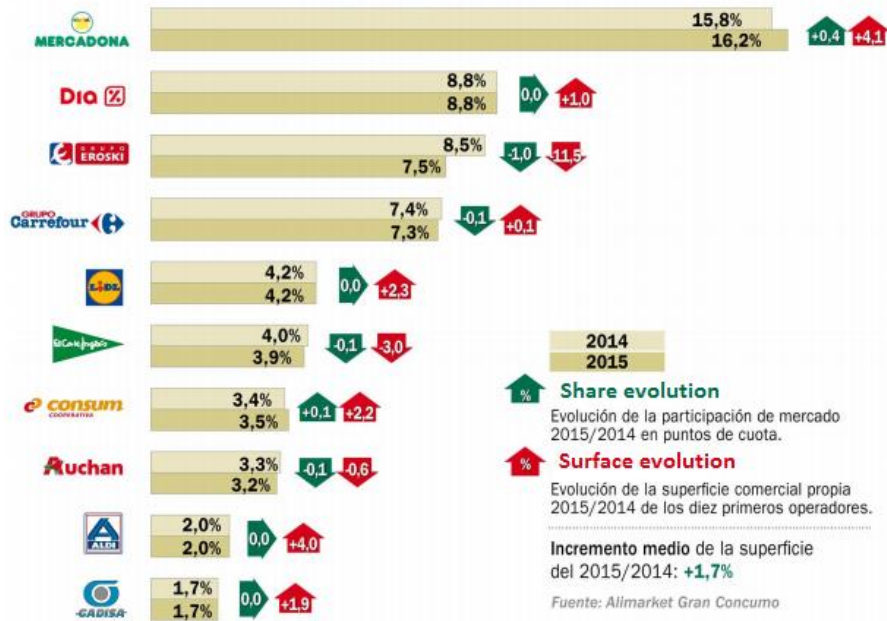
Figure 18: Market share evolution (%) [43]

As it can be checked, the sector of distribution in Spain has a structure oligopolistic with 4 major commercial groups (Mercadona, day, Eroski and Carrefour). Between the 4 have the 46.2% of total area of the market.

- Mercadona and Eroski base its business model on the format of big supermarket.
- Carrefour group base its model in hypermarket format. However, Carrefour Express is based on small supermarkets.
- DIA group is based on small and medium-sized supermarkets.

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[43] http://www.sir.cat/images/pdf/informe-2016AlimentacionESP.pdf

4.4.2. SWOT

The following graphic will evaluate the pros and cons of the implantation of DRS both from the point of view of retailers (internal analysis) as from the point of view of their environment (external analysis).

	Strenght	Weaknesses
Internal analysis	• Acquisition of new customer profiles. • New loyalty channels. • Improvement of corporate social responsibility. • Improvement of brand image.	• High costs of implementation (approx. €31,000 /machine). • Specialization of employee. • Loss of space and new logistics costs. • Adaptation period.
	Opportunities	Threats
External analysis	• Increased awareness by the recycling of Spanish society. • European recycling targets more stringent and hardly achievable with the current system. • Obtaining income from resources. • Cleaning fee reduction.	• Highly legislated and protectionist market. • Competence of Ecoembes, who isn't interested in the implementation of DRS • Barriers to entry by large packers, which pay less with the current system.

Table 3: SWOT

4.4.3. Porter's Five Forces

Another way to analyse the market are Porter's 5 forces, this model establishes a framework to analyse the level of competition within an industry, and to develop a business strategy. In this case, it will be studied from the point of view of the power distribution sector both from the environmental sector and the implementation of the DRS regarding the current SIG.

1. <u>Barriers to entry and potential entries</u>

Currently in Spain, to get into the distribution sector must meet the following requirements:

*   Open License: to get into the distribution sector you must first get a license of opening from local authorities. This usually includes a license of works, economic guarantees, environmental impact declaration, measures of security, etc...
*   Capital and economies of scale: this sector requires high investment due to the strong amounts earmarked for purchases. This is should take advantage of the economies of scale that have already installed companies.
*   Brand recognition: one of the most difficult to enter this market is brand recognition. This is achieved through of the contact with the client, quality of products and service, etc...
    In the case of the DRS is already accepted by law, require a high initial investment capital and would have to gain the acceptance of society.

2. Substitutive service:

In case of the food retail sector only the small traditional tent can be considered as replacement service for a closer customer location and personalized attention.

DRS has as a substitute product the current system. It could be considered as a substitutive or complementary product depending on if the two can coexist at the same time.

3. Bargain power of suppliers:

When suppliers have bargaining power, they can apply pressure on a company by charging higher prices, adjusting the quality of the product or controlling availability and delivery timelines. In hypermarkets and supermarkets case, they have quite power with their suppliers because they are the main points of distribution in Spain and therefore the ones with more sales.

In case of DRS, it will need to convince its `suppliers´, bottlers, to get into the system. It has reasonable bargaining power as with the current system bottlers pay less for each container but you must negotiate also from the environmental point of view.

4. Bargain power of customers:

The main customers of retailers are the person or persons responsible within the household to make purchases. These customers, individually, they do not offer any power of negotiation opposite retailers, however, they are really considered.

In case of DRS, it will need to convince its `buyers´, final consumers, through awareness and marketing campaigns to achieve their goals.

5. Competitive rivalry

The sector analysed in Spain is dominated by 4 major groups and demand varies very little between them. The sector is currently in a `war´ of buying-selling of groups.

As for DRS, SIG is their competence with respect to the collection of packaging.

4.5. Target market size

The study of target market is a useful tool which helps us to quantify the size of potential consumers who might value our system. It is necessary to make an adequate population segmentation to check the real viability of DRS system. According to data study carried out by the CECU[44] in 2011, on a population of 2006 people through telephone interviews shows that the end consumer of bottled drinks would be fully prepared to adapt the system.

The end user will be those who buy the packaged product to our customer (retail) and pay the appropriate deposit, which subsequently will be returned once he/she return the packaging.

