

PlastiCircle: Improvement of the plastic packaging waste chain from a circular economy approach

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PlastiCircle Deliverable

D7.5 SOCIAL LIFE CYCLE ASSESSMENT

(ITENE)

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Abstract

This deliverable provides information on social impact of plastic packaging waste management. In the scope of the analysis cities of Valencia (Spain), Utrecht (Netherlands) and Alba Iulia (Romania) have been studied. Also, a European approach is shown in which an extrapolation of the results of the three cities have been done to see the approximate situation in Europe. Social impacts before and after the pilots have been evaluated using PlastiCircle measurement tools.

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Publishable summary

PlastiCircle aims to develop and implement a holistic process to increase recycling rates of household packaging waste in Europe. This will allow to reprocess plastic waste in the same value chain (i.e. Circular economy; closure of plastic loop). This process is based on four axes: collection (to increase quantity of packaging collected), transport (to reduce costs and fuel use of recovered plastic), sorting (to increase quality of recovered plastic), and valorisation in value-added products (i.e. foam boards, automotive parts like engine covers/bumpers/dashboards, bituminous roofing membranes, garbage bags, asphalt sheets/roofing felts and urban furniture like fences/benches/protection walls).

This deliverable presents SLCA results for the waste management systems in Valencia (Spain), Utrecht (Netherlands) and Alba Iulia (Romania). Moreover, an extrapolation of the results has been calculated to show the results on the European level.

1. Introduction

The final objective of this task is to carry out a social comparative between current management of household plastic packaging waste and the potential management by using the PlastiCircle concept. D7.5 is based on the results of T7.4. It is based on a social LCA comparing the situation on the three cities and in Europe in general before and after PlastiCircle pilots. D7.5 is the basis for T7.5.

S-LCAs are surely as important as environmental ones. One core issue with S-LCA is keeping consistency among the standards between studies. Even if standards can eventually become more or less similar in criteria, differences among studies will always occur. Generally, practitioners of S-LCA will need to incorporate a large share of qualitative data, since numeric information will be less capable of addressing the issues at hand. When numeric data is useful—for example, in assessing the wages of a particular enterprise—additional data will still be needed to address its meaning: compliance with minimum wage laws does not always mean the wages are livable. Often, data may have to be collected on the spot, since databases for specific social and socio-economic impacts are at a minimum.¹

As one might guess, the current limitations of S-LCA are many. They can be expensive, if extensive data gathering is required. They are challenging to conduct because qualitative data is often subjective and therefore must be handled by capable experts. As with environmental LCAs (E-LCA), the ripple effects in the life cycle of the product are difficult to determine. It is hard to see where the effects of social interaction finally diminish. Since the scope of the studies is quite large, it is impossible to truly assess the entire life cycle.

Two tools have been developed to assess parts of this framework. The most famous is Environmental Life Cycle Assessment (E-LCA), a very popular tool used to provide information on the externalities and internalities for the planet. In other words, it is mainly looking at the impacts on the natural environment of economic activities and, to a minor extent, impacts on human health and natural resources.

A rather new tool is Life Cycle Costing (LCC). This tool is primarily focused on the direct costs and benefits from economic activities for “people, planet and profit or prosperity.”

Until now, no commonly accepted methodology for assessing internalities and externalities of the production of goods and services for “people” and “profit/prosperity” was available. That is precisely what the assessment presented wants to deliver on the basis of the most current and state of the art methodological developments it formulates guidelines on how to assess a product based on social and socio-economic indicators. By doing so, it is complementing the E-LCA and the LCC in contributing to the full assessment of goods and services within the context of sustainable development. In the text, social LCA will be used as a synonym for social and socio-economic LCA and S-LCA will be used as an acronym.

¹ UNEP / SETAC, 2009

A social and socio-economic Life Cycle Assessment (S-LCA) is a social impact (and potential impact) assessment technique that aims to assess the social and socio-economic aspects of products and their potential positive and negative impacts along their life cycle encompassing extraction and processing of raw materials; manufacturing; distribution; use; re-use; maintenance; recycling; and final disposal. S-LCA complements E-LCA with social and socio-economic aspects. It can either be applied on its own or in combination with E-LCA.

S-LCA assesses social and socio-economic impacts found along the life cycle (supply chain, including the use phase and disposal) with generic and site-specific data. It differs from other social impacts assessment techniques by its objects: products and services, and its scope: the entire life cycle. Social and socioeconomic aspects assessed in S-LCA are those that may directly affect stakeholders positively or negatively during the life cycle of a product. They may be linked to the behaviors of enterprises, to socio-economic processes, or to impacts on social capital. Depending on the scope of the study, indirect impacts on stakeholders may also be considered.²

S-LCA does not have the goal nor pretends to provide information on the question of whether a product should be produced or not. S-LCA documents the product utility but does not have the ability nor the function to inform decision making at that level. It is correct that information on the social conditions of production, use and disposal may provide elements for thoughts on the topic, but will, in itself, seldom be a sufficient basis for decision.

In theory, S-LCA may be conducted on any products, even those that are knowingly harmful to society (e.g. weapons). It is recommended to use S-LCA ethically and it is assumed that peer review will prevent using the methodology inappropriately. Socially responsible investing firms often provide lists of product categories being excluded for ethical reasons. If the product category studied is listed, it is recommended to detail, in the goal and scope phase of the study, the reason why it is ethical and reasonable to conduct a S-LCA of this particular product. Documentation of the product utility and assessment of the use phase of the life cycle will also generally reflect the unethical or harmful nature of the product.

S-LCA is a technique that helps inform incremental improvements but does not in itself provide a breakthrough solution for sustainable consumption and sustainable living. Those topics go well beyond the scope of the tool.

S-LCA provides information on social and socio-economic aspects for decision making, instigating dialogue on the social and socio-economic aspects of production and consumption, in the prospect to improve performance of organizations and ultimately the well-being of stakeholders.

² UNEP / SETAC, 2009

1.1. Goal and Scope

The objective of this report is to make a social comparison of the current management of plastic packaging waste compared to the potential results in waste management of plastic packaging after pilots of PlastiCircle project. The ultimate objective is to know if the perception of people improves with the new waste management system offered by PlastiCircle.

In this way, the objective is in the same line as those established in the study of environmental life cycle (ELCA) and economic (LLC) analysis, using, in this case, the methodology proposed by Guidelines for Social Life Cycle Assessment of Products "(UNEP / SETAC, 2009).

The intended application of a S-LCA is to identify social "hotspots" and the options for reducing the potential negative impacts and risks through waste management using PlastiCircle model.

The scope of this report will be focused on the part of collection of household plastic packaging waste.

1.1.1. Functional Unit

The functional unit is to collect and manage 1000 kg of plastic packaging waste.

1.1.2. Selection of Stakeholders and Subcategories

Three stakeholders have been selected for this analysis:

- Consumers: As the final users of PlastiCircle system (citizens). The specific questionnaires for citizens have been done before and after the pilots in each city, once the people that is going to participate was identified.
- Local communities: Taking into account communities of people living in the three pilot cities.
- Society: how PlastiCircle will improve society perception of waste management.

Stakeholders	Subcategory
Consumer (citizens)	Health and safety
	Service satisfaction
	Consumer privacy
	Feedback Mechanism
	Transparency
	End of life responsibility
Local community	Health and safety living conditions
	Local Employment
	Community engagement
	Acces to inmaterial resources
Society	Public commitment to sustainability issues
	Technology development
	Contribution to economic development

Figure 1. Stakeholders and subcategories chosen for this report.

