

The Case of “La Hormiga Verde”: Recycling Electronic Waste (e-Waste) as a Paradigmatic Example of a New Entrepreneurial Trend in the Fourth Sector



Juan Luis Tato Jiménez, María Victoria Carrillo Durán, and
María García García

Abstract This chapter proposes a research study based on a case methodology examining the La Hormiga Verde company, an example of entrepreneurship in the Fourth Sector, within the regional scope in Spain.

Currently, society demands companies to be involved in the creation of a fairer and more sustainable economy, and hence the rise of the so-called Fourth Sector. La Hormiga Verde is a clear example of sustainable entrepreneurship in this sector, both because it is a Special Employment Centre (SEC), with almost 100% of its workforce being disabled persons, and because the company focuses its activity on processing electronic waste through the recycling of the polluting materials that this waste contains.

This is an innovative case of value creation in the Fourth Sector, due to both the regional environment in which the business project is developed and the business model it follows. Its business model stands out because of its contribution to the creation of economic value and above all social value, thanks to promoting employment among people with disabilities and to the recycling of electronic waste because of its environmental impact.

On the one hand, La Hormiga Verde creates regional economic value, thanks to its different business model based on solving two problems of local environments—reaching everywhere in its region, and meeting the recycling needs of the final consumer (households).

And on the other hand, La Hormiga Verde is a company that is strongly supported by the creation of social value. To this end, it hires people with disabilities, guaranteeing their well-being and their working conditions in the job market, as well as using social marketing strategies such as organizing recycling contests in schools and raising awareness among the younger population.

La Hormiga Verde provides solutions to a global problem through local actions, instead of vice versa. Thus, it solves some of the important challenges facing

J. L. Tato Jiménez (✉) · M. V. Carrillo Durán · M. García García
Badajoz, Spain
e-mail: jlato@unex.es; vicduran@unex.es; mgargar@unex.es

© Springer Nature Switzerland AG 2021

M. I. Sánchez-Hernández et al. (eds.), *Entrepreneurship in the Fourth Sector*, Studies on Entrepreneurship, Structural Change and Industrial Dynamics,
https://doi.org/10.1007/978-3-030-68390-0_10

193

sustainable companies, and, as an SEC, provides a business model for the Fourth Sector that is replicable and viable as a contribution to the United Nations 2030 Agenda on Sustainable Development.

Keywords Fourth Sector · electronic waste · recycling · disability

1 Introduction

Since the end of the twentieth century, the need to put a brake on climate change, conserve the planet's natural resources, and defend human rights has stirred the conscience of businesses (Dacasa 2017). Although nowadays organizations are rushing to develop corporate social responsibility (CSR) policies, the urgency of new challenges was already made clear in the Sustainable Development Goals (SDG) for 2030 set out in 2015 by the United Nations (United Nations 2020). Despite this, there is still no universal consensus criterion on how companies can advance firmly towards achieving those goals (Rubio-Mozos et al. 2019).

However, a significant number of initiatives have emerged that highlight the need to change from the obsolete but dominant economic model based on continuous growth, the main exponent of which is the macroeconomic magnitude, to a sustainable model focused on people and the planet and which prioritizes individual well-being and social prosperity (Rubio-Mozos et al. 2019).

In recent years, the boundaries between the public, private, and non-profit sectors have become blurred (Fourth Sector Network Concept Working Group 2009), and the Fourth Sector is creating its own path in the form of companies that combine approaches based on the private for-profit sector and the social and environmental objectives of the public and non-profit sectors. According to Zurbano et al. (2012), the differentiating elements of the Fourth Sector are Corporate Social Responsibility, Social Entrepreneurship, Inclusive Businesses at the Base of the Pyramid, and Fair Trade.

Along this line, it can be said that the examples of entrepreneurship in the Fourth Sector represent the new ways society has of solving new social problems. This paper addresses the case of La Hormiga Verde, a company created in 2018, whose business model is based on the need to recycle all types of electronic components (WEEE) (computer, electronic, and audiovisual equipment, etc.) that are not only kept in households, but also in large institutions.

The activity of the company already by itself represents a contribution to the development of a sustainable environment, and is part of the so-called Circular Economy that has grown in popularity in recent years (Lahane et al. 2020). In addition, the company is a Special Employment Centre (SEC) that supports its business plan on a fundamental pillar: designing a model that can create social value.

La Hormiga Verde is a clear example of the Fourth Sector, a company with a business model that seeks social benefits without ignoring the economic ones. Its

model is far from the traditional one that does not take into account the social and environmental factors generated by economic activities.

This chapter analyses, therefore, the case of a private and for-profit company with activity in the region of Extremadura (Spain), La Hormiga Verde, as an experience of regional entrepreneurship in the Fourth Sector, since it is considered to be a Special Employment Centre (La Hormiga Verde 2020a). The research question is focused on knowing what the keys are for the La Hormiga Verde business model to be successful, and highlights the way in which they manage to create social and economic value in the Fourth Sector and at the regional level.

The objective of this study is to describe the business model adopted by La Hormiga Verde, emphasizing its establishment as a Special Employment Centre (SEC) and as an innovative model within a regional environment. To this end, the main results will be presented which provide the keys to the company’s business model for the creation of social and economic value, as well as the impact these social and economic values have on the economy, society, and environment.

2 Preliminary Aspects: La Hormiga Verde as a Special Employment Centre in the Fourth Sector

Social demands are among the causes of profound transformations in society which is demanding responsibility and transparency from all types of organizations. As a result of these social changes, the so-called Fourth Sector emerged as being those companies that seek to have economic profitability as well as having an interest in the environment and society as added value (Haigh and Hoffman 2012). In the Fourth Sector, SECs are configured as a particular business type since they are spaces for the social integration of workers with disabilities, and promote the efficiency of these workers and encourage innovation and synergies with other businesses (Gimenez Rodriguez 2012).

As a way to promote a fairer and more inclusive society, in Europe, there has been an increase in initiatives that promote the inclusion of people with disabilities. In Spain specifically, among the strategies carried out in favour of the employment of people with disabilities, the Royal Decree 1/2013 stands out as it guarantees the right of employment for these individuals and establishes that public and private companies with more than 50 employees must reserve 2% of their staff for people with disabilities.

In this respect, SECs were defined in Article 42 of the Law 13/1982 of 7 April on the social integration of disabled persons as a type of organization that makes it possible to reconcile economic viability with social commitment, since they are companies where at least 70% of the workforce has a recognized disability. SECs pursue two fundamental objectives. On the one hand, they offer products or services in a free and open market while being economically viable. And on the other hand, they respond to a social purpose by offering opportunities for people with

disabilities, as well as developing and improving the quality of their employment (Valls and Peña 2015). The proliferation of SECs shows their economic viability (Gelashvili et al. 2016), whereas the social repercussion of these centres is a more complex aspect to measure, although it must be taken into account due to its positive effects on the company (Atadi Employment Report 2018).

In this sense, the social impact of SECs should not be measured solely using economic indicators since, in this type of organization, the social return on investment is as important or more important, and is not included in traditional financial accounts. The impact on the quality of life of the people employed by these centres is relevant as has been shown by studies such as that of Romeo et al. (2020) which concludes that the employees of SECs present medium-to-high levels of affective commitment to the values of the organization and medium levels of general satisfaction.