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[44] http://www.retorna.org/mm/files/InformeEncuestaSDDR.pdf

	Theorical sample	Practical sample	Error margin ± %
TOTAL	2.000	2.006	2,23
Sex			
Men	979	982	3,19
Women	1.021	1.024	3,13
Age			
18-24 años	188	195	7,16
25-34 años	392	404	4,98
35-44 años	406	405	4,97
45-54 años	341	335	5,46
55-64 años	263	262	6,18
65 y más años	410	405	4,97
Comunidad Autónoma			
Andalucía	153	156	8,01
Aragón	109	109	9,58
Asturias	107	105	9,76
Balears	107	108	9,62
Canarias	113	114	9,37
Cantabria	104	105	9,76
Castilla y León	117	117	9,25
Castilla - La Mancha	113	116	9,28
Cataluña	148	147	8,25
Comunitat Valenciana	133	131	8,74
Extremadura	107	107	9,67
Galicia	119	121	9,09
Madrid	141	143	8,36
Murcia	109	109	9,58
Navarra	104	103	9,85
País Vasco	114	113	9,41
Rioja (La)	102	102	9,90

Figure 20: Population simple by sex/age/AC

The most relevant data for this study are collected in this study are:

<u>Assessment of public services</u>: the system of collection and treatment of waste is considered by users interviewed as the second most important service, after the service of sewerage and water supply. So, it is something that society values and is willing to improve.
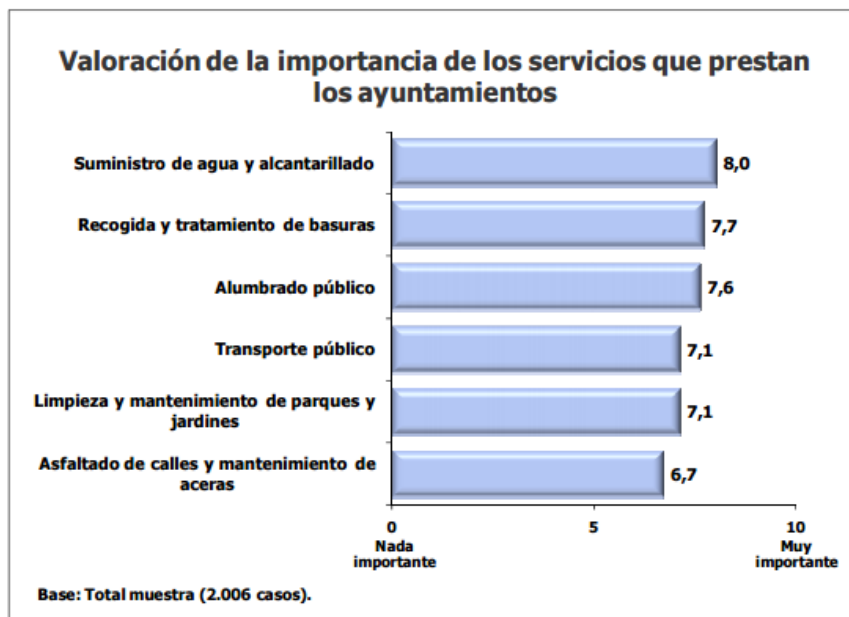
Figure 21: Assessment of public services

<u>Types of garbage that separate</u>: citizens claim to separate in their homes an average of 5.6 types of different wastes. Mainly paper/cardboard 89.2%, glass 89.1% and 85.2% packaging. So, the use of DRS would not suppose any changes in their habits.
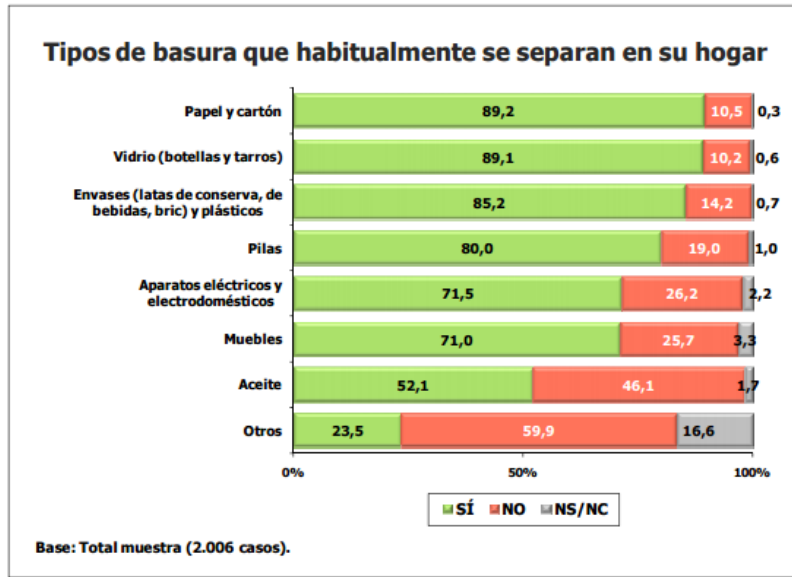
Figure 22: types of garbage separated

<u>Knowledge of the DRS and the current system</u>: 52.9% of the interviewees considered not having the appropriate level of information on SIG. About DRS, 48.8% have knowledge about it.

<u>Disadvantages and advantages of the system</u>: about the main drawbacks, none of them is considered as important.
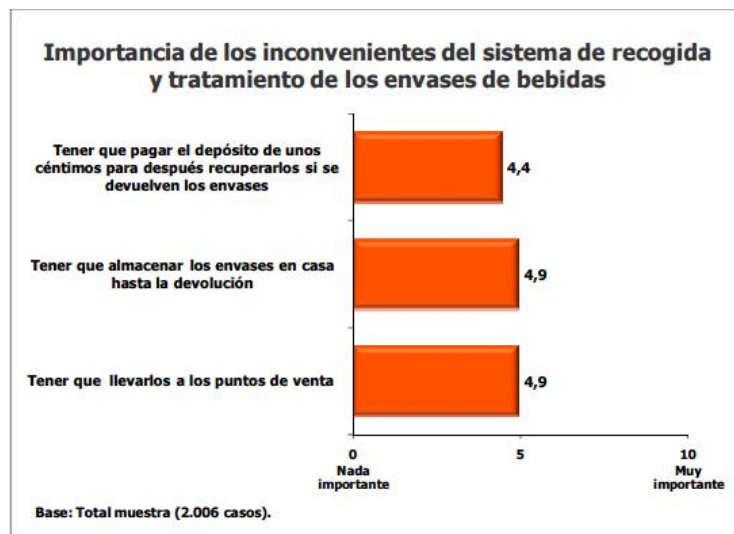
Figure 23: importance of disadvantages

About the importance of advantages, every of them, such us remove trash from streets, reduce CO2 pollution, save energy or create employment, are value above 8.