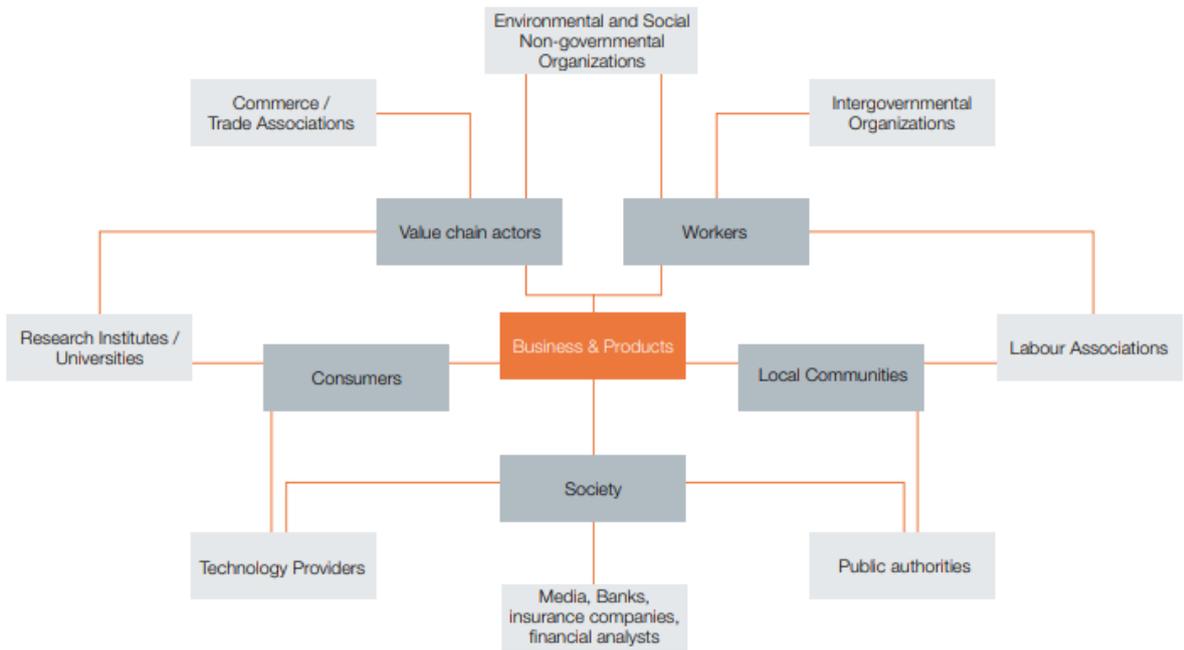


Figure 2. Hub and spoke stakeholder diagram.

1.2. Boundaries and Assumptions

S-LCA seek to minimize the uncertainty in its results, in order to provide clearer support to decision making. While it shares this orientation towards uncertainty, it has very different orientations towards the use of subjective information, and its role in reducing uncertainty in the final results.

Sometimes in S-LCA, subjective data is the most appropriate information to use. Sometimes the data that is sought (because of its empirically demonstrated relevance to social outcomes of interest) is inherently subjective, such as worker reports of their perceived degree of control over their schedules and working environment. In these cases, bypassing data on worker impressions in favour of more “objective” data (such as variability in observed worker arrival times, or other attempted proxies for perceived degree of control) would introduce greater uncertainty in the results, not less.

1.2.1. Data Inventory

Data was collected from groups of citizens, citizens associations, waste managers and municipalities (city hall workers).

Questionnaires have been completed in order to ask these groups of people questions to assess the social impact of the waste management systems in each city (Annex 1).

Questions have been prepared according to the guidelines for Social Life Cycle Assessment of products - UNEP DTIE.

Results have been included with the comparisons between the situation before and after PlastiCircle.

Table 1. List of questions of social life pre- and post-questionnaires for different stakeholders.

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions (citizens)	Questions citizens associations	Questions (waste managers)	Questions municipality	
Consumer (citizens)	Health and safety	Existence of policies in favour of consumer protection	Satisfaction of citizens regarding health and safety issues	A.1 Waste management system in my municipality ensures health and safety living conditions	B.1 Waste management system in my municipality ensures health and safety living conditions	C.1 Waste management system in my municipality ensures health and safety living conditions	D.1 Waste management system in my municipality ensures health and safety living conditions	
			Number of complaints identified regarding waste management service within 6 months period		B.2 Number of complaints identified regarding waste management service within 6 months period	C.2 Number of complaints identified regarding waste management service within 6 months period	D.2 Number of complaints identified regarding waste management service within 6 months period	
			Accomplishment of legal requirements			C.3 Which legal requirements / standards regarding environment are being accomplished (ISO 14000, EMAS...)?	D.3 Which legal requirements / standards regarding environment are being accomplished (ISO 14000, EMAS...)?	
	Service satisfaction	Level of consumer's satisfaction with the waste management service	Level of waste management system acceptability by citizens		A.2 I have access to an adequate system of waste management	B.3 Citizens have access to an adequate system of waste management	C.4 Citizens have access to an adequate system of waste management	D.4 Citizens have access to an adequate system of waste management
					A.3 I am satisfied with the recycling system of my municipality			
					A.4 I have access to an adequate system of plastic packaging waste management	B.4 Citizens have access to an adequate system of plastic packaging waste management	C.5 Citizens have access to an adequate system of plastic packaging waste management	D.5 Citizens have access to an adequate system of plastic packaging waste management
					A.5 I have regular waste collection in my area			
	Consumer privacy	Consumers personal data is well stored and managed	Number of consumer complaints related to breach of privacy or loss of data within 6 months period	A.6 I believe that my personal data and information is well stored	B.5 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	C.6 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	D.6 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	
	Feedback Mechanism	Existence of Feedback channels to support consumers queries	Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	A.7 I am able to give feedback on the system and give my opinion on different matters on the waste management field	B6. Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	C.7 Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	D.7 Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	
			Existence of consumer satisfaction questionnaires	A.8 I have access to consumers' satisfaction questionnaires	B.7 Existence of consumer satisfaction questionnaires	C.8 Existence of consumer satisfaction questionnaires	D.8 Existence of consumer satisfaction questionnaires	
	Transparency	If the organization clearly communicates its social responsibility and the aspects	Number of consumer complaints regarding transparency within 6 months period		B.8 Number of consumer complaints regarding transparency within 6 months period	C.9 Number of consumer complaints regarding transparency within 6 months period	D.9 Number of consumer complaints regarding transparency within 6 months period	
			Communication of the results of social and environmental life cycle impact assessment	A.9 I believe that waste management system in my municipality is transparent	B.9 The results of social and environmental life cycle impact assessment have been communicated	C.10 The results of social and environmental life cycle impact assessment have been communicated	D.10 The results of social and environmental life cycle impact assessment have been communicated	

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions (citizens)	Questions citizens associations	Questions (waste managers)	Questions municipality			
	End of life responsibility	If the organization communicates clearly to consumers how they should properly manage their waste	Degree of improvement of the social awareness of consumers on issues of effectiveness and efficiency of recycling	A.10 Recycling helps to conserve the environment						
				A.11 Recycling reduces the amount of waste going to landfill						
				A.12 Landfilling waste harms the environment						
				A.13 Waste incineration discourages recycling						
				A.14 I know how to separate waste according to the directives of my country						
			Do internal management systems ensure that clear information is provided to consumers on end-of-life options (if applicable)?	A.15 Transforming plastic packaging to other products is a good way to obtain valuable resources						
				A.16 I know how to separate all plastic packaging						
				A.17 Internal management systems ensure that clear information is provided to consumers on end-of-life options	B.10 Internal management systems ensure that clear information is provided to consumers on end-of-life options	C.11 Internal management systems ensure that clear information is provided to consumers on end-of-life options	D.11 Internal management systems ensure that clear information is provided to consumers on end-of-life options			
			Local community	Health and safety living conditions	Existence of policies in favour of consumer protection or consumer complaints	If the service affects the local community's health and safe living conditions (or not)	A.1 Waste management system in my municipality ensures health and safety living conditions	B.11 Waste management system in my municipality ensures health and safety living conditions		
						Pollution levels in the municipality				
Local Employment	How does the organization's role affect local employment? Evaluate if the organization hires local people	Number of new jobs created				C.12 Number of new jobs created in the last 6 months				
		Number of jobs lost during the reporting period				C.13 Number of jobs lost during the lasts 6 months				
Community engagement	Level of engagement of the community with sustainability issues	Level of awareness of citizens in waste management options		A.14 I know how to separate waste according to the directives of my country						
				A.16 I know how to separate all plastic packaging						
		A.20. Whether I recycle or not does NOT make a difference								
		A.21 Recycling is rewarding								
		A.22 Sustainability issues are relevant to our daily life								
		A.23 Recycling of plastic packaging is relevant to our daily lives								
A.24 Recycling is rewarding										