The situation of the job market in Spain, with high structural unemployment, makes it difficult for people with disabilities to be professionally integrated. They have an employment rate of 25.5% (Odismet 2020). Since just one in four people with disabilities has a job, social economy companies can be of vital importance for the employability of people with disabilities and the improvement of their quality of life. SECs are, without a doubt, the main instrument for the job insertion of this sensitive group (Bengoetxea 2014).

As an SEC, La Hormiga Verde is a type of organization that corresponds to the Fourth Sector, and is an SEC in accordance with the General Law on the rights of people with disabilities and their social inclusion which states that: “The Special Employment Centres are companies whose main objective is to provide workers who have disabilities with productive and remunerated work, appropriate to their personal characteristics and which that facilitates their integration into the ordinary job market”. Therefore, the case of La Hormiga Verde can be considered to be exemplary to improve society and local environments since it promotes protected employment for people with disabilities and, in addition, within its regionally closer context, adapts to the characteristics of the local population, as well as contributing flexibly to their personal development.

In order to comply with current regulations for SECs, La Hormiga Verde, based in the region of Extremadura (Spain), complies with the Decree 117/2012 of 29 June, which regulates the requirements necessary to obtain the qualification and subsequent registration as an SEC in the Register of Special Employment Centres of the Region of Extremadura. This is an administrative registry in which SECs must be inscribed which have their headquarters and conduct their activity in Extremadura (Spain). As described in Article 2, Paragraph 3 of the aforementioned Decree, companies must prove the personality or legal capacity of the applicant entity, justify the technical and financial viability of the centre, prove that the workforce will be at least 70% of workers with disabilities, and foresee the incorporation into the workforce of any technical and support staff necessary for workers with disabilities. In addition, the registered headquarters and activity must take place in the territory of the Region of Extremadura (Spain).

La Hormiga Verde’s business activity is part of the so-called Circular Economy, and has a strong impact on the improvement of the local environment since it works to promote the efficient use of WEEE in Extremadura (Spain) through the recycling and reuse of components from WEEE, offering as an added value the ease of recycling such waste no matter where one lives, no matter how isolated. Thus, Gonda et al. (2019) emphasize the need to take into account the regional context when collecting WEEE. Bahers and Kim (2018) also note the main dysfunctions of the WEEE management system, which include the lack of participation of local authorities and final consumers, spatial dispersion, and the low recycling rate at local levels, problems which La Hormiga Verde is trying to solve.

The activity of La Hormiga Verde contributes to the achievement of the objectives set in the 2030 Agenda on Sustainable Development (Sustainable Development Goals, United Nations, 2030) which stresses the need to implement actions related to responsible production and consumption and climate action. It is an international proposal to achieve the efficient use of resources and the creation of fair remunerated jobs with good working conditions. All of this translates into achieving general development plans that reduce economic, environmental, and social costs, and increase competitiveness (United Nations 2020).

The United Nations is calling for a systemic approach and cooperation among the component members of the supply chain, from the producer to the final consumer. In this context, La Hormiga Verde is committed to the Circular Economy as an alternative to the linear model (Ecoembes 2020). The Circular Economy is emerging as a sustainable development strategy that requires a complete reform of the entire business system. It includes both adaptation of the production processes and activities related to the supply chain (Sehnm et al. 2019). Thus, under the umbrella of the Circular Economy, the concept of circular supply chain management (CSCM) has appeared (Farooque et al. 2019). This can be defined as forward and backward supply chains, that is, those that incorporate reusable products, by-products, and flows of waste, and that help organizational sustainability (Batista et al. (2018). It is here where La Hormiga Verde’s business model takes on meaning, and where its clients and collaborating partners appear.

The policies of the European Union, through the Action Plan in Europe (MITECO 2020), are also focused on promoting smart, sustainable, and inclusive economic growth. The said plan considers that it is necessary to act with the different stages of the life cycle of products: design and production, consumption, waste management, and use of the resources contained in the waste through its reintroduction into the economy. Within this frame of reference, there are gaps in research on WEEE in the context of the Circular Economy (Bressanelli et al. (2020). It is understood that is essential to pay attention to the WEEE stored in households (not only in companies and institutions) without recognition of its usefulness to be recycled, reused, or repaired (Kaya 2018). This is the sector in which La Hormiga Verde carries out its work.

As a whole, it can be said that La Hormiga Verde is a socially and environmentally innovative company, since one form of innovation is environmental innovation through recycling (Morales Gutiérrez 2009). Its fundamental characteristics also

include job insertion and the preservation of the local environment. This case study thus becomes a paradigm of a Fourth Sector company that provides social value as an SEC and in the form of environmental benefits as well as economic value, and that, although it is developed in a regional environment, is replicable to any context since it does not depend on its own context's particularities but tries to resolve that context's problems.

3 Methodology: The Case Method

According to Yin (1994), case-study research is an empirical form of research that is used to analyse a contemporary phenomenon within its real context, especially when the limits between the phenomenon (in this case, new business models) and the context being studied (the Fourth Sector at the regional level) need to be exemplified and analysed. Thus, a case study tries to review a reality in which there are many variables of interest beyond the directly observable quantitative data.

In this case, and within the possible types of design for case studies according to their typology (Yin 2009: 46), the "type of design for a single case" was chosen. The case is considered to be a single unit of analysis that is original and relevant enough to be representative of the context in which the work is being approached. La Hormiga Verde is a different company since it is dedicated to recycling WEEE in Extremadura (Spain), and has little competition in this region. It is relevant as a case study in the new ideas and business models of the Fourth Sector, and especially as being an SEC.

In addition, within case studies, Stake (2005) states that there are several types depending on their purposes. In our research, we opted for the "intrinsic type of case study", which must have its own specificities and a value in itself. In this type of research, the case is studied in order to describe its uniqueness and because it is itself of interest to exemplify a specific reality within the study context. These premises are fulfilled by La Hormiga Verde because it is a company representative of the problem that it illustrates and solves (the recycling of WEEE), and because the case itself is interesting to know examples within the Fourth Sector and SECs in the local context of Extremadura (Spain).

Regarding the presentation of results, Pérez Serrano (1994) puts forward different possibilities for presenting the research report. For this research, we chose the "descriptive case study" in which a report of the phenomenon under study is presented without excessive prior theoretical foundation, in order not to be guided by pre-established hypotheses and to provide basic information on the different fields of study.

Therefore, the analysis of the case is based on multiple sources of evidence that must converge on a previous model that guides the collection of information and analysis (Monge 2010). Along these lines, three areas of analysis are established a priori (Table 1) as being where La Hormiga Verde creates value as an SEC in a regional ecosystem.