Importancia de las ventajas o beneficios del sistema de recogida y tratamiento de los envases de bebidas

Ventaja	Valor
Reducir las basuras en calles, parques y espacios públicos o en el campo, las playas o el mar	8,4
Reducir las emisiones de CO2	8,4
Reducir la cantidad de basura en general	8,3
Ahorrar energía y materiales empleados en la fabricación de envases	8,3
Concienciar y estimular a la gente para que se preocupe más por reciclar	8,3
Reducir la cantidad de basura que va a los vertederos o que se incinera	8,2
Creación de puestos de trabajo	8,1

Base: Total muestra (2.006 casos).

Figure 24: importance of advantages

In conclusion, a **62.6%** make a **favourable balance** of disadvantages and advantages while only 9.4% indicates that the disadvantages outweigh the advantages.

The DRS attitude: nearly 9 out of 10 citizens would collaborate with the DRS. We will disaggregate data by age, educational level, income and place of dwelling.

P.14.- Si este nuevo sistema de tratamiento de los envases de bebidas se implantara en España, ¿lo adoptaría o colaboraría con él?	TOTAL	SEXO		EDAD					
		Hombre	Mujer	De 18 a 24 años	De 25 a 34 años	De 35 a 44 años	De 45 a 54 años	De 55 a 64 años	Más de 64 años
Total	2006	982	1024	189	393	407	342	264	411
Muestra real	2006	982	1024	195	404	405	335	262	405
	%	%	%	%	%	%	%	%	%
Sí	89,6	91,1	88,2	93,3	90,2	91,2	94,4	90,7	81,0
No	7,0	5,4	8,6	4,0	6,3	6,1	3,3	5,6	14,1
No contesta	3,4	3,5	3,2	2,7	3,4	2,7	2,3	3,7	5,0

Figure 25: Acceptance of deposit system by age.

Regarding sex, it is observed that men are slightly more in favour. In terms of age more favor sectors would be the aged 18 to 24 (93.3%), with one greater environmental awareness, and the aged 45 to 54 (94.4%), accustomed to the deposit system that existed in Spain long ago.

P.14.- Si este nuevo sistema de tratamiento de los envases de bebidas se implantara en España, ¿lo adoptaría o colaboraría con él?	TOTAL	ESTUDIOS				INGRESOS ENTREVISTADO						HABITAT			
		Sin estudios	Primarios	Secundarios	Universitarios	Sin Ingresos	<750€	751-1.250€	1.251-2.000€	>2.000€	Ns/Nc	Rural (<10.000)	Peq. Ciudad (10 a 100.000)	Gran Ciudad (>100.0001)	Madrid Barcelona
Total	2006	242	631	606	527	368	352	509	323	168	287	423	784	590	209
Muestra real	2006	219	660	597	530	382	324	512	336	169	283	525	737	638	106
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Sí	89,6	81,3	88,5	93,1	90,7	91,3	88,1	89,1	93,9	92,4	83,7	89,7	91,0	88,4	87,3
No	7,0	13,7	6,9	5,2	6,2	7,1	9,9	5,6	4,3	6,4	9,3	7,3	6,4	7,4	8,0
No contesta	3,4	5,0	4,6	1,7	3,1	1,6	2,0	5,3	1,8	1,2	7,0	3,0	2,6	4,2	4,7

Figure 26: Acceptance of deposit system by level of studies/incomes/location

It will be better fostered by the population with secondary or university studies, with a greaterawareness about the environment. They are also more to please people with more income and curiously people without income, which mostly coincides with the 18-24 year olds. Finally, in terms of location more willing customers would be those of rural areas and small towns.
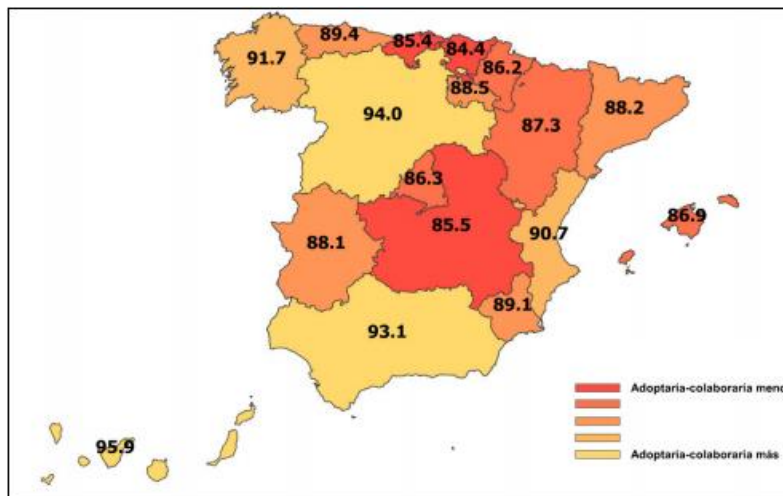
Figure 27: Acceptance of deposit system by autonomous community

Finally, all autonomous communities would be predominant in favour of DRS, but there are slight differences between the most in favour (Canary 95.9%) and the least in favour (Basque country 84.4%).

4.5.1. Target market conclusion

- The service of collection and treatment of waste is one of the services that the citizens more value.
- Currently, citizens already divide rubbish in paper, glass, cans, etc. So, they would not need to change their habits.
- The level of information about the current system is inadequate and 50% of respondents have knowledge about DRS. So, its implementation would not be so hard at informational level.
- More than 6 out of 10 people surveyed (62.2%) considered that the advantages outweigh the disadvantages.
- Almost *9 of every 10* respondents (89.6%) shown ***willing to adopt*** the DRS only front to 7% declared that they would not do so.

Author thesis´ opinion is that citizens are willing to adapt this system even when they must get used to collected the containers and transport them again to the supermarkets. DRS has such a good reputation among the citizens because we see the Nordic countries as an environmental example to follow.

5. Economic-financial analysis

For a supermarket/hypermarket it has become apparent that adapt a system DRS would attract new segments of customers to the stores, but first we will analyse if such a system will be viable economically for them.

DRS checkouts of drink of the following type system will be implemented:

- Plastic bottles manufactured mainly with PET and HDPE, for example, bottles of carbonated drinks, mineral water or fruit juice, but excluding milk bottles.
- Metal cans, both steel and aluminium, for example, soft drinks with gas, alcohol, energy drinks, etc.
- Glass bottles, for example, bottles of beer, soft drinks, etc., but excluding wine and liquor bottles.
- Bricks of drinks, for example, soft drinks, including brands such as Tetra.