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions (citizens)	Questions citizens associations	Questions (waste managers)	Questions municipality
				A.25 I would prefer to receive individual/collective incentives for recycling			
				A.26 I believe my efforts in sorting plastic packaging have a direct benefit			
				A.27 I feel guilty if I don't recycle			
			Number of meetings with community stakeholders	A.18 I have participate in workshops and awareness campaigns and meetings on waste management	B.11 Number of meetings with community stakeholders	C.14 Number of meetings with community stakeholders	D.12 Number and quality of meetings with community stakeholders
	Access to immaterial resources	Level of organizations working to give the Community greater access to intangible resources (services, intellectual property rights, freedom of expression and access to information)	Presence/strength of community education initiatives	A.19 I am aware of education initiatives on waste management in my municipality	B.12 Number of community education initiatives regarding waste management or environment (last 6 months period)	C.15 Number of community education initiatives (last 6 months period)	D.13 Number of community education initiatives (last 6 months period)
Society	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and reduce its environmental impact. Existence of commitments ...	Level of engagement of society regarding sustainability due to changes in waste management systems		B.13 Number of public commitment actions by waste management stakeholders	C.16 I believe that citizens are committed with sustainability issues	B.13 I believe that citizens are committed with sustainability issues
	Technology development	Evaluates if the organization participates in joint research and the development of safe, efficient and environmental technologies	Sector efforts in technology development	A.28 I believe that waste managers are making an effort to improve technology development		C.17 Economic effort by the company in the development of new technologies compared to the sector	
				A.29 I believe that the waste manager in my municipality is working to reduce their environmental impact		C.18 Percentage of employees of the company assigned to R&D with respect to the total number of employees	
	Contribution to economic development	Evaluates if the organization contributes to the economic development of the country	Contribution of the service to economic development	A.30 I believe that plastic recycling can contribute to economic development of the municipality	B.14 I believe that the waste management system in my municipality boosts economic development	C.19 I believe that plastic recycling can contribute to economic development of the municipality	C.19 I believe that plastic recycling can contribute to economic development of the municipality
				A.31 I believe that the waste management system in my municipality boosts economic development		C.20 I believe that the waste management system in my municipality boosts economic development	C.20 I believe that the waste management system in my municipality boosts economic development

2. Evaluation of Social Impact

2.1. Social Life Cycle Assessment results

2.1.1 Evaluation of Social Life Cycle Assessment results

To evaluate the social assessment, data from Alba Iulia, Utrecht and Valencia has been collected.

The above mentioned questions have been evaluated as it can be seen in the Table 2.

Table 2. Evaluation of different aspects of social life questionnaires.

PERCENTAGE	COMPLAINTS	COMMUNICATION CHANNELS	MEETINGS / INITIATIVES
60-100	<5	>3	>2
30-60	5 -> 15	1 -> 3	1 -> 2
0-30	>15	<1	<1

2.1.2 Social Groups of Interest

The social conditions of the groups of people who answered the questionnaires can be seen in the Table 3.

Table 3. Information about people who have answered the social life pre-questionnaire of Valencia.

CITIZENS (number of answers: 116)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	33	18-25	3	Employed full-time	43	No studies	1
Female	71	25-35	22	Employed part-time	16	Elementary school	18
Not declared	12	35-45	30	Unemployed	21	High school	44
		45-55	27	Student	4	College	45
		55-65	15	Other	14	PhD	1
		Over 65	10	Not declared	18	Other	7
		Not declared	9			Not declared	0
CITIZENS ASSOCIATIONS (number of answers: 5)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	2	18-25	0	Employed full-time	1	No studies	0
Female	3	25-35	0	Employed part-time	2	Elementary school	0
Not declared	0	35-45	3	Unemployed	0	High school	2
		45-55	0	Student	0	College	3
		55-65	2	Other	2	PhD	0
		Over 65	0	Not declared	0	Other	0
		Not declared	0			Not declared	0
WASTE MANAGER (number of answers: 21)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	13	18-25	3	Administrative technician	3	No studies	0
Female	8	25-35	3	Research technician	2	Elementary school	4
Not declared	0	35-45	8	IT technician	1	High school	6
		45-55	3	Sanitary technician	3	College	7
		55-65	3	Labourer	4	PhD	3
		Over 65	1	Other	7	Other	0
		Not declared	0	Not declared	1	Not declared	1
PUBLIC AUTHORITY (number of answers: 1)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	0	18-25	0	Employed full-time	1	No studies	0
Female	1	25-35	0	Employed part-time	0	Elementary school	0
Not declared	0	35-45	0	Unemployed	0	High school	0
		45-55	1	Student	0	College	1
		55-65	0	Other	0	PhD	0
		Over 65	0	Not declared	0	Other	0
		Not declared	0			Not declared	0

Table 4. Information about people who have answered the social life post-questionnaire of Valencia.

CITIZENS (number of answers: 44)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	13	18-25	0	Employed full-time	21	No studies	0
Female	27	25-35	9	Employed part-time	5	Elementary school	3
Not declared	4	35-45	7	Unemployed	8	High school	15
		45-55	7	Student	1	College	24
		55-65	13	Other	6	PhD	2
		Over 65	2	Not declared	3	Other	0
		Not declared	6			Not declared	0
CITIZENS ASSOCIATIONS (number of answers: 4)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	2	18-25	0	Employed full-time	1	No studies	0
Female	2	25-35	0	Employed part-time	1	Elementary school	0
Not declared	0	35-45	2	Unemployed	0	High school	2
		45-55	0	Student	0	College	2
		55-65	2	Other	2	PhD	0
		Over 65	0	Not declared	0	Other	0
		Not declared	0			Not declared	0
WASTE MANAGER (number of answers: 379)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	223	18-25	23	Cleaning worker	61	No studies	6
Female	154	25-35	47	Cleaning pawn	221	Elementary school	124
Not declared	2	35-45	89	Driver	50	High school	193
		45-55	139	Other	35	College	24
		55-65	79	Not declared	12	PhD	0
		Over 65	2			Other	32
		Not declared	0			Not declared	0

Table 5. Information about people who have answered the social life pre-questionnaire of Alba Iulia.

CITIZENS (number of answers: 21)							
No info available.							
BLOCK ADMINISTRATORS (number of answers: 18)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	0	18-25	0	Employed full-time	17	No studies	1
Female	16	25-35	0	Employed part-time	0	Elementary school	0
Not declared	2	35-45	6	Unemployed	0	High school	6
		45-55	5	Student	0	College	11
		55-65	5	Other	0	PhD	0
		Over 65	0	Not declared	1	Other	0
		Not declared	2			Not declared	0
WASTE MANAGER (number of answers: 10)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	2	18-25	0	Legal advisor	1	No studies	0
Female	8	25-35	0	Not declared	9	Elementary school	0
Not declared	0	35-45	4			High school	4
		45-55	5			College	6
		55-65	1			PhD	0
		Over 65	0			Other	0
		Not declared	0			Not declared	0
PUBLIC AUTHORITY (number of answers: 29)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	10	18-25	1	Employed full-time	22	No studies	0
Female	19	25-35	9	Employed part-time	6	Elementary school	0
Not declared	0	35-45	9	Unemployed	0	High school	1
		45-55	4	Student	0	College	26
		55-65	6	Other	1	PhD	1
		Over 65	0	Not declared	0	Other	1
		Not declared	0			Not declared	0

Table 6. Information about people who have answered the social life post-questionnaire of Alba Iulia.