Table 1 Areas of analysis and value creation

Areas of analysis	Value creation
Economic scope: Study the economic keys of the company that help to maximize the social impact, but attending to the for-profit motive and observing the fundamental laws of the economy	Creation of economic value through the way of defining and developing its activity within a different business model, strongly supported by social marketing strategies
Social scope: Describe the role that the company plays in creating social value as a Special Employment Centre (SEC)	Creation of social value because of being a Special Employment Centre (SEC), a place of employment for the disabled with the activity of recycling electronic waste
Regional environment: Analyse the development of business activity focused on recycling electronic waste in a regional environment (Extremadura, Spain) and contributing to supporting a social cause represented by caring for the environment	Creation of environmental value, making the Circular Economy the basis for the creation of its economic value, helping the sustainability of the environment, and raising awareness regarding ecology and recycling

Source: Author’s elaboration

To carry out the study, a qualitative research design was implemented in which the information collection methods were aimed at filling the gap that exists in social science research on these issues (Rubio-Mozos et al. 2019). They were the following:

1. In-depth semi-structured interviews with the head of administration and the director of the company.

The first interview focused on aspects of business management and was divided into blocks:

- (a) The origin of the business idea and the difficulties encountered in creating the company
- (b) The business model: Value creation, scope of the firm’s market and description of its services, results and viability of the project, human resources policy, awareness about recycling, and approach as a socially responsible company
- (c) The implications for the business as a Special Employment Centre (SEC) and the creation of social value

The second interview focused mainly on social marketing and communication policies, and on actions in offline and online channels. In addition, two guided visits were made to the facilities to see the work they were doing, and the activity in situ was noticed. Both the interviews and the visits were carried out in February 2020.

2. The documental review of secondary sources through the analysis of documents generated by the company: analysis of its Web pages, analysis and extraction of traffic data on social networks, analysis of advertising brochures and the annual report published by the company in 2019. The collection of this information was done in the months of February and March 2020.

4 Analysis Model

Starting from the study areas described in Table 1, the study of the information obtained was carried out based on an analysis model prepared for this purpose (Table 2). Following Rubio-Mozos et al. (2019), this analysis model addresses the role that La Hormiga Verde has to play to advance towards the United Nations Agenda (2030) as a company within the Fourth Sector.

In overall terms, the analysis model is based on three fundamental aspects (Economic Activity, Social Integration of Disabled Persons, and Environmental Care) to guarantee the business project, forming a unit among themselves despite being apparently different spheres. All these dimensions are important and depend on each other, not being separable at the strategic level of the company but rather at the analytical level to study the organization and its business. The creation of social value must be analysed through the way in which the company carries out its activity, seeking social integration and care for the environment. Regarding the creation of economic value, the business activity must be efficient to have a positive effect in this area. In turn, the economic efficiency of the company also depends on its social impact, since environmental awareness and the effort of social integration

Table 2 Analysis model and creation of new companies

Creation of economic value	Creation of social value	
Economic activity of the business	Social integration of disabled persons	Environmental care
Analyse the key resources and activities that define the competitive capacity	Define what the social project and the future impact objective are like	Define the environmental value proposition that is developed through the activity carried out
Assess the company’s capacity for growth and the possibility of replicating the business model	Establish the type of social enterprise (cooperative, Special Employment Centre, . . .)	Know how waste management and recycling are done within the Circular Economy
Study the management of operations and logistics	Delimit the scope of social need at geographical, quantitative, and qualitative levels	Delimit the scope of the environmental need at geographical, quantitative, and qualitative levels
Know the marketing strategies developed	Explain how to satisfy social need with the agents involved	Explain how to collaborate in environmental care with the agents involved
Analyse the economic profitability (know how they obtain profitability)	Analyse alliances and associations with social agents and institutions and public or private companies, keys to the activity	Analyse alliances and associations with social agents and institutions and public or private companies, keys to the activity
Know how they carry out management control	Assess the capacity for permanence of the present and future social activity	Assess the capacity for permanence of present and future environmental activity

Source: Author’s elaboration based on Osterwalder et al. (2015)

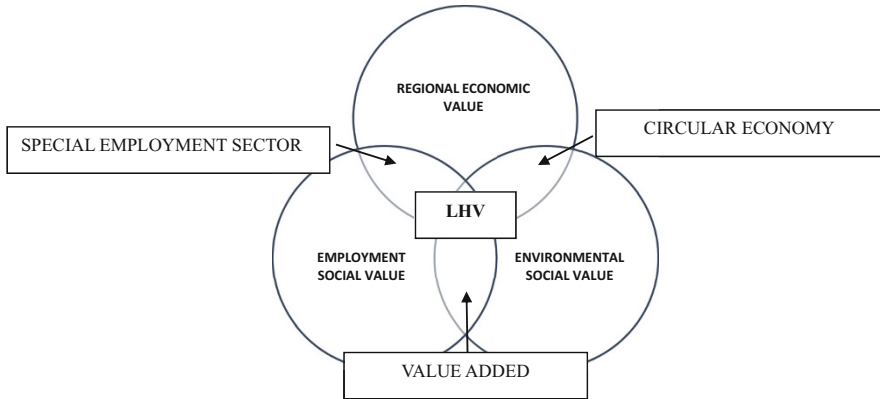


Fig. 1 Value areas of the business model. Source: Author’s elaboration

can make its turnover grow. Thus, one can say that there is an indissoluble and necessary trilogy between the three areas (Fig. 1).

In this way, as another important consideration, the three dimensions will be interrelated in their activity and must be developed in three temporal action planes—the strategic plane (where the paths to follow are established and the long-term approach is delimited), the tactical plane (where the way to achieve the short and medium term goals is defined), and the operational or application plane (where the specific action policies are established).

Next, we shall define the areas of value creation and the aspects on which it is convenient to focus within each of them and on which each area depends, in order to obtain an X-ray of the company as an SEC within the Fourth Sector and a creation model for new organizations that wish to replicate it.

This model (Table 2) summarizes the key aspects, and has been adapted by the authors based on the contribution by Osterwalder et al. (2015).

After conducting the interviews and gathering the necessary documentation, we shall proceed to present the results obtained for the different areas of the La Hormiga Verde business model established in Table 2.

5 La Hormiga Verde: Creation of Social and Economic Value

Taking the above into account, we can specify that La Hormiga Verde follows a business model that deals with the creation of economic, social, and environmental value within the Fourth Sector, since it develops its activity according to the Circular Economy model and has a strong social focus, being an SEC in Extremadura.

According to the company itself and the approach described above, its objectives as an organization focus on the following basic aspects, which are intended to

respond to the two large areas of value that they generate (economic value and, above all, social value):

1. Create an electronic waste management model that is scalable and replicable in neighbouring geographic areas
2. Generate benefits also for social purposes such as non-profit organizations
3. Create stable employment for people with disabilities
4. Offer solutions to better manage waste

5.1 La Hormiga Verde as a Special Employment Centre for the Integration of Disabled Persons

As already indicated in Table 2, the creation of social value is carried out in La Hormiga Verde, in part, through the social and professional integration of people with disabilities because it is an SEC. This delimits the scope of social need that is attended to and the way to satisfy it, valuing also the capacity for permanence of the social activity in the future.

The company creates stable jobs for people with disabilities who have a morning-concentrated work-day and all the guarantees to be able to carry out their work. Along these lines, according to the annual report of the company, in 2019, it generated 10,970 hours of work through collecting electronic waste (La Hormiga Verde 2020a).

Since the values that are most mentioned by the La Hormiga Verde management team are commitment, cooperation, transparency, collaboration, rootedness, sustainability, inter-cooperation, and solidarity, the company looks for employees committed to the project among the towns closest to its location (a town in the south of Extremadura, Spain). In this sense, it is worth highlighting the important recruitment work that they carry out thanks to their knowledge of business management from the world of disability experienced from within, since the person responsible for this task is from this group.

Therefore, with its jobs, La Hormiga Verde offers an opportunity to people who need it. The degree of satisfaction of these employees with the company is very high. It should be taken into account that they have a salary above the average for this type of worker (even higher than what they earn in many administrations and public institutions), and that they perform their full-time jobs only in the morning, and with a working load of 35 hours a week.