Other types of containers, such us milk and food cans, are not accepted due to healthy reasons.

5.1. Pricing

Pricing is the process in which a business sets the price at which it will sell its products and services. In DRS case, the only price that should be agreed is the price of the deposit. It should be a studied amount because if the price is too high the customer will not acquire the product but even if it is too low the customer will not give it value enough to return the container.

Following the study by CECU, It can be checked that the average of those interviewed is 16 cents. By experiences in other countries with similar consumption (Germany: 0.25 c, Denmark: 0.30 c, Norway: 0.15 c) at an early stage will set up the deposit in **20 cents** for all containers.
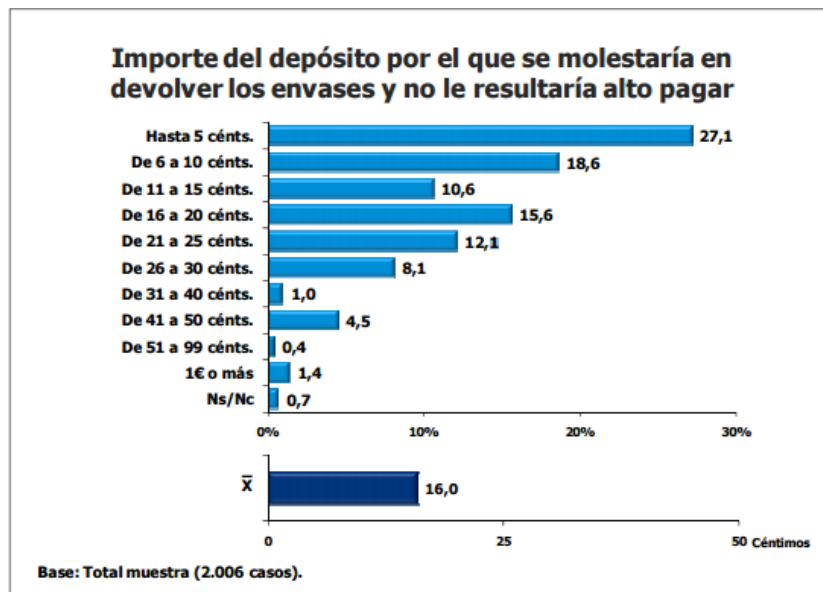
Figure 28: Amount of deposit that citizens considered as reasonable

To ratify that 20 cents is a value of deposit according to the purchasing power of the Spanish market, will be a comparison with Germany, since it has a volume of containers like the Spanish market, using the ***Purchasing Power Parity***[45]. According to this concept, two currencies are in equilibrium or at par when a market basket of goods (considering the exchange rate) is priced the same in both countries.

PPP Germany: 0.797 → ***Deposit: 0.25c***

PPP Spain: 0.67 → ***Deposit: 0.21c***

With a simple operation, it can be checked that optimal deposit value would be 0.21 c that isn't far away from the value which has been established of **0.20 c**.

5.2. Costs

To start with the costs, we will consider this data of the flow of masses that have been obtained through estimates and probabilities[46]. Then, we assume for the first year a return of 60%, the second a return of 70%, the third would be 80% and finally the fourth year 89% of recovery.

Nº containers/year	1st year	2nd year	3rd year	4th year
Glass	2.010,00	2.211,00	2.432,10	3.066,00
PET/HDPE	3.064,80	3.371,28	3.831,00	5.108,00
Steel cans	725,40	797,94	906,75	1.209,00
Aluminium cans	2.902,20	3.192,42	3.627,75	4.837,00
Bricks	1.166,40	1.283,04	1.458,00	1.944,00
Total	9.868,80	10.855,68	12.255,60	16.164,00

Table 4: Recovered mass flow with DRS.

In addition, according to the data of consumption in each type of store is estimated the recovery percentages of each type of container in each segments.

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[45] http://www.investopedia.com/updates/purchasing-power-parity-ppp/

[46] FLETCHER,Debbie, HOGG,Dominique,VON EYE, Maxime Evaluación de costes de introducción de un sistema de depósito, devolución y retorno en España.Apéndice Técnico. Eunomia Research & Consulting, Enero 2012

	Glass	PET/HDPE	Cans	Bricks
Hypermarkets (>2.500 m2)	15,34	16,09	14,28	13,96
Supermarkets (1.000-2.499 m2)	34,7	36,06	36,68	38,18
Supermarkets (400-999 m2)	27,65	27,11	28,61	27,03
Supermarkets (100-399 m2)	18,5	16,98	13,65	17,33
Supermarkets (<100 m2)	3,81	3,76	6,78	3,5

Table 5: percentage of recovery

Therefore, it is possible to calculate the number of packaging recovered annually by each establishment.

<u>Note</u>: the calculations only shall be made for the first year, the remaining years will be the same by changing the number of collected containers.

	Glass				Cans			
	Nº establishment	% estimated collected	Collected containers(Millions)	Collected containers/establishment	% estimated collected	Collected containers(M illions)	Collected containers/establishment
Hipermarkets (>2.500 m2)	538,00	15,34	308,33	**573.111,52**	14,28	518,02	**962.864,83**
Supermarkets (1.000-2.499 m2)	2.996,00	34,70	697,47	**232.800,40**	36,68	1.330,60	**444.126,73**
Supermarkets (400-999 m2)	4.891,00	27,65	555,77	**113.630,14**	28,61	1.037,86	**212.197,17**
Supermarkets (100-399 m2)	8.890,00	18,50	371,85	**41.827,90**	13,65	495,17	**55.699,37**
Supermarkets (<100 m2)	10.078,00	3,81	76,58	**7.598,83**	6,78	245,95	**24.404,77**

Table 6: Collected Glass/cans per establishment for 1st year.

	PET/HDPE				Briks		
	Nº establishment	% estimated collected	Collected containers(Millions)	Collected containers/establishment	% estimated collected	Collected containers(Millions)	Collected containers/establishment
Hipermarkets (>2.500 m2)	538,00	16,09	493,13	**916.591,67**	13,96	162,83	**302.656,95**
Supermarkets (1.000-2.499 m2)	2.996,00	36,06	1.105,17	**368.880,80**	38,18	445,33	**148.642,03**
Supermarkets (400-999 m2)	4.891,00	27,11	830,87	**169.876,77**	27,03	315,28	**64.460,83**
Supermarkets (100-399 m2)	8.890,00	16,98	520,40	**58.538,02**	17,33	202,14	**22.737,58**
Supermarkets (<100 m2)	10.078,00	3,76	115,24	**11.434,46**	3,50	40,82	**4.050,80**

Table 7: Collected Plastic/Briks per establishment for 1st year.