CITIZENS (number of answers: 13)							
No info available.							
BLOCK ADMINISTRATORS (number of answers: 5)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	3	18-25	0	Employed full-time	4	No studies	0
Female	1	25-35	0	Employed part-time	0	Elementary school	0
Not declared	1	35-45	1	Unemployed	0	High school	0
		45-55	3	Student	0	College	4
		55-65	0	Other	0	PhD	0
		Over 65	0	Not declared	1	Other	0
		Not declared	1			Not declared	1
WASTE MANAGER (number of answers: 1)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	0	18-25	0	Alba Iulia Director	1	No studies	0
Female	1	25-35	0	Not declared	0	Elementary school	0
Not declared	0	35-45	1			High school	0
		45-55	0			College	1
		55-65	0			PhD	0
		Over 65	0			Other	0
		Not declared	0			Not declared	0
PUBLIC AUTHORITY (number of answers: 10)							
GENDER		AGE		WORKING CONDITIONS		LEVEL OF STUDIES	
Male	3	18-25	0	Employed full-time	6	No studies	0
Female	7	25-35	3	Employed part-time	4	Elementary school	0
Not declared	0	35-45	2	Unemployed	0	High school	0
		45-55	1	Student	0	College	3
		55-65	4	Other	0	PhD	7
		Over 65	0	Not declared	0	Other	0
		Not declared	0			Not declared	0

As can be seen in Figures Figure 3 and Figure 4, it was not possible to obtain the same homogeneous number of responses in the pre- and post-pilot. In the case of citizens, this fact was due to the fact that not all citizens who enrolled on the pilot were active until the end of the pilot. Pre-questionnaires were common to WP6 and WP7.

Just one response was obtained from the public authority in Valencia (Spain). Due to the low number of answers obtained, this stakeholder was not taken into account for the S-LCA analysis.

On the other hand, it can be observed that in Alba Iulia pilot (Romania), the number of responses obtained in the post-pilot is lower than those obtained in the pre-pilot. The main reason is that the COVID-19 situation delayed the progress and the pilot ended at the end of 2020 and there was not enough time to obtain a greater number of responses. Post-questionnaire of WP6 (also published in D6.5) have been used since the S-LCA was not carried out due to this complex situation.

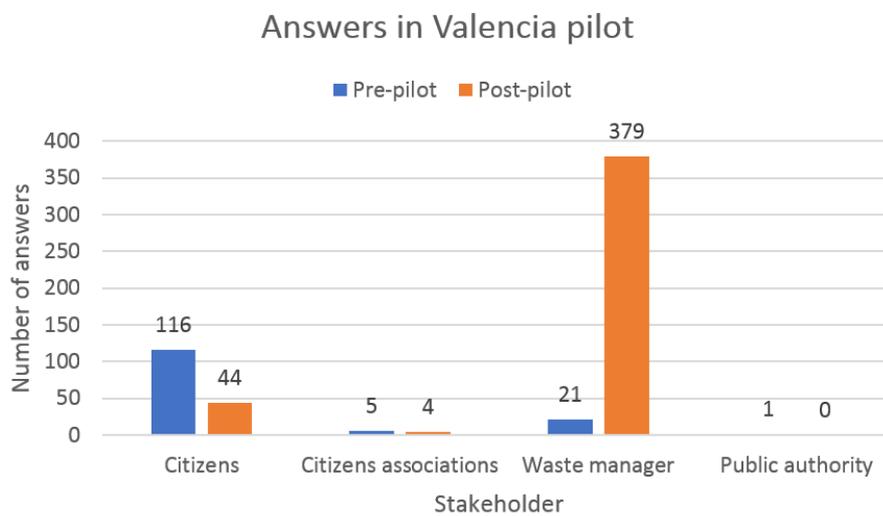


Figure 3. Number of answers by stakeholder in Valencia pilot.

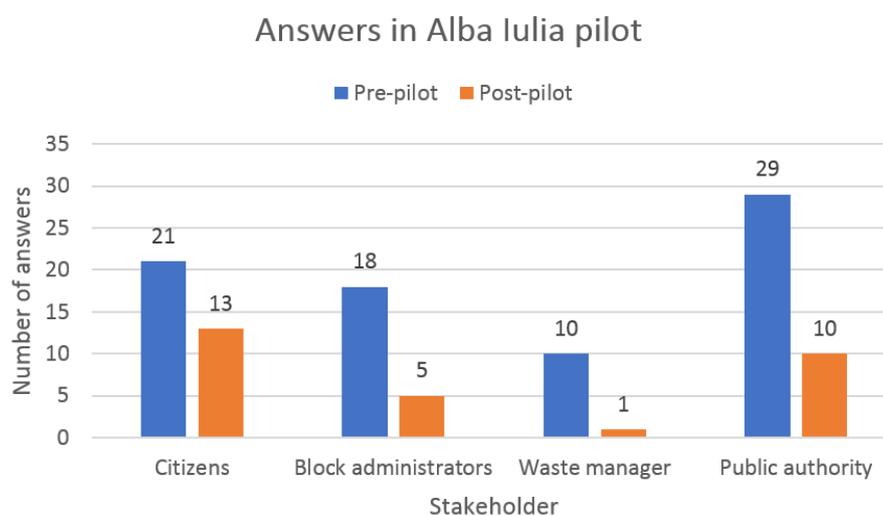


Figure 4. Number of answers by stakeholder in Alba Iulia pilot.

2.2. Results of Evaluation of Social Impact

In order to compare the pre- and post-pilot situation, relevant data from stakeholders was collected using the developed questionnaires. Pre-questionnaires were sent before to evaluate the previous waste management system and the the pilots' implementation was evaluated through post-questionnaires. It should be noted that LAS NAVES participated in the data collection process of Valencia.

The responses obtained to the questionnaires were evaluated by applying the criteria presented in Table 2, obtaining the results shown below.

2.2.1. Evaluation of Social Impact in Valencia

2.2.1.1. Citizens

Table 7. Results of evaluation of social life pre- and post-questionnaires for citizens of Valencia.

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions citizens	Pre-pilot impact	Post-pilot impact
Consumer (citizens)	Health and safety	Existence of policies in favor of consumer protection or consumer complaints	Satisfaction of citizens regarding health and safety issues	5. The domestic waste management system in my municipality provides safe and healthy living conditions.	64,14%	60,45%
	Service satisfaction	Level of consumer's satisfaction with the waste management service	Level of waste management system acceptability by citizens	4. In general, I am satisfied with the domestic waste management in my municipality.	54,48%	52,73%
				6. I am satisfied with the plastic packaging collection system in my city.	57,93%	56,36%
				12. How far from your home is the nearest packaging container (by foot)?	2-5 minutes: 91,38% 5-10 minutes: 6,90% 10-15 minutes: 0,86% 15-20 minutes: 0% More than 20 minutes: 0% No packaging containers near home: 0,86%	2-5 minutes: 97,73% 5-10 minutes: 2,27% 10-15 minutes: 0% 15-20 minutes: 0% More than 20 minutes: 0% No packaging containers near home: 0%
				13. Select which products can be put in the yellow bin.	Sprays: 68,10% Plastic toys: 27,59% Cans: 94,83% Milk cartons: 95,69% Plastic pots: 39,66% Diapers: 4,31% Electric items: 0,86% Shampoo bottles: 90,52%	Sprays: 70,45% Plastic toys: 22,73% Cans: 95,45% Milk cartons: 95,45% Plastic pots: 31,82% Diapers: 0% Electric items: 0% Shampoo bottles: 90,91%
				20. I think my taxes fully cover the management of my waste.	43,10%	64,09%
	Consumer privacy	Consumers personal data is well stored and managed	Number of consumer complaints related to breach of privacy or loss of data within 6 months period	28. I think that the waste management system in my municipality treats my data with confidentiality	59,83%	73,64%

				29. I think that looking at the way I separate my waste affects my rights of privacy.	27,93%	47,73%
Transparency	If the organization clearly communicates its social responsibility and the aspects	Communication of the results of social and environmental life cycle impact assessment	14. I am well informed about the domestic management system in my municipality.	51,72%	53,18%	
			27. I would like to have more information about what happens with my containers once I deposit them in the Yellow container.	95,69%	79,55%	
End of life responsibility	if the organization communicates clearly to consumers how they should properly manage their waste	Degree of improvement of the social awareness of consumers on issues of effectiveness and efficiency of recycling	7. I know how to separate my waste as required by law.	61,21%	64,55%	
			16. Reducing the use of plastics and increasing their recycling preserves the environment and reduces landfill waste.	76,03%	76,82%	
		Do internal management systems ensure that clear information is provided to consumers on end-of-life options (if applicable)?	8. Do you separate your packaging from other waste at home?	91,55%	93,64%	
			9. You have answered that you separate your packaging from the rest of the waste at home. In which container do you throw your packaging?	Blue: 3,45% Yellow: 92,24% Green: 0,86% Grey: 0,86% Brown: 0,86%	Blue: 0% Yellow: 100% Green: 0% Grey: 0% Brown: 0%	
			10. How often do you put your plastics in containers for packages?	Once a day: 9,48% Once two days: 17,24% Once three days: 34,48% Once a week: 32,76% Once two weeks: 3,45% Less often: 0%	Once a day: 13,95% Once two days: 27,91% Once three days: 27,91% Once a week: 25,58% Once two weeks: 2,33% Less often: 2,33%	