5.2 La Hormiga Verde and Caring for the Environment Through Recycling Electronic Waste

The creation of social value is also carried out at La Hormiga Verde through environmental care, trying to respond to the aspects highlighted in the above analysis

model (Table 2) for this section. In the following paragraphs, the main aspects related to the field of environmental care are discussed, including knowing how WEEE management is done. The scope of the need to be addressed and the form of action are also delimited, thus estimating the capacity for permanence of the environmental activity in the future.

The company is dedicated to the correct management of electronic waste (WEEE), from its weighing, classification, and calculation of its value, to its new incorporation as a raw material into the environment of production, and taking advantage of more than 95% of that waste (La Hormiga Verde 2020a). Regarding the amount of waste recovered and treated, the amount managed in 2019 by La Hormiga Verde was 157.4 tons. Most of the waste collected is iron, computer and television monitors, and highly polluting electronic equipment components.

Its scope is regional, limited at the moment to Extremadura, although with the establishment as future goals of the possibility of growth in neighbouring areas, both outside Spain (Portugal) and within Spain (in the Region of Andalusia).

It is important to highlight that La Hormiga Verde provides a service in Extremadura for the free collection of electronic waste, adapted to the needs of the rural world and solving problems in a flexible way, e.g., including the recycling of new waste that was not initially foreseen, such as batteries, toners, computer screens, etc., and covering a gap in the market that had not been detected or attended to before. This implies a greater effort, but the commitment to the activity carried out, the collection of WEEE, is prioritized.

In the case of Extremadura, and according to the latest data available from 2017 (MITECO 2020), for each inhabitant of Extremadura, a total of 5.67 kg of WEEE was collected that year. However, in 2019, the objective for Extremadura of the MITECO was to collect about 9 kg per person (MITECO 2020). This objective cannot be contrasted at present. However, it is presumed not to have been reached, since the known trend in the region is that during 2017 only 41% of the WEEE that producers put on the market in the previous 3 years was collected. Taking into account that the national objective for that year was to collect 50% of the waste generated from devices previously introduced to the market, the presumable reality is that Extremadura continues to be below the minimum national limits.

In addition, the evolution of WEEE recycling in Extremadura (Fig. 2) underwent a decrease in 2016, only partially corrected in 2017, when 116 tons of discarded electrical equipment and components were collected, out of the 54,599 tons recycled throughout Spain (INE 2020).

Therefore, the reality is that, despite the efforts made, the Region of Extremadura is clearly in the tail-wagon of recycling in Spain. In this sense, initiatives are needed to channel European and state indications about the collection and recycling of WEEE.

Currently, in addition to La Hormiga Verde, there is only one company in Extremadura dedicated to recycling electronic waste. La Hormiga Verde has two differential values over the other organization: firstly, it employs only people with disabilities, therefore, being an SEC is a very important differentiating and competitive advantage, and secondly, it guarantees, unlike the other company, collection at

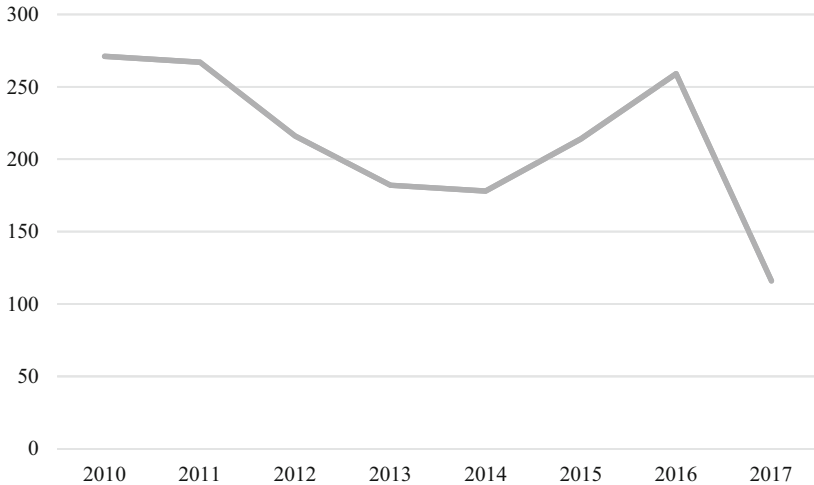


Fig. 2 Weight in tons of WEE discarded in Extremadura. Source: Author's elaboration based on INE (2020)

the point of origin of the waste, regardless of where it is located in Extremadura even though Extremadura is constituted by the two largest provinces in all of Spain.

To date, in terms of the services they offer, the collection of electronic waste is carried out through a network of 200 micro greenspots, located in associated centres and establishments, reaching the most central and also the most remote towns of the whole of Extremadura. The objective of this service is that anyone can take their electronic waste to a place close to their home. Even if they live in a remote area, La Hormiga Verde is committed to travel to collect it.

Thus, they manage to reach the end consumer of the products they recycle—households, including the most remote—and enter the family environment through the schools attended by the young.

La Hormiga Verde works with different SCRAPs (Spanish acronym for Collective Systems of Extended Producer Responsibility) such as non-profit organizations dedicated to the collection of used packaging and waste from electrical and electronic equipment for their recovery. Among them, it collaborates with Recyclia, Ecolec, Tragatoner (toner and printer cartridges), Ecopilas (batteries), and Ecolum (lighting and lamps), establishing alliances to achieve synergies in the logistics of collecting materials.

La Hormiga Verde's dissemination of its environmental work is essential to the success of its activity. Communication highlights key elements of social marketing (such as education), and, although today its communication lacks adequate strategic planning, it is essential for the creation of environmental awareness in the long term.

The company's management personnel are clear that the objective to be pursued is to make the population aware of the need to dispose of electronic waste in a correct and sustainable way. The development of the market may depend on communication

of this goal. However, raising public awareness is a long and costly path, especially for organizations with limited resources and when the sector does not make any great effort in this regard.

To achieve this objective, the main purpose of its communication is education, and this is done through free talks given by company managers in educational centres and, in addition, through guidance and instruction about recycling given to their own clients. Therefore, the strategy is eminently educational, based on information, the modification of everyday attitudes (such as the disposal of any type of waste and its subsequent recycling) so that the social actors involved know what types of electronic waste can be recycled. With this, La Hormiga Verde intends to create new behaviour in different stakeholder and social groups, especially the younger ones, as well as to contribute to the company’s objective—to be an SEC that addresses educating in social values, whether environmental or the integration of disabled persons.

5.3 La Hormiga Verde’s Economic Sustainability and Creation of Economic Value

This section explains how La Hormiga Verde generates economic value as it is a private for-profit company. The aspects highlighted in the analysis model (Table 2) are explained for this section. The main areas related to the economic field corresponding to the organization are discussed, analysing the key resources and activities that define its competitive capacity, assessing its growth capacity, logistics capacity, and marketing strategies, and highlighting its way of obtaining economic profitability and its control mechanisms.

In this line, La Hormiga Verde does not differ from other for-profit companies. Thus, its results must be sufficient to guarantee the survival of the company and meet the expectations of its ownership partners, as well as its growth objectives. It is therefore essential to cover all costs, mainly labour, on which its business model as an SEC is based. This leads to a management system based on control for the proper consolidation of its accounts.