Then, the number of containers collected per week/establishment would be:

	Collected cans week/establishment	Collected briks week/establishment	Collected glass week/establishment	Collected PET/HDPE week/establishment	Total containers week/establishment
Hipermarkets (>2.500 m2)	18.879,70	5.934,45	11.237,48	17.972,39	54.024,02
Supermarkets (1.000-2.499 m2)	9.252,64	3.096,71	4.850,01	7.685,02	24.884,37
Supermarkets (400-999 m2)	4.420,77	1.342,93	2.367,29	3.539,10	11.670,10
Supermarkets (100-399 m2)	1.160,40	473,70	871,41	1.219,54	3.725,06
Supermarkets (<100 m2)	508,43	84,39	158,31	238,22	989,35

Table 8: Collected containers per week/establishment for 1st year.

To find the number of machines needed for each establishment we suppose returns concentrate in a period end of two hours a day while on Saturday the entire day are peak hours. Hypermarkets open Sunday (opening only they assume 4 peak hour) so the machines which would have a maximum load 24 hours a week while in supermarkets 20 hours.

Note: Hypermarkets are opened 51 weeks per year while supermarkets only 48.

	Collected containers/week (total)	Working hours/week	Collected containers per minute	Number of RVM
Hipermarkets (>2.500 m2)	54.024,02	24	37,51668003	3
Supermarkets (1.000-2.499 m2)	24.884,37	20	20,73697847	2
Supermarkets (400-999 m2)	11.670,10	20	9,72508519	1
Supermarkets (100-399 m2)	3.725,06	20	3,104216582	1
Supermarkets (<100 m2)	989,35	20	0,824459425	0

Table 9: Number of RVM per establishment (60% recovery)

	Collected containers/week (total)	Working hours/week	Collected containers per minute	Number of RVM
Hipermarkets (>2.500 m2)	88.452,25	24	61,43	3
Supermarkets (1.000-2.499 m2)	40.788,68	20	33,99	2
Supermarkets (400-999 m2)	19.115,69	20	15,93	1
Supermarkets (100-399 m2)	6.085,31	20	5,07	1
Supermarkets (<100 m2)	1.626,55	20	1,36	0

Table 9.1: Number of RVM per establishment (89% recovery)

A return machine, has a processing capacity of about 15-20 containers per minute so it has been estimated that number of machines for each establishment of each segment considering the final goal (89% recovery).

Therefore, it is estimated that in Spain would be a total of ***21.087 machines***. These machines would generate the following costs:

1. Capital costs (including installation): according to the prices of the company Tomra[47] the average cost of a machine has been estimated at around € 30,000 and costs of installation in about €1,000.

Capital cost			
Initial investment		Machine	30.000,00
		Instalation	1.000,00
			31.000,00

Table 10: Initial investment per machine.

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[47] https://www.tomra.com/en/solutions-and-products/collection-solutions

To divide this cost on a yearly basis, it has been assumed that the retailer will request a loan for the acquisition and will repay the loan over a period of 4 years (lifetime of the machine) and with an estimated 5% interest rate.

Operational costs account for 10% of the cost of capital of the machine:

		1st year	2nd year	3rd year	4th year
Yearly interest		1.372,40	984,90	597,40	209,90
Opration cost (Variable each month)		3.100,00	3.100,00	3.100,00	3.100,00
		4.472,40	**4.084,90**	**3.697,40**	**3.309,90**

Table 11: financial and operation costs per machine.

Interest has been calculated in proportion to the remaining capital:

Depreciation		Interest	Remaining capital
			31.000,00
Mes 1	645,83	129,17	30.354,17
Mes 2	645,83	126,48	29.708,33
Mes 3	645,83	123,78	29.062,50
Mes 4	645,83	121,09	28.416,67
Mes 5	645,83	118,40	27.770,83
Mes 6	645,83	115,71	27.125,00
Mes 7	645,83	113,02	26.479,17
Mes 8	645,83	110,33	25.833,33
Mes 9	645,83	107,64	25.187,50
Mes 10	645,83	104,95	24.541,67
Mes 11	645,83	102,26	23.895,83
Mes 12	645,83	99,57	23.250,00

Table 11.1: Interest for the 1st year per machine.

Finally, estimated maintenance costs by obsolescence in € 2,000 for each 800,000 compacted containers, i.e.€ 0,0025 per container.

	Collected containers per year	Maintenance costs
Hipermarkets (>2.500 m2)	2.755.224,98	6.888,06
Supermarkets (1.000-2.499 m2)	1.194.449,96	2.986,12
Supermarkets (400-999 m2)	560.164,91	1.400,41
Supermarkets (100-399 m2)	178.802,88	447,01
Supermarkets (<100 m2)	47.488,86	118,72

Table 12: Maintenance costs for 1st year (60% recovery).

So, the costs of machine (Loan, financial, operation and maintenance) for the first 4 years would be:

	Number of RVM	1st year	2nd yeard	3th year	4th year
Hipermarkets (>2.500 m2)	3	43.555,26	43.081,57	42.894,97	44.457,36
Supermarkets (1.000-2.499 m2)	2	27.430,92	26.954,54	26.604,18	27.014,44
Supermarkets (400-999 m2)	1	13.622,81	13.375,35	13.186,55	13.353,78
Supermarkets (100-399 m2)	1	12.669,41	12.326,61	12.001,98	11.790,14
Supermarkets (<100 m2)	0	0,00	0,00	0,00	0,00

Table 13: Capital costs per year

2. <u>Labour costs:</u> it will be split into two distinct types, the automatic collection establishments and those with manual collection.

2.1 <u>Automatic collection labour costs:</u> In each machine of "medium-sized" RVM fits 800 plastic bottles, 3,500 cans, 500 units of glass or 900 bricks. A container gets empty in 5 minutes and is daily cleaned in another 5 minutes. Therefore, assuming an average wage of 15.8 €/h according to the national statistical agency[48].