				11. You have answered that you never or almost never separate your packaging from other waste at home. Please indicate the reasons below. You can choose more than one answer.	<p>I have no time: 0%</p> <p>I produce very little packaging at home: 0%</p> <p>I don't know how to do it: 0,86%</p> <p>I don't want to clean the containers before throwing them away: 0%</p> <p>It disgusts me having to separate the waste: 0%</p> <p>I have the container too far: 0%</p> <p>The container is always full: 0%</p> <p>I lack space at home for all the garbage cans: 0%</p> <p>I don't think it's useful: 0,86%</p> <p>Other ("There are no reward like in other countries"): 0,86%</p>	<p>I have no time: 0%</p> <p>I produce very little packaging at home: 0%</p> <p>I don't know how to do it: 0%</p> <p>I don't want to clean the containers before throwing them away: 0%</p> <p>It disgusts me having to separate the waste: 0%</p> <p>I have the container too far: 0%</p> <p>The container is always full: 0%</p> <p>I lack space at home for all the garbage cans: 2,27%</p> <p>I don't think it's useful: 0%</p> <p>Other: 0%</p>
Local community	Access to immaterial resources	Level of organizations working to give the Community greater access to intangible resources (services, intellectual property rights, freedom of expression and access to information)	Presence/strength of community education initiatives	23. I am aware of one or several plastic recycling initiatives in my municipality.	47,76%	62,73%
	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and reduce its environmental impact. Existence of commitments ...	Level of engagement of society regarding sustainability due to changes in waste management systems	17. I think that the plastics/packages I separate from the rest of my waste are effectively recycled.	55,00%	68,18%
				18. I think it does not matter if I separate the waste at home because It is going to be anyway separated at the sorting plant.	20,69%	32,27%
				19. I believe that after the truck picks up the containers, the trash is all mixed up together at the sorting plant.	21,90%	33,64%
	Local Employment	How does the organization's role affect local employment? Evaluate if the organization hires local people	Number of new jobs created	22. I think that plastic recycling creates new jobs	61,21%	75,00%
	Community engagement	Level of engagement of the community with sustainability issues	Level of awareness of citizens in waste management options	24. I know products made of recycled plastics.	52,93%	61,36%
	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and	Level of engagement of society regarding sustainability due to	25. Households should pay according to the waste they generate.	68,28%	62,27%

		reduce its environmental impact. Existence of commitments ...	changes in waste management systems	26. Households should be rewarded for separating their waste correctly.	68,28%	80,45%
Society	Contribution to economic development	Evaluates if the organization contributes to the economic development of the country	Contribution of the service to economic development	15. Transforming plastic packaging waste into new products is a valuable resource for the society	72,93%	72,73%
				21. I believe that the recycling of plastics is a way to increase economic development (improve the economic and social well-being of people).	62,76%	78,64%

2.2.1.2. Citizens associations

Table 8. Results of evaluation of social life pre- and post-questionnaires for citizens associations of Valencia.

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions citizens associations	Pre-pilot impact	Post-pilot impact
Consumer (citizens)	Health and safety	Existence of policies in favor of consumer protection or consumer complaints	Satisfaction of citizens regarding health and safety issues	B.1 Waste management system in my municipality ensures health and safety living conditions	60,00%	55,00%
			Number of complaints identified regarding waste management service within 6 months period	B.2 Number of complaints identified regarding waste management service within 6 months period	30	51
			Accomplishment of legal requirements			
	Service satisfaction	Level of consumer's satisfaction with the waste management service	Level of waste management system acceptability by citizens	B.3 Citizens have access to an adequate system of waste management	68,00%	82,50%
				B.4 Citizens have access to an adequate system of plastic packaging waste management	64,00%	87,50%
	Consumer privacy	Consumers personal data is well stored and managed	Number of consumer complaints related to breach of privacy or loss of data within 6 months period	B.5 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	0	2
	Feedback Mechanism	Existence of Feedback channels to support consumers queries	Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	B6. Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	4 (Phone number, email, incident sheets, app Valencia City Council)	6 (Phone number, email, incident sheets, technical service phone number, social networks, app Valencia City Council)
			Existence of consumer satisfaction questionnaires.	B.7 Existence of consumer satisfaction questionnaires.	Yes	Yes
	Transparency	If the organization clearly communicates its social responsibility and the aspects	Number of consumer complaints regarding transparency within 6 months period	B.8 Number of consumer complaints regarding transparency within 6 months period	0	0
			Communication of the results of social and environmental life cycle impact assessment	B.9 The results of social and environmental life cycle impact assessment have been communicated	Partially	Partially

	End of life responsibility	if the organization communicates clearly to consumers how they should properly manage their waste	Do internal management systems ensure that clear information is provided to consumers on end-of-life options (if applicable)?	B.10 Internal management systems ensure that clear information is provided to consumers on end-of-life options	34,00%	77,50%
Local community	Local Employment	How does the organization's role affect local employment? Evaluate if the organization hires local people	Number of new jobs created			
			Number of jobs lost during the reporting period			
	Community engagement	Level of engagement of the community with sustainability issues	Number of meetings with community stakeholders	B.11 Number of meetings with community stakeholders	1,4	12,5
	Access to inmaterial resources	Level of organizations working to give the Community greater access to intangible resources (services, intellectual property rights, freedom of expression and access to information)	Presence/strength of community education initiatives	B.12 Number of community education initiatives regarding waste management or environment (last 6 months period)	1	6,5
Society	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and reduce its environmental impact. Existence of commitments ...	Level of engagement of society regarding sustainability due to changes in waste management systems	B.13 Number of public commitment actions by waste management stakeholders	0,8	9,25
	Technology development	Evaluates if the organization participates in joint research and the development of safe, efficient and environmental technologies	Sector efforts in technology development			
Contribution to economic development	Evaluates if the organization contributes to the economic development of the country	Contribution of the service to economic development				



2.2.1.3. Waste managers

Table 9. Results of evaluation of social life pre- and post-questionnaires for waste managers of Valencia.

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions waste managers	Pre-pilot impact	Post-pilot impact	
Consumer (citizens)	Health and safety	Existence of policies in favor of consumer protection or consumer complaints	Satisfaction of citizens regarding health and safety issues	C.1 Waste management system in my municipality ensures health and safety living conditions	81,00%	79,95%	
			Number of complaints identified regarding waste management service within 6 months period	C.2 Number of complaints identified regarding waste management service within 6 months period	1493	220	
			Accomplishment of legal requirements	C.3 Which legal requirements / standards regarding environment are being accomplished (ISO 14000, EMAS...)?	ISO 14000 EMAS Carbon Finger Point Registry Water Footprint Registry	ISO 14000 EMAS ISO 50001	
	Service satisfaction	Level of consumer's satisfaction with the waste management service	Level of waste management system acceptability by citizens	C.4 Citizens have access to an adequate system of waste management	C.4 Citizens have access to an adequate system of waste management	74,50%	80,59%
				C.5 Citizens have access to an adequate system of plastic packaging waste management	C.5 Citizens have access to an adequate system of plastic packaging waste management	57,00%	83,75%
	Consumer privacy	Consumers personal data is well stored and managed	Number of consumer complaints related to breach of privacy or loss of data within 6 months period	C.6 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	0	0	
	Feedback Mechanism	Existence of Feedback channels to support consumers queries	Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	C.7 Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	3 (Phone number, email, fax)	4 (Phone number, email, technical service phone, communication with citizens is through the City Council)	
			Existence of consumer satisfaction questionnaires.	C.8 Existence of consumer satisfaction questionnaires.	Yes	No	
	Transparency	If the organization clearly communicates its social responsibility and the aspects	Number of consumer complaints regarding transparency within 6 months period	C.9 Number of consumer complaints regarding transparency within 6 months period	0	0	
			Communication of the results of social and environmental life cycle impact assessment	C.10 The results of social and environmental life cycle impact assessment have been communicated	Some	Yes	