5.3.1 Key Resources and Activities That Define the Business Model

The business idea was based on the fact that there was a little exploited market that could be accessed. The initial figures for this market were 14,000 tons per year of WEEE in Extremadura, of which 5000 tons were being handled by the competition. This left La Hormiga Verde with a great margin of action.

La Hormiga Verde’s business model differs from that of the competition principally in two aspects:

- Recycling is usually done in two ways: paying for the materials, which is what waste management companies do (for example, large scrap metal dealers), as well as some other company in Extremadura, or charging for its pick-up, as is the case of the main and most direct competitor of La Hormiga Verde. Instead, La Hormiga Verde neither pays nor charges for the pick-up of materials.
- The other aspect that distinguishes its business model is that it is mainly dedicated to the withdrawal of WEEE from homes, without renouncing that from institutions, public administrations, and companies. This is completed with the idea of carrying out a fast and efficient WEEE collection service covering anywhere in the Extremadura region.

The problem with this business model is twofold. One is that a solution must be found as to how to get the waste materials to the company, that is, how to convince Extremadura households to hand over their electronic waste. The second problem is what to do with these materials once they have been disassembled, that is, to whom to sell them. It should be taken into account that a priority for La Hormiga Verde is that no material ends up in a landfill or thrown away, as this is one of the three design principles of the Circular Economy according to McDonough and Braungart (2002).

As it is a growing company, it not only has to develop new and more precise activities economically speaking, but it also has to obtain greater knowledge of its environment and of the activity it carries out in order to improve its processes and look for solutions to the problems that arise. In this sense, the organization has two raw material suppliers: households (families) and institutions (especially other companies, administrations, and educational centres). But, a priori, it lacks the discourse and the effective means to reach those potential suppliers on a large scale.

Beyond these ideas, for correctly making use of the market (especially reaching households), strong actions of promotion and awareness are required, which would need heavy investment. In this sense, the lack of competition leads to the lack of investment in awareness campaigns. There is less need to carry them out since the growing environmental awareness of the population means that there is enough volume of WEEE to keep La Hormiga Verde supplied and for it to achieve growth, without its having to make financial efforts that could put it at the limit of its resources. However, in as far as it is able, La Hormiga Verde makes an effort to raise awareness and provide important information given the few means it has available.

In terms of logistics, the resources they use are their own vehicles and the economic optimization of the routes for the periodic collection of the waste from the recycling points or “clean-points” scattered throughout the remotest places in the region. These clean-points are established by La Hormiga Verde after prior agreement with the corresponding institution, almost always a public place. These localized places are where families can leave their electronic waste. It should be noted that economic optimization is almost always contingent on speed of service. It should be taken into account that Extremadura is a region in Spain with around one million inhabitants and an area of 41,634 km². The wide dispersion and the low population density condition the resources that need to be invested to guarantee good service.



Fig. 3 Process followed by materials in La Hormiga Verde. Source: Author’s elaboration

5.3.2 Reception, Treatment, and Sales Operations

Once the WEEE has been retrieved from its collection points, the first phase consists of weighing and classification. This is followed by manual disassembly, taking advantage of more than 95% of the waste. The resulting parts and components are classified again, accumulated, and valued. The third phase consists of sale of the resulting materials. The process followed by the materials in La Hormiga Verde is described in Fig. 3.

Thus, the company is opening a new line of business focused on the reuse of equipment after it has been repaired, which is termed PTR (Prepare to Reuse), that is, to revalue and reuse it. This is one of the six principles of the new Circular Economy strategy: reuse, reduce, recycle, redesign, remanufacture, and repair the products, by-products, and services used (Ludeke-Freund et al. 2019). These products are sold to companies that can in turn sell them directly or through sales platforms. The company is dedicating resources to reuse as well. Some of the best-selling reused products are computer equipment, metal cabinets, PC fans, etc.

In the constant search for new knowledge, the management seeks solutions for dismantled materials that have no known reuse, for example, conducting some tests for the application of plastic waste crushed and mixed with concrete to use in flooring. In this line, their last and most important challenge in innovation and search for solutions to the problems of their activity is to find a feasible solution for their own plastic waste generated in their electronic waste management processes, in order not to discard it in landfills. In this sense, the company has launched an ideas contest for the entire population (“Enterprising with plastic has a reward”) (La Hormiga Verde 2020b).

5.3.3 Communication and Marketing

In La Hormiga Verde’s business model, we must point to and highlight its promotion and communications policy, not because of the resources and planning dedicated to it, but because it has naturally become the main link between its business and social profiles. Taking into account that the company is of recent creation, it still does not have a clear marketing and communication structure, a strategic plan, an assigned budget, or any control systems for these purposes.

Its main communication action consists of a school contest that brings the world of electronic recycling closer to the youngest population, the under-16s, thus carrying out an educational task that involves families as a whole, and allows the children to be the ones who press their families into taking the waste to the clean-point at their

school. Thanks to the contest, the company is managing to raise awareness in the nearest rural environment of the importance of caring for the environment by getting rid of the electronic waste that has accumulated in homes. The educational objective of the contest is for the pupils to get to know everything related to the recycling of WEEE as an example of the Circular Economy. Hand in hand with the contest, La Hormiga Verde offers talks in the schools in which the problem of sustainability is addressed, so as to convey to the pupils the importance of a production model aimed at preventing the generation of waste, and how we can take advantage of the materials they contain so as to avoid the depletion of finite natural resources.

The means of dissemination that will allow the company to get in touch with the public are eminently digital, for a cost reason. Currently, the company has a strategy to disseminate its online activity that is focused on two Web sites (www.lahormigaverde.org and <http://www.concursolahormigaverde.org/>) and a corporate page on Facebook (La Hormiga Verde Centro Especial de Empleo).

The corporate profile they have on Facebook disseminates the company's work and updates the information related to the contest. Hashtags such as the Spanish language versions of #CircularEconomy, #SocialEconomy, #Sustainability, and #recycling are frequently used which position the company as an organization concerned with the environment, the circular economy, and the social economy. In this way, the company is able to promote interaction, build a brand, and meet an interesting potential audience, directly accessing the young population between the ages of 18 and 35.

5.3.4 Revenue and Costs

La Hormiga Verde's revenue, as we have noted, comes from the sale of the different materials extracted from the electronic waste—metals, electronic material, plastics, components. . . These materials are supplied to companies who reintroduce them into the market. Operating expenses (personnel, equipment, supplies, financing, etc.) must be subtracted from this revenue generated by the sale of materials. Economic income has grown sixfold in the last year (La Hormiga Verde 2020a).

As already mentioned, the resources available to La Hormiga Verde are limited and the funding is largely its own. It seeks to self-finance from its activity, and has received numerous subsidies for aid to Special Employment Centres and for recycling activities.

This WEEE management model as an SEC is replicable and also extensible to other areas. The employment of disabled personnel suitable for the activity carried out has allowed the firm to gradually increase its processes, generate new products, and thus increase constant hiring. The company reinvests the profits in more services and improvements, as its commitment is to create the maximum quality employment among the disabled because it believes in cooperation and being very proactive in the execution of its project.

The main obstacles are usually of a bureaucratic nature since it is an activity not clearly recognized in any sector of those laid out by the public administration. This

has harmed them on numerous occasions by adding further obstacles to those of a legal and legislative nature that are normal in their lines of business.

6 The Keys of La Hormiga Verde’s Success

In synthesis, this model generates benefits to help society since it solves a social problem (the integration of disability and its visibility as an SEC) and another environmental problem, also contributing to the reuse of waste and its re-incorporation into the chain of production.