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[48] http://www.20minutos.es/noticia/2767026/0/trabajadores-espanoles-cobran-39-por-ciento-menos-media-europea/

	Emptying frequency cans/week	Emptying frequency briks/week	Emptying frequency glass/week	Emptying frequency plastic/week	Total frequency	Emptying cost	Cleaning cost	**Total cost**
Hipermarkets (>2.500 m2)	5,39	6,59	22,47	22,47	57	3.822,75	470,05	**4.292,80**
Supermarkets (1.000-2.499 m2)	2,64	3,44	9,70	9,61	25	1.604,69	442,40	**2.047,09**
Supermarkets (400-999 m2)	1,26	1,49	4,73	4,42	12	752,95	442,40	**1.195,35**
Supermarkets (100-399 m2)	0,33	0,53	1,74	1,52	4	260,71	442,40	**703,11**

Table 14: automatic collection labour costs for 1st year.

2.2 <u>Manual collection labour costs:</u> The labour of manual collection costs will be related to extra time spent on accept containers of customers, pay the deposit and place containers in the designated storage area. When the bag/box is full, it is sealed and is carried to the storage area. It is estimated that the average container processing time is 10 seconds.

	Collected cans week/establishment	Collected briks week/establishment	Collected glass week/establishment	Collected plastic week/establishment	
Supermarkets (<100 m2)	508,43	84,39	158,31	238,22	
Hour/week	1,41	0,23	0,44	0,66	
Hour/year	67,79	11,25	21,11	31,76	**Total**
Cost (15,8 E/H)	1071,10	177,79	333,50	501,85	**2084,23**

Table 15: manual collection labour costs for 1st year.

3. <u>Cost of the space occupied by machines for storage:</u> We also distinguish between locals with manual and automatic collection.

3.1 <u>Automatic collection space costs:</u> The costs of space will cover the rental of the space that the machines occupy, since this supposes a loss of sales and storage space. It is also an opportunity cost lost by the decrease in space in the area of sales.

Each machine is about 6m 2, the rent to be paid per m^2 which already cannot be used for other activities is set to €30/m^2/month[49]. The opportunity cost is calculated through the invoicing associated with m^2 and the percentage of space occupied by the machine with respect to the total of the establishment.

<u>Note</u>: Storage cost are not considered because the collection is daily so the cost is negligible.

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[49] Informe sobre el Mercado de Centros Comerciales. Estudio de Mercado, Aguirrre Newman, Junio 2012.

	Nº of machines	Occupied space	Cost for space	% occupied space	Medium billing(E/m2 year)	Opportunity cost	Total space cost (E/year)
Hipermarkets (>2.500 m2)	3	18	6.480,00	0,60	5.880,00	35,28	**6.515,28**
Supermarkets (1.000-2.499 m2)	2	12	4.320,00	0,69	5.053,00	34,65	**4.354,65**
Supermarkets (400-999 m2)	1	6	2.160,00	0,86	4.153,00	35,60	**2.195,60**
Supermarkets (100-399 m2)	1	6	2.160,00	2,40	4.056,00	97,34	**2.257,34**
Supermarkets (<100 m2)	0	0	0,00	0,00	4.702,00	0,00	**0,00**

Table 16: automatic collection space costs for 1st year.

3.2 <u>Manual collection space costs:</u> The only impact on the space when the containers are collected manually is the storage area. It usually is in the back of the store so opportunity cost is not considered.

It is assumed that in each bag fit an average of 150-200 containers of beverages (plastics, cans and cartons) and that fit some 40 glass bottles in the box. These occupy 1.5 m2 and rent valued at 30 €/ m2/month. Collection will be made weekly by the system manager.

	Collected cans week/establishment	Collected glass week/establishment	Collected plastic week/establishment	
Supermarkets (<100 m2)	508,43	158,31	238,22	
Bags/boxs per week	2,91	3,96	1,36	
Space m2	4,36	5,94	2,04	**Total**
Cost year 30 E/m2	1.568,88	2.137,17	735,07	**4.701,53**

Table 17: Manual collection space costs for 1st year.

Al tener un volumen tan bajo de envases, la recogida tiene que ser

To sum up, these are the costs that would generate the implementation of DRS the first year:

	Machine costs	Storage costs	Labour costs	Total
Hipermarkets (>2.500 m2)	43.555,26	6.515,28	4.292,80	**54.363,34**
Supermarkets (1.000-2.499 m2)	27.430,92	4.354,65	2.047,09	**33.832,67**
Supermarkets (400-999 m2)	13.622,81	2.195,60	1.195,35	**17.013,75**
Supermarkets (100-399 m2)	12.669,41	2.257,34	703,11	**15.629,86**
Supermarkets (<100 m2)	0,00	4.701,53	2.084,23	**6.785,76**

Table 18: Total costs for each establishment for 1st year

In blue the ones with automatic collection and in green the centres with manual collection.

5.3. Revenues

Revenues will only come from the €0.025 /container provided by the central system by the management of each container. Therefore, income will be as follows:

	Total containers week/establishment	Revenues/year
Hipermarkets (>2.500 m2)	54.024,02	**68.880,62**
Supermarkets (1.000-2.499 m2)	24.884,37	**29.861,25**
Supermarkets (400-999 m2)	11.670,10	**14.004,12**
Supermarkets (100-399 m2)	3.725,06	**4.470,07**
Supermarkets (<100 m2)	989,35	**1.187,22**

Table 18: Total revenues for each establishment for 1st year

5.4- Balance

	Year	1st year	2nd year	3rd year	4th year
Hipermarkets (>2.500 m2)	Revenues	68.880,62	75.768,69	85.527,67	112.776,62
	Costs	54.363,34	54.271,92	54.598,36	57.600,70
	Margin	14.517,28	21.496,77	30.929,31	55.175,92
	Acc. margin	14.517,28	36.014,05	66.943,36	122.119,28
	Year	1st year	2nd year	3rd year	4th year
Supermarkets (1.000-2.499 m2)	Revenues	29.861,25	32.847,37	37.093,76	48.946,42
	Costs	33.832,67	33.516,75	33.382,57	34.399,36
	Margin	-3.971,42	-669,37	3.711,19	14.547,06
	Acc. margin	-3.971,42	-4.640,79	-929,60	13.617,46
	Year	1st year	2nd year	3rd year	4th year
Supermarkets (400-999 m2)	Revenues	14.004,12	15.404,53	17.391,52	22.938,82
	Costs	17.013,75	16.841,59	16.753,76	17.204,41
	Margin	-3.009,63	-1.437,06	637,76	5.734,41
	Acc. margin	-3.009,63	-4.446,69	-3.808,93	1.925,49
	Year	1st year	2nd year	3rd year	4th year
Supermarkets (100-399 m2)	Revenues	4.470,07	4.917,08	5.545,76	7.302,37
	Costs	15.629,86	15.313,13	15.023,20	14.908,83
	Margin	-11.159,79	-10.396,05	-9.477,44	-7.606,46
	Acc. margin	-11.159,79	-21.555,84	-31.033,28	-38.639,74
	Year	1st year	2nd year	3rd year	4th year
Supermarkets (<100 m2)	Revenues	1.187,22	1.305,94	1.476,43	1.951,86
	Costs	6.785,76	6.315,70	8.383,38	10.960,52
	Margin	-5.598,54	-5.009,76	-6.906,95	-9.008,65
	Acc. margin	-5.598,54	-10.608,30	-17.515,25	-26.523,90