	End of life responsibility	if the organization communicates clearly to consumers how they should properly manage their waste	Do internal management systems ensure that clear information is provided to consumers on end-of-life options (if applicable)?	C.11 Internal management systems ensure that clear information is provided to consumers on end-of-life options	63,00%	82,31%
Local community	Local Employment	How does the organization's role affect local employment? Evaluate if the organization hires local people	Number of new jobs created	C.12 Number of new jobs created in the last 6 months	Inconclusive	767
			Number of jobs lost during the reporting period	C.13 Number of jobs lost during the lasts 6 months	Inconclusive	539
	Community engagement	Level of engagement of the community with sustainability issues	Number of meetings with community stakeholders	C.14 Number of meetings with community stakeholders	0	24
	Access to inmaterial resources	Level of organizations working to give the Community greater access to intangible resources (services, intellectual property rights, freedom of expression and access to information)	Presence/strength of community education initiatives	C.15 Number of community education initiatives (last 6 months period)	0	6
Society	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and reduce its environmental impact. Existence of commitments ...	Level of engagement of society regarding sustainability due to changes in waste management systems			
				C.16 I believe that citizens are committed with sustainability issues	46,50%	60,64%
	Technology development	Evaluates if the organization participates in joint research and the development of safe, efficient and environmental technologies	Sector efforts in technology development	C.17 Economic effort by the company in the development of new technologies compared to the sector	73,50%	81,23%
				C.18 Percentage of employees of the company assigned to R&D with respect to the total number of employees	27,00%	37,00%
Contribution to economic development	Evaluates if the organization contributes to the economic development of the country	Contribution of the service to economic development	C.19 I believe that plastic recycling can contribute to economic development of the municipality	84,50%	85,19%	

				C.20 I believe that the waste management system in my municipality boosts economic development	78,50%	81,42%
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2.2.1.4. Municipality

Table 10. Results of evaluation of social life pre- and post-questionnaires for municipality of Valencia.

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions municipality	Pre-pilot impact	Post-pilot impact
Consumer (citizens)	Health and safety	Existence of policies in favor of consumer protection or consumer complaints	Satisfaction of citizens regarding health and safety issues	D.1 Waste management system in my municipality ensures health and safety living conditions	90,00%	No data
			Number of complaints identified regarding waste management service within 6 months period	D.2 Number of complaints identified regarding waste management service within 6 months period	9850	No data
			Accomplishment of legal requirements	D.3 Which legal requirements / standards regarding environment are being accomplished (ISO 14000, EMAS...)?	Inconclusive	No data
	Service satisfaction	Level of consumer's satisfaction with the waste management service	Level of waste management system acceptability by citizens	D.4 Citizens have access to an adequate system of waste management	90,00%	No data
				D.5 Citizens have access to an adequate system of plastic packaging waste management	100,00%	No data
	Consumer privacy	Consumers personal data is well stored and managed	Number of consumer complaints related to breach of privacy or loss of data within 6 months period	D.6 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	Inconclusive	No data
	Feedback Mechanism	Existence of Feedback channels to support consumers queries	Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	D.7 Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	5 (Phone number, email, incident sheets, technical service phone number, check-in)	No data
				Existence of consumer satisfaction questionnaires.	D.8 Existence of consumer satisfaction questionnaires.	Yes
	Transparency	If the organization clearly communicates its social responsibility and the aspects	Number of consumer complaints regarding transparency within 6 months period	D.9 Number of consumer complaints regarding transparency within 6 months period	Inconclusive	No data
				Communication of the results of social and environmental life cycle impact assessment	D.10 The results of social and environmental life cycle impact assessment have been communicated	Yes

	End of life responsibility	if the organization communicates clearly to consumers how they should properly manage their waste	Do internal management systems ensure that clear information is provided to consumers on end-of-life options (if applicable)?	D.11 Internal management systems ensure that clear information is provided to consumers on end-of-life options	90%	No data
Local community	Local Employment	How does the organization's role affect local employment? Evaluate if the organization hires local people	Number of new jobs created			
			Number of jobs lost during the reporting period			
	Community engagement	Level of engagement of the community with sustainability issues	Number of meetings with community stakeholders	D.12 Number and quality of meetings with community stakeholders	62	No data
	Access to inmaterial resources	Level of organizations working to give the Community greater access to intangible resources (services, intellectual property rights, freedom of expression and access to information)	Presence/strength of community education initiatives	D.13 Number of community education initiatives (last 6 months period)	8	No data
Society	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and reduce its environmental impact. Existence of commitments ...	Level of engagement of society regarding sustainability due to changes in waste management systems			
				D.14 I believe that citizens are committed with sustainability issues	70,00%	No data
	Technology development	Evaluates if the organization participates in joint research and the development of safe, efficient and environmental technologies	Sector efforts in technology development			
	Contribution to economic development	Evaluates if the organization contributes to the economic development of the country	Contribution of the service to economic development	D.15 I believe that plastic recycling can contribute to economic development of the municipality	90,00%	No data

				D.16 I believe that the waste management system in my municipality boosts economic development	90,00%	No data
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2.2.1.5. Main conclusions of social impact in Valencia

Based on the results obtained, the social impact was calculated for each of the subcategories studied. The impact values were determined by comparing the answers to the questionnaires before and after the pilot. This impact was calculated on a scale from 0 to 5, where 5 would be the highest possible impact and 0 no impact.

The impact values of Figure 5 were calculated as the mean of the social impact obtained from the results of each questionnaire (citizens, citizens associations, waste managers and municipality).