6.1 The Social Impact

At the environmental level, the social impact of La Hormiga Verde is closely related to the educational work it is doing in schools, educational institutions, and wherever it is required, by means of talks about WEEE, the environment, and the Circular Economy. An important contribution is the contest that they organize in the different primary and secondary schools. This social impact can also be seen in the results of their communication through social networks.

On another extremely important level from the point of view of social impact, La Hormiga Verde does a commendable job in incorporating disabled people into the workplace. According to Romeo et al. (2020), these people are committed to the company and its values. Thanks to this employment, they have financial independence and a life of their own. The disabled people who work at La Hormiga Verde do a very professional job, gaining in self-esteem and working as a team into which they quickly integrate since the processes are especially designed to be carried out by this group of persons.

Finally, an indirect social impact comes from the fact of the significance of entrepreneurship in a region such as Extremadura, which has one of the lowest per capita incomes in Spain, and suffers from a constant flight of young talent. In addition is the fact that it is a company located in a rural area that has been suffering from a notable exodus demographically and economically. La Hormiga Verde thus contributes to the improvement of the rural world by promoting internal solidarity as an SEC and by making an important commitment to local development, as highlighted by Vilar Sáez (2018).

6.2 The Economic Impact

The best demonstration of its innovative entrepreneurial capacity is that it has been recognized by different institutions in the form of awards. In October 2018, it

received the EMPRENDE24 CIRCULAR award for the “Best Business Idea in the Green and Circular Economy” awarded by Acción Contra El Hambre in Extremadura. It has also received awards at the Extremadura Empresarial Awards 2019 (Finalist in Best Social Company), Demolab Maker Awards (Project of Greatest Projection), and Demolab Maker Awards (Best Project Aligned with the Green and Circular Economy).

The company carries out very professional management, and the management team forms an interesting tandem that enables decision-making to be analytical as well as intuitive and creative.

The economic activity is profitable, which encourages growth in both market penetration and expansion. In a short time, it has managed to be regarded as a benchmark in the region and has consolidated its business.

Finally, there are numerous growth possibilities that La Hormiga Verde is discovering day by day. This will mean new business and employment opportunities, which will lead them into the difficult terrain of having to make strategic decisions to get the path and purpose right without giving up being an SEC as a hallmark. What is certain is that, whatever economic decision they make, they will always prioritize its effect on the creation of social value.

6.3 Synergies: The Fourth Sector Economy

Finally, it is worth talking about the synergistic effect between social and economic impact. Thus, on the one hand, the contribution of La Hormiga Verde to the Circular Economy is remarkable since they are constantly looking for solutions for the recycling of any material, with new applications in different industries. They do this in an intuitive and resource-poor way, but also with enthusiasm, professionalism, and contacts.

In addition, as a result of its activity, La Hormiga Verde shows care for the effects of its actions by obtaining a “Quantified Certificate of Corporate Social Responsibility” by which it quantifies the effects of the electronic waste it receives from its institutional suppliers in aspects such as CO₂ emissions, electrical energy saved, and, something which is very important, work hours generated for its disabled staff. Thus, and in accordance with Etilé and Teyssier (2016), CSR must be incorporated into brand building strategies through third-party certification, which endows the brand with a real value rather than just an estimated value.

Finally, the economic results will be those that can prolong this activity over time. But, on the other hand, as if it were a vicious circle, its social activity as an SEC at the service of the circular economy positions the firm strategically, providing it with a promising future since it has been able to integrate disabled persons as agents of social change, with the important repercussions that this has in the global, and therefore local, context.

Table 3 presents an X-ray picture of the social value that La Hormiga Verde provides. The presentation is divided into the three action planes to be taken into

Table 3 Radiography of La Hormiga Verde's social value

Management of social value		
Action planes	<i>Social Integration</i> Special Employment Centre	<i>Environmental Care</i> WEEE management
Strategic plane (vision)	Be a recognized Special Employment Centre within the Fourth Sector This vision is framed in the context of Objective 12 of the United Nations (2020) in the section referring to the generation of stable jobs	Understand that recycling WEEE is a way to fight pollution and electronic waste This vision is framed in the context of Objective 12 of the United Nations (2020) in the section referring to the fact that consumption and production should be sustainable, and therefore that one should work to do more and better things with fewer resources
Tactical plane (mission)	We delimit social need at geographical, quantitative, and qualitative levels. Quantitatively: the employment of disabled persons increases Qualitatively: employment is improved, and helps to solve the problem of social exclusion of the disabled by improving their conditions and quality of life	We delimit social need at geographical, quantitative, and qualitative levels Quantitatively: solve part of the WEEE problem in the local environment, reaching the remotest places Qualitatively: offering WEEE recycling solutions directly to households and facilitating for them the task of recycling. Thus, the company's mission is clearly reflected in its positioning itself to be the company that reaches everyone easily and helps solve their specific problem, whether they are a home or a business
Application plane (business project)	Agents involved and geographical context: disabled people, and institutions and society in general in the Extremadura region It is a project framed in the social and circular economy, sustainable and expandable, which includes disabled people as agents of change	Agents involved and geographical context: partnerships and associations with public institutions and schools in Extremadura. The strategy is for the service to reach everyone and to enter the household context through the youngest part of the population
	Strategic orientations and principles of action in the design of specific policies: Company oriented to human resources, seeking for 99% of the work to be carried out by disabled people, although the obligation for it as an SEC is only 70% of its workforce	Strategic orientations and principles of action in the design of specific policies Company oriented to products and services WEEE collection through setting up micro greenspots Also attending to the demand for free warehouse cleaning Search for new solutions to the waste that it collects

(continued)

Table 3 (continued)

Management of social value		
Action planes	<i>Social Integration</i> Special Employment Centre	<i>Environmental Care</i> WEEE management
	Strategic orientations and principles of action in the design of specific policies: Company oriented to making its values compatible with the emotional and economic well-being of its employees	Strategic orientations and principles of action in the design of specific policies: Company oriented to suppliers and customers—institutions and organizations with which they have an agreement, educational centres, and places of installation of micro greenspots Customers to whom they sell the recycled raw materials
	Strategic orientations and principles of action in the design of specific policies: Company oriented to guaranteeing jobs, looking for compatibility with its financial results	Strategic orientations and principles of action in the design of specific policies: Company oriented to distribution The company has a network of micro greenspots, which act as suppliers and clients, where it collects waste free of charge. Moreover, it invoices and delivers orders to its customers through another distribution network
		Strategic orientations and principles of action in the design of specific policies: Company oriented to resources and costs The resources are limited and the financing is to a large extent its own, coming from its activity and from aid to Special Employment Centres Its cost policy is restrictive, taking advantage of recycling to solve furnishing needs, for example Although it operates in a rigid environment in terms of decision making and legal limits and gaps, it also reinvests its profits in the business
		Strategic orientations and principles of action in the design of specific policies: Company oriented towards promotion and communication: Design of actions: contests and formal communication channels, website, and Facebook

Source: Author’s elaboration

account for any organization that wants to replicate this model: the strategic plane, which represents its vision and therefore its path of action; the tactical plane, which is specified in the medium and short term missions; and the operational plane, which is defined through the business project to be developed by the application of specific policies.