Table 19: Balance

As it can be checked, it only would be profitable for hypermarkets and supermarkets 2.499-1,000 m2 since they have a large volume of return of packaging and they can amortise the initial investment. For supermarkets 999-400 m^2 it is non-profitable for the first 4 years even when they get benefit in the last two years but it is despicable compare with the initial ivestment. For these supermarkets, from the 4 year it would be more profitable because although theoretically they would have to buy new machines, the percentage of recycling would remain at 89%.

The supermarkets of 100-399 m^2 don´t manage enough quantity of containers to amortize the investment of one machine. Finally, for the smallest supermarkets, the manual collection involve high cost of storage thar are not covered with their revenues. These last would not improve even next years with 89% of recovery.
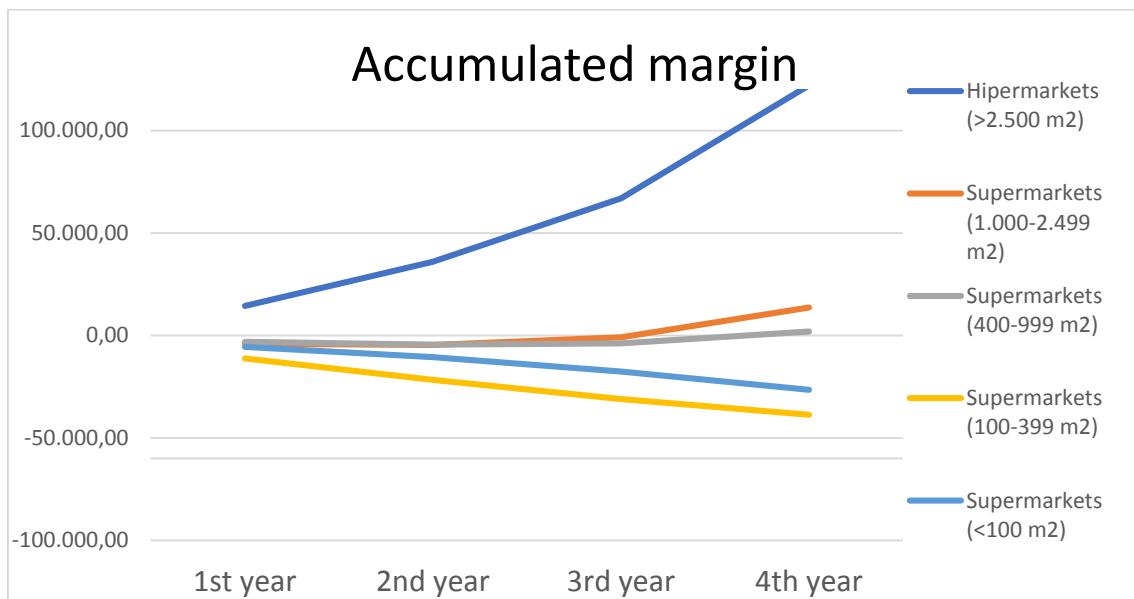
Figure 29: Accumulated margin for each establishment.

5.5. Cash Flow, Net present value and Internal rate of return

We will study the profitability of hypermarkets and supermarkets from 2.499 and 1,000 through the cash flows, NPV and IRR.

5.5.1. Hypermarkets

The initial investment is 3 machines, i.e. 93,000 euros, which will be paid by the application of a loan with an interest of 5% during the 4 years of useful life of the machines.

Although for large hypermarkets usually cash flow is not a big problem for the pressure on its suppliers, it is advisable to study separately the feasibility of the implementation of the DRS cash flow.

As indicated in previous sections, the consumption of beverages is seasonal so we will assume that the revenues and costs will vary according to seasonality. The percentage of drink consumed data are taken from the study of MERCASA[50].

The unique taxes that are deducted of the implementation of DRS at hypermarkets will be the *corporate tax* that suppose a 25%. It should be paid in March, October, December and the last one in July of next year.

	Corporate tax March (Paid in April)	Corporate tax Sept (Paid in Oct)	Corporate tax DEC (Paid in NOV)	Yearly Corp. Tax (Paid in July next year)
Revenues	14.602,69	38.435,39	15.842,54	68.880,62
Labour costs	910,07	2.395,38	987,34	4.292,80
Operation costs	1.971,60	5.189,40	2.139,00	9.300,00
Mantenaince costs	1.460,27	3.843,54	1.584,25	6.888,06
Storage costs	1.628,82	3.257,64	1.628,82	6.515,28
Depreciation	5.812,50	11.625,00	5.812,50	23.250,00
Intresest	1.138,28	2.058,59	920,31	4.117,19
Tax base	**1.681,15**	**10.065,83**	**2.770,31**	**14.517,30**
25% rate	420,29	2.516,46	692,58	3.629,32
Paid amount	**420,29**	**2.096,17**	**-1.823,88**	**2.936,75**

Table 20: corporate taxes for the 1st year.

So, the cash flow for the first year divided into months would be:

	1	2	3	4	5
%beverage consumption	7,9	6,4	6,9	7,2	8,5
Revenues	5.441,57	4.408,36	4.752,76	4.959,40	5.854,85
Labour costs	339,13	274,74	296,20	309,08	364,89
Operation costs	734,70	595,20	641,70	669,60	790,50
Mantenaince costs	544,16	440,84	475,28	495,94	585,49
Storage costs	542,94	542,94	542,94	542,94	542,94
Loan	1.937,50	1.937,50	1.937,50	1.937,50	1.937,50
Interest	387,50	379,43	371,35	363,28	355,21
Depreciation	1937,5	1937,5	1937,5	1937,5	1937,5
Corporate taxes				420,29	
Total Cash Flow	**2.893,14**	**2.175,22**	**2.425,29**	**2.158,27**	**3.215,83**

Table 21.1: Cash flow for the 5 first months.