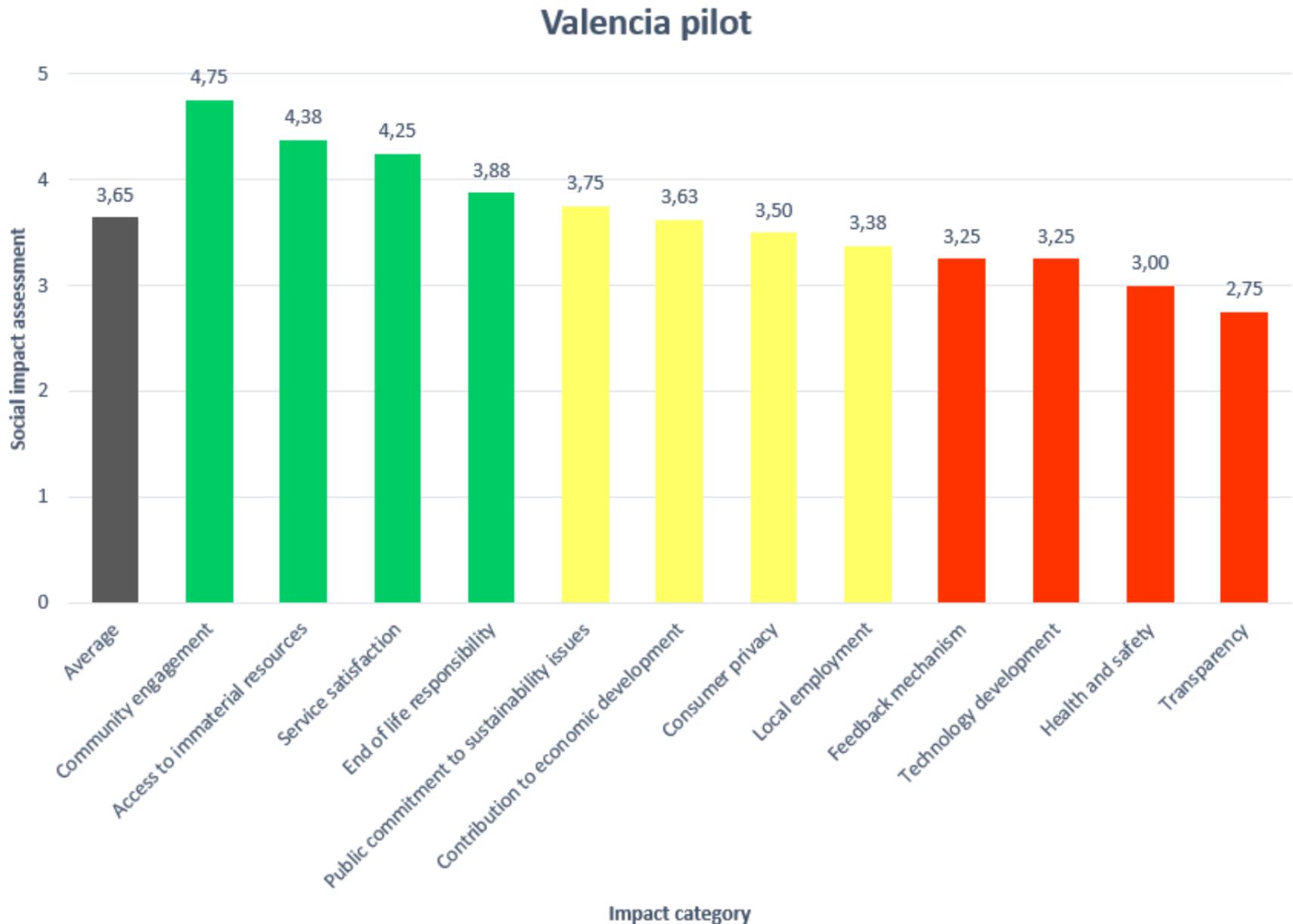


Figure 5. Social impact assessment in Valencia pilot by impact category.

1. Community engagement

The level of awareness of citizens in waste management options has been increased by 10%. Moreover, the number of meetings between community stakeholders has been considerably increased: citizens associations (from 1,4 to 12,5) and waste managers (from 0 to 24).

2. Access to immaterial resources

Since the start of the pilot, a great improvement has been achieved in this sense. On the one hand, citizens are better informed of the initiatives on the recycling of plastics. On the other hand, the number of community education initiatives regarding waste management or environment has increased, multiplying by 6 the number of initiatives carried out since the beginning of PlastiCircle project.

3. Service satisfaction

In general, the level of consumer acceptability of the waste management service has been improved. More than 90% of citizens know which products (sprays, cans, milk cartons, plastic pots, etc.) can be put in the yellow bin and which can not.

4. End of life responsibility

The way of communicating to consumers how they should manage their own waste has been improved. 92% of the citizens analyzed initially knew in which container to throw their packaging waste before the start of the pilot. Once finished, 100% knew that the yellow container is the right one to dispose of this waste.

The frequency with which citizens dump their packaging waste has also increased. In the pre-pilot, around 25% threw away their

waste every 1 or 2 days. After the pilot, this percentage has reached more than 40% of the consumers analyzed.

5. Public commitment to sustainability issues

The number of public commitment actions by waste managers has increased: from 0,8 to 9,25 actions on average. These actions have achieved an improvement in sustainability and a reduction in environmental impact.

Furthermore, citizens associations have the belief that citizens are more committed to sustainability issues.

6. Contribution to economic development

In general, all questions about economic development have been answered optimistically. In other words, the groups analyzed relate the improvement in recycling to a boost in the local economy.

7. Consumer privacy

Consumers have a better vision of how the waste management system in their municipality treats their data with confidentiality and if looking at the way they separate waste affects their rights of privacy.

8. Local employment

Citizens believe that plastic recycling contributes to creating new jobs for local people. In fact, during the project, a total of 767 jobs have been created and 539 were lost. That is, an increase over the total of 228 job positions.

9. Feedback mechanism

Citizen associations and waste managers have increased the number of communication channels with citizens. With this, it has been achieved that citizens can contact them through a greater number of channels, thus facilitating that citizens' doubts and complaints are answered more efficiently.

10. Technology development

The percentage of employees of the waste manager company assigned to R&D with respect to the total number of employees has increased by 10% since the start of the pilot.

11. Health and safety

The number of complaints identified about the waste management service stands out. Although the complaints identified by the waste manager have been considerably reduced during the development of the project (from 1493 to 220 complaints) it is still a very high number. Therefore, new measures should be implemented to improve consumer satisfaction.

12. Transparency

Waste managers clearly communicate the results of the social and environmental life cycle analysis while citizens associations partially communicates it. However, there have been no complaints from consumers about the transparency of these companies.

2.2.2. Evaluation of Social Impact in Alba Iulia

In order to compare the pre- and post-pilot situation, relevant data from stakeholders was collected using the developed questionnaires. Pre-questionnaires were sent before to evaluate the previous waste management system and the the pilots' implementation was evaluated through post-questionnaires.

The responses obtained to the questionnaires were evaluated by applying the criteria presented in Table 2, obtaining the results shown below.

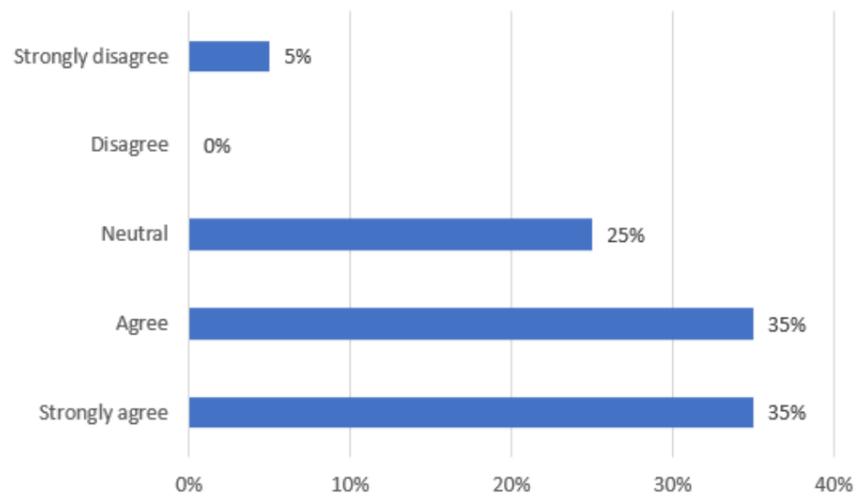
2.2.2.1. Citizens

Table 11. Results of evaluation of social life pre-questionnaire for citizens of Alba Iulia.