Finally, it should be noted that the business is in the growth and consolidation phase, facing a series of weaknesses, threats, and, above all, major challenges and opportunities. Among the main weaknesses are the paucity of invested resources, its only very recent trajectory, and the lack of qualified personnel which means that key activities such as communication are not managed by experts.

Thus, it also faces a series of threats that are centred on the insufficient awareness of the population regarding recycling, dependence on the evolution of the very volatile markets for raw materials such as copper, gold, and platinum, for example. La Hormiga Verde’s billing will depend in part on the prices set in those markets.

However, the strengths it has are important given that it enjoys a strategic position based on the circular economy and making recycling easy for households no matter how far away they are. It is also a strength to have integrated the business model within the format of an SEC, which improves social awareness towards the disabled who, thanks to the recycling work of La Hormiga Verde, have a better life and are considered agents of social change. This fact encourages the firm’s signing of collaboration agreements with public entities, such as regional governments and educational institutions, and also encourages families to collaborate with education centres to achieve a greater amount of WEEE recycled, and also contribute to a good social purpose by promoting a type of employment that has had little protection. Finally, their strong point is also in offering a solution to a global problem through local action (in a regional environment), and in that they depend on themselves to take advantage of any opportunities that arise, given the scarce competition they have, increased awareness with regard to disability, the natural expansion of their market, and legislation favouring recycling.

7 Conclusions

The case of La Hormiga Verde clearly solves a need already expressed by Rubio-Mozos et al. (2019), and responds, as does that previous study, to two important challenges. One is the urgent need to modify the current economic model with metrics aligned with the characteristics of companies oriented to the United Nations Agenda (2030). And the other is the design of new business models which, within what the aforementioned authors call an “ecosystem of participation”, allow companies in the Fourth Sector to make real contributions with their business models to get closer to the seventeen Sustainable Development Goals for 2030 proposed by the UN in 2015.

Some of the particular aspects that make La Hormiga Verde as an SEC stand out as a case of entrepreneurship within the Fourth Sector and in the regional ecosystem,

and that endow it with originality, and whose contributions might be very interesting for business management in this sector, are centred on the form of generating synergies between the creation of social (labour and environmental) and economic value. Thus, La Hormiga Verde combines in a single case the characteristics described by Zurbano et al. (2012) for the Fourth Sector, since it is a company that does business socially, is itself inclusive in its integration of disabled persons, promotes the sustainable management of WEEE, has opted for a circular economy model, and fosters the preservation of the environment.

La Hormiga Verde is also a case of economic and social value creation in a developing region, helping to increase the entrepreneurial projection of Extremadura and of the company itself by offering an unprecedented solution to a global problem from actions at the scale of its own region. According to Zhu et al. (2017), the environmentally friendly handling and efficient recycling of WEEE have become a social issue globally. Initiatives such as this are milestones for regional progress, also contributing to the advancement of society and the conservation of the planet. This gives the company a dimension that surpasses its own geographic scope, since its model as constructed can be replicated anywhere. Thus, it can be said that a very important aspect of this business model is that La Hormiga Verde does not provide a local solution to a global problem, but rather the contrary—its model is replicable in other areas, and therefore contributes a solution to a global problem from a local action.

Another aspect that La Hormiga Verde resolves in its business model is that it responds to the challenge proposed by Zhu et al. (2017) by going directly to the final consumers of electronic devices, including to households as the smallest dimension core where WEEE accumulates. Those authors explain that consumers have a significant effect on the WEEE recycling process, and that greater attention paid to the influence of consumer behaviour on the recycling process could help achieve more effective results.

La Hormiga Verde is also a paradigmatic case within the Fourth Sector as regards its creation of social value. This is because it helps the employability of disabled persons by integrating them into the ordinary, rather than necessarily protected, job environment (González 2020). This may lead to improvement in the existing knowledge about disability, taking advantage of the extra motivation of these people who have become an active population without any of the previous stigmas deriving from belonging to an organization related to disability (Romeo et al. 2020).

La Hormiga Verde's circular business model guarantees economic viability and the creation of economic value. It allows discarded products and materials to be in use for as long as possible (by processing all the materials the firm receive as raw materials, thus tending towards zero waste), protecting the economy against the scarcity of resources and the concomitant increase in the costs of raw material (since the firm recycles what nobody wants, at no cost to the user), obtaining the maximum value from those materials and improving circular waste management practices (Braun et al. 2018).

This circular business model leads to the offer of new business opportunities for manufacturing industries and contributes to sustainable business growth. Thus, in

line with the Sustainable Development Goals (United Nations 2020), the development of its economic activity in a sector of priority action for the European Union places the company in an exemplary position for others to emulate, both in its nearby environment and further afield, showing that financial viability is not incompatible with sustainable social and environmental development.

However, despite the obvious social, economic, and environmental benefits of La Hormiga Verde, according to Rubio-Mozos et al. (2019) it is necessary to demonstrate progress with results, which may be done by means of certifications based on a more reliable and precise system of indicators of social and environmental benefits. This would undoubtedly help the company to improve its management and to become more transparent in its activities.

Finally, La Hormiga Verde contributes beneficially to sustainability by collaborating with different institutions (schools, institutes, and other public administrations) in training about recycling in talks and visits. The company has based its communications policy on education, taking advantage of the powerful resource represented by entering society through its younger generations, who are more flexible to environmental awareness, to change of habits (Mallick and Bajpai 2019), and to social awareness (Afuape 2016) related to diversity. Gaining the trust of young people allows adults to be reached by inverse example—in this case, from young people to adults (Casey et al. 2019).

In addition, the main source the firm uses to spread awareness is education through the competitions it organizes in schools to see who is able to recycle more kilograms of WEEE. The results of these competitions are very satisfactory from a social marketing perspective (Stafford and Brain 2017) since there is intelligent integration of a social marketing action (the organization of a competition) with the productive activity itself (the acquisition of raw materials in the form of kilograms of WEEE). Thus, it not only converts an isolated marketing action into the means of developing a part of its activity (the acquisition of raw materials), but it also achieves value for its brand since its strategy is based on transmitting the social values that it fosters in its own staff of disabled persons, such as camaraderie, team work, and the ability to share achievements, outwards to the case of the prize in the competition, since it is the winning school that gets the award, with the spotlight not on individualities but on the collective, which is where the strength of society and La Hormiga Verde lies.

As a coda, in sum we might state that La Hormiga Verde is sowing seeds for the future through involvement of the younger community, promoting values such as respect for the environment, the fight against climate change, and the generation of job opportunities in favourable conditions for persons with disabilities. This is done with a vocation for service and expectations for the future, and always with a clear social character, offering an innovative, dynamic, and flexible model that can be replicated within the Fourth Sector.

Acknowledgements



Unión Europea

European Regional Development Fund
"A way of making Europe".