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[50] http://www.mercasa.es/files/multimedios/1406495170_Consumo_de_bebidas_refrescantes_en_Espana_p22-p35.pdf

6	7	8	9	10	11	12
9,9	10,1	11,5	8,6	7,6	7,2	8,2
6.819,18	6.956,94	7.921,27	5.923,73	5.234,93	4.959,40	5.648,21
424,99	433,57	493,67	369,18	326,25	309,08	352,01
920,70	939,30	1.069,50	799,80	706,80	669,60	762,60
681,92	695,69	792,13	592,37	523,49	495,94	564,82
542,94	542,94	542,94	542,94	542,94	542,94	542,94
1.937,50	1.937,50	1.937,50	1.937,50	1.937,50	1.937,50	1.937,50
347,14	339,06	330,99	322,92	314,84	306,77	298,70
1937,5	1937,5	1937,5	1937,5	1937,5	1937,5	1937,5
				2.096,17		692,58
3.901,50	**4.006,37**	**4.692,04**	**3.296,52**	**724,43**	**2.635,07**	**2.434,56**

Table 21.2: Cash flow for the next 7 moths.

To check how the corporate tax is paid:

13	14	15	16	17	18	19
7,9	6,4	6,9	7,2	8,5	9,9	10,1
5.633,62	4.563,95	4.920,51	5.134,44	6.061,49	7.059,86	7.202,48
369,33	299,20	322,58	336,61	397,38	462,83	472,18
734,70	595,20	641,70	669,60	790,50	920,70	939,30
598,57	484,92	522,80	545,53	644,03	750,11	765,26
542,94	542,94	542,94	542,94	542,94	542,94	542,94
1.937,50	1.937,50	1.937,50	1.937,50	1.937,50	1.937,50	1.937,50
290,63	282,55	274,48	266,41	258,33	250,26	242,19
1937,5	1937,5	1937,5	1937,5	1937,5	1937,5	1937,5
		565,02				3.629,32
3.097,46	**2.359,13**	**2.050,98**	**2.773,36**	**3.428,31**	**4.133,02**	**611,28**

Table 21: Corporate tax for the first year paid in next July.

So, net cash flow for the first for years would be:

	Net flow cash
1st year	34.558,26
2nd year	35.817,04
3rd year	44.373,15
4th year	64.009,62

Table 22: Net cash flow hypermarkets

Taking into account the initial investment of 93,000€ and this formula, we will calculate NPV:

$$VAN = -A + \frac{Q1}{(1+k)^1} + \frac{Q2}{(1+k)^2} + \cdots + \frac{Qn}{(1+k)^n}$$

Table 23: Net present value

- Q_n: Cash Flow of each year.
- K: Discount rate
- A: Initial investment

The value of the IRR leaves us 28,49% and the value of the NPV, calculated with the function of Excel comes out 63.391,84€ so we check that the implantation of DRS at hypermarkets is **viable and profitable.**

5.5.2. Supermarkets (2.499-1.000 m^2)

For supermarkets, we have repeated the same operation with the same assumptions, but with different initial investment since you only need two machines (€62,000).

	Net cash flow
1st year	12.078,10
2nd year	15.952,93
3rd year	19.122,78
4th year	28.492,33

Table 24: Net cash flow supermarkets.

The value of the VAN leaves us 3.932,38 and the value of TIR 7,35% so, it is also **viable and profitable**.

5.5.3. Supermarkets (999-400 m^2)

For supermarkets of 999-400 m^2, it presents few benefits in the last 2 years but is not profitable because the initial inversion is too elevated. However, for the next years it would become profitable with 89% of recovery. So, it is **viable** and **profitable** in **long-term**.

5.6. Advertising campaign

The main goal of advertising campaign is to mark the main guidelines to make the system known. DRS implementation will facilitate its positioning with its competitors and increased both sales and brand image.

Marketing campaigns throughout the first year of implementation of DRS will be:

- Internet: It will reward the checkouts through sweepstakes and discounts in the own brands of beverages containers.

- In the main streets: to make known the system some campaigns would take place on the streets of Spanish cities with recycling workshops and activities.

- At college parties: in Spain, there is a problem of awareness about the garbage collection after parties. Therefore, some manual collecting point would be established on the own party where you can return the container.

Figure 30: garbage after party in University of Valladolid

In addition, conducted campaigns of loyalty with a card called "eco-card´´ where for each container returned is will get points that can be redeemed for prizes.

The costs associated with advertising campaigns shall be borne by the manager of the system with the benefits of not returned containers.

6. Conclusion

Our model of implementation of DRS in Spain presents **real viability** in **hypermarkets** due to the high volume of containers they manage. Even, capital expenditures are amortized from the first year, considering the rates of recovery that we assumed.

For supermarkets (2.499-1.000 m^2) it is also **viable** and **profitable** in short-term. Finally, for supermarkets (999-400 m^2) it is not profitable in short-term but it is **viable** and **profitable** in **long-term**.

The others potential ``customers´´ of DRS don´t present real viability with our plan due to the elevated capital and storage costs. So, the system presents **8.425 collecting points** with 12.497 reverse vending machines in Spain. Counting with Spain's 52 provinces, we get an average of **162 collecting points per province** so, most of the citizens will have access to the system.

Apart from purely economic point of view, is a system that will generate **customer loyalty** since the cash flow remains in own supermarket by having to spend the deposit on subsequent purchases. In addition, it will generate **differentiation** from the competition because the ECO-awareness is increasing from day to day.

In author´s thesis view is the time for the implementation of the system because Spain must meet the **objectives** set by the European Union in **2020** and it has been checked that current system is not efficient enough. As it is said in this report[51], Spain is known as the ``*Landfill country´´*. In these times of growth, we must advocate for a **sustainable development**.

From economic point of view of the country, Spain is in a process of economic growth after several years of recession so, economic investment by all stakeholders would not suppose so much effort. Moreover, taking previous experiences in other countries the risk is reduced and bounded.

To sum up, the implementation of DRS would be a **challenge**, with limited risks, for all the stakeholders, who should change their habits, but would mean a source of income for the chain of distribution of beverages and a step forward for a sustainable development in Spain.

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[51] http://www.elconfidencial.com/tecnologia/ciencia/2017-03-27/vertederos-ilegales-reciclaje-sentencia-europa_1353765/

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