JUNTA DE EXTREMADURA

Consejería de Economía, Ciencia y Agenda Digital

References

- Afuape, T. (2016). Beyond awareness of 'difference' and towards social action: 'Solidarity practice' alongside young people. *Clinical Child Psychology and Psychiatry*, 21(3), 402–415.
- Atadi Empleo. (2018). Análisis del retorno social y socioeconómico de Atadi Empleo mediante la aplicación de la metodología SROI (Retorno Social de las Inversiones). Informe de resultados. https://www.atadi.org/wp-content/uploads/informe_final_sroi_atadi_empleo_actualizacion_dic_2018.pdf.
- Bahers, J. B., & Kim, J. (2018). Regional approach of waste electrical and electronic equipment (WEEE) management in France. *Resources, Conservation and Recycling*, 129, 45–55.
- Batista, L., Bourlakis, M., Smart, P., & Maull, R. (2018). In search of a circular supply chain archetypes content-analysis-based literature review. *Production Planning & Control*, 29(6), 438–451.
- Bengoetxea, A. (2014). Economía social e inserción laboral de las personas con discapacidad. *Revista Vasca de Administración Pública*, 99–100, 529–547.
- Braun, A., Kleine-Moellhoff, P., Reichenberger, V., & Seiter, S. (2018). Case study analysing potentials to improve material efficiency in manufacturing supply chains, considering circular economy aspects. *Sustainability*, 10(3), 880.
- Bressanelli, G., Saccani, N., Pigosso, D. C., & Perona, M. (2020). Circular economy in the WEEE industry: A systematic literature review and a research agenda. *Sustainable Production and Consumption*. <https://doi.org/10.1016/j.spc.2020.05.007>
- Casey, K., Lichrou, M., & Fitzpatrick, C. (2019). Treasured trash? A consumer perspective on small Waste Electrical and Electronic Equipment (WEEE) divestment in Ireland. *Resources, Conservation and Recycling*, 145, 179–189.
- Dacasa, E. (2017). Sobre la ética y la responsabilidad social empresarial. *Revista Académica*, 14 (29), 43–92.
- Ecoembes. (2020). La economía circular en España. <https://www.ecoembes.com>.
- Etilé, F., & Teyssier, S. (2016). Signaling corporate social responsibility: Third-party certification versus brands. *The Scandinavian Journal of Economics*, 118(3), 397–432.
- Farooque, M., Zhang, A., Thurer, M., Qu, T., & Huisingh, D. (2019). Circular supply chain management: A definition and structured literature review. *Journal of Cleaner Production*, 228, 882–900.
- Fourth Sector Network Concept Working Group. (2009). *The emerging fourth sector (Fourth Sector Network)*. Washington, DC: Aspen Institute.
- Gelashvili, V., et al. (2016). Análisis económico-financiero de los centros especiales de empleo de España. *Revista Española de Discapacidad*, 4(2), 7–24.
- Gimenez Rodriguez, S. (2012). *Sinergias en tiempos de crisis: los centros especiales de ocupación*. Barcelona: Universitat Rovira i Virgili, Publicacions URV.

- Gonda, L., D’Ans, P., & Degrez, M. (2019). A comparative assessment of WEEE collection in an urban and rural context: Case study on desktop computers in Belgium. *Resources, Conservation and Recycling*, 142, 131–142.
- González, A. R. (2020). Cooperativa-centro especial de empleo como forma jurídica de empresa para la inserción laboral (Análisis a partir de un caso). *CIRIEC-España, revista jurídica de economía social y cooperativa*, (36), 93–130.
- Haigh, N., & Hoffman, A. J. (2012, July). The new heretics: Hybrid organizations and the changing face of corporate sustainability. In *Academy of management proceedings* (Vol. 2012, No. 1, p. 13993). Briarcliff Manor, NY: Academy of Management.
- INE. (2020). *Instituto Nacional de Estadística (Spain)*. <https://www.ine.es/en/index.htm>.
- Kaya, M. (2018). Current WEEE recycling solutions. In *Waste electrical and electronic equipment recycling* (pp. 33–93). Woodhead.
- Lahane, S., Kant, R., & Shankar, R. (2020). Circular supply chain management: A state-of-art review and future opportunities. *Journal of Cleaner Production*, 258, 1–16. <https://doi.org/10.1016/j.jclepro.2020.120859>.
- La Hormiga Verde. (2020a). Memoria Anual de La Hormiga Verde. 2019.
- La Hormiga Verde. (2020b). www.lahormigaverde.org.
- Ludeke-Freund, F., Gold, S., & Bocken, N. M. (2019). A review and typology of circular economy business model patterns. *Journal of Industrial Ecology*, 23(1), 36–61.
- Mallick, R., & Bajpai, S. P. (2019). Impact of social media on environmental awareness. In *Environmental awareness and the role of social media* (pp. 140–149). IGI Global.
- McDonough, W., & Braungart, M. (2002). *Cradle to cradle: Remaking the way we make things*. New York: North Point Press.
- MITECO. (2020). Economía circular en La Comisión Europea. <https://www.miteco.gob.es/>.
- Monge, E. (2010). El Estudio de Casos como Metodología de Investigación y su importancia en la dirección y Administración de Empresas. *Revista Nacional de administración*, 1(2), 31–54.
- Morales Gutiérrez, A. (2009). *Innovación Social: un ámbito de interés para los servicios sociales*. Seminario sobre Innovación Social en el ámbito de los Servicios Sociales, Documento Marco.
- ODISMET. (2020). *Informe general. La situación de las personas con discapacidad en el mercado laboral*. Madrid: Fundación ONCE. Available at <https://www.odismet.es/informes-publicaciones> (último acceso 07/10/2020).
- Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2015). *Value proposition design*. Campus.
- Pérez Serrano, G. (1994). *Investigación cualitativa. Retos, interrogantes y métodos*. España, La Muralla.
- Romeo, M., Yepes-Baldó, M., & Lins, C. (2020). Job satisfaction and turnover intention among people with disabilities working in special employment centers: The moderation effect of organizational commitment. *Frontiers in Psychology*, 11, 1035. <https://doi.org/10.3389/fpsyg.2020.01035>.
- Rubio-Mozos, E., García-Muiña, F. E., & Fuentes-Moraleda, L. (2019). Rethinking 21st-century businesses: An approach to fourth sector SMEs in their transition to a sustainable model committed to SDGs. *Sustainability*, 11(20), 5569.
- Sehnm, S., Jabbour, C. J. C., Pereira, S. C. F., & de Sousa Jabbour, A. B. L. (2019). Improving sustainable supply chains performance through operational excellence: Circular economy approach. *Resources, Conservation & Recycling*, 149, 236–248.
- Stafford, E. R., & Brain, R. G. (2017). The inconvenient youth: Exploring how high school teens voluntarily influence (pester?) others on confronting air pollution via a clean air poster contest. *Sustainability: The Journal of Record*, 10(6), 340–351.
- Stake, R. E. (2005). *Investigación con estudio de casos*. Madrid: Morata.
- United Nations. (2020). *Sustainable development goals*. <https://www.un.org/sustainabledevelopment/>.
- Valls, R., & Peña, A. (2015). Informe FEAPS: “El sobreesfuerzo económico que la discapacidad intelectual o del desarrollo ocasiona en la familia en España 2014”. FEAPS.
- Vilar Sáez, A. (2018). The social economy: Analysis of the economic and financial profitability of integration enterprises and special employment centers.

- Yin, R. (1994). *Case study research: Design and methods*. Thousand Oaks, CA: Sage.
- Yin, R. K. (2009). *Case study research*. London: Sage.
- Zhu, X., Wang, J., & Tang, J. (2017). Recycling pricing and coordination of WEEE dual-channel closed-loop supply chain considering consumers' bargaining. *International Journal of Environmental Research and Public Health*, *14*(12), 1578.
- Zurbano, M., Henry, G., & Urzelai, A. (2012). *El Cuarto Sector en Euskadi*. Bizkaia: Innobasque.