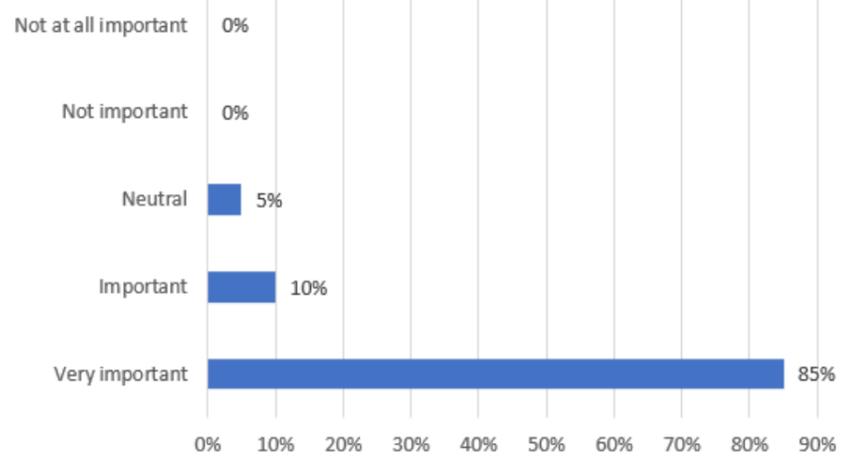
Questions citizens Pre-questionnaire	Pre-pilot impact												
<p>1. How satisfied are you with the existing waste management system in your city?</p>	<table border="1"> <tr><td>Very unsatisfied</td><td>32%</td></tr> <tr><td>Dissatisfied</td><td>36%</td></tr> <tr><td>Neutral</td><td>5%</td></tr> <tr><td>Satisfied</td><td>18%</td></tr> <tr><td>Very satisfied</td><td>9%</td></tr> </table>	Very unsatisfied	32%	Dissatisfied	36%	Neutral	5%	Satisfied	18%	Very satisfied	9%		
Very unsatisfied	32%												
Dissatisfied	36%												
Neutral	5%												
Satisfied	18%												
Very satisfied	9%												
<p>You have replied that you are dissatisfied with the existing waste management system in your city.</p> <p>1a. What are the most important improvement opportunities in your opinion? You can select multiple options.</p>	<table border="1"> <tr><td>Increase the number of containers in the city</td><td>7%</td></tr> <tr><td>Increase the frequency of garbage collection</td><td>0%</td></tr> <tr><td>Improve waste recycling in general</td><td>43%</td></tr> <tr><td>Set up new containers for recyclable materials in the city</td><td>36%</td></tr> <tr><td>Give more information about recyclable waste materials</td><td>7%</td></tr> <tr><td>Other. Please specify:</td><td>7%</td></tr> </table> <p>In our city we do not have any containers for recycling and our waste container areas are dirty and rat infested. Therefore, there are maximum opportunities for improvement.</p> <p>Educate the population, automate the collection for other types of containers and refuse, apply fines</p>	Increase the number of containers in the city	7%	Increase the frequency of garbage collection	0%	Improve waste recycling in general	43%	Set up new containers for recyclable materials in the city	36%	Give more information about recyclable waste materials	7%	Other. Please specify:	7%
Increase the number of containers in the city	7%												
Increase the frequency of garbage collection	0%												
Improve waste recycling in general	43%												
Set up new containers for recyclable materials in the city	36%												
Give more information about recyclable waste materials	7%												
Other. Please specify:	7%												
<p>Instead of using two waste containers, one for dry waste, another for wet waste, households will soon be required to separate their waste in four new fractions, one of which will be plastic packaging.</p> <p>2. Have you heard of this future initiative in our city to increase the recycling and re-utilisation of raw materials?</p>	<table border="1"> <tr><td>Yes and I would like to know more about it</td><td>67%</td></tr> <tr><td>Yes but I am not interested in it</td><td>5%</td></tr> <tr><td>No but I would like to know more about it</td><td>29%</td></tr> <tr><td>No and I am not interested in it</td><td>0%</td></tr> </table>	Yes and I would like to know more about it	67%	Yes but I am not interested in it	5%	No but I would like to know more about it	29%	No and I am not interested in it	0%				
Yes and I would like to know more about it	67%												
Yes but I am not interested in it	5%												
No but I would like to know more about it	29%												
No and I am not interested in it	0%												

<p>3. Are the waste containers easy to access and use in your opinion?</p>	<table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>95%</td> </tr> <tr> <td>No</td> <td>5%</td> </tr> </tbody> </table>	Response	Percentage	Yes	95%	No	5%								
Response	Percentage														
Yes	95%														
No	5%														
<p>You have replied that waste containers are not easy to access and use.</p> <p>3a. Please provide the reason for your response:</p>	<p>They are hard to access because they are dirty and every time one takes the garbage out, they risk stepping into something, getting dirty, having rats, cats or stray dogs jump at them. At present waste containers are a source of infection and disease and the smell is unbearable during summertime.</p>														
<p>4. How often do you place the trash bags with the recyclables in the dedicated container?</p>	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Once a day</td> <td>20%</td> </tr> <tr> <td>Once in two days</td> <td>20%</td> </tr> <tr> <td>Once in three days</td> <td>25%</td> </tr> <tr> <td>Once a week</td> <td>25%</td> </tr> <tr> <td>Once in two weeks</td> <td>5%</td> </tr> <tr> <td>Less often</td> <td>5%</td> </tr> </tbody> </table>	Frequency	Percentage	Once a day	20%	Once in two days	20%	Once in three days	25%	Once a week	25%	Once in two weeks	5%	Less often	5%
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<p>5. When do you usually throw the trash bags in the containers?</p>	<table border="1"> <thead> <tr> <th>Time of Day</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Morning</td> <td>20%</td> </tr> <tr> <td>Afternoon</td> <td>25%</td> </tr> <tr> <td>Evening</td> <td>30%</td> </tr> <tr> <td>Night</td> <td>5%</td> </tr> <tr> <td>Not relevant</td> <td>20%</td> </tr> </tbody> </table>	Time of Day	Percentage	Morning	20%	Afternoon	25%	Evening	30%	Night	5%	Not relevant	20%		
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<p>6. What do you do when the container is full?</p>	<table border="1"> <thead> <tr> <th>Action</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>It never happens because I know when the containers are being emptied</td> <td>25%</td> </tr> <tr> <td>I come back later</td> <td>5%</td> </tr> <tr> <td>I go to another container in this area</td> <td>50%</td> </tr> <tr> <td>I leave my garbage bags near the container</td> <td>15%</td> </tr> <tr> <td>I put my garbage bags in another container even if it is the right one</td> <td>5%</td> </tr> <tr> <td>Other. Please specify:</td> <td>0%</td> </tr> </tbody> </table>	Action	Percentage	It never happens because I know when the containers are being emptied	25%	I come back later	5%	I go to another container in this area	50%	I leave my garbage bags near the container	15%	I put my garbage bags in another container even if it is the right one	5%	Other. Please specify:	0%
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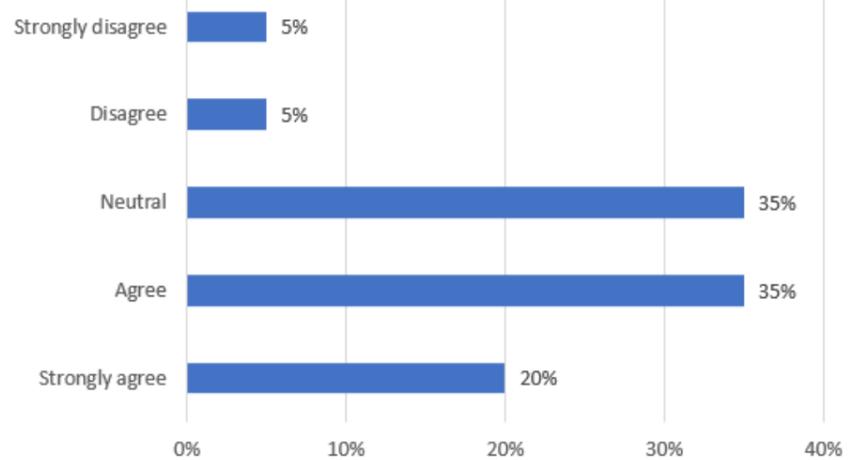
7. I am well informed on recyclable materials and correctly separate my waste.



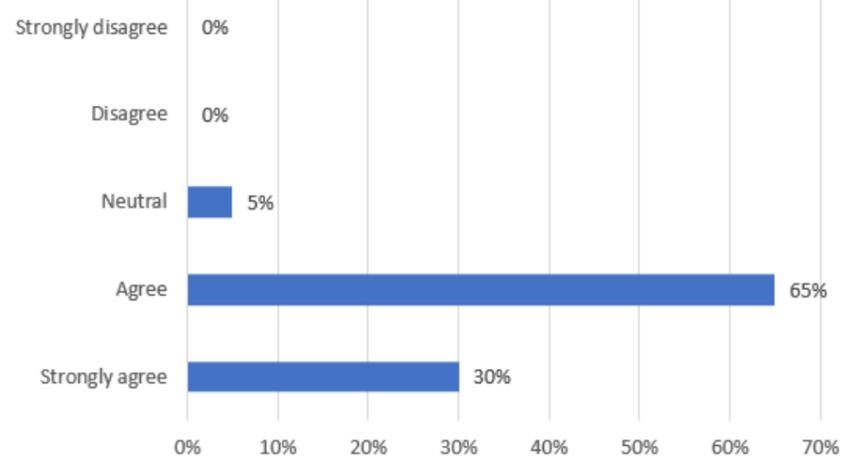
8. How important do you think recycling of plastic materials is for society and the environment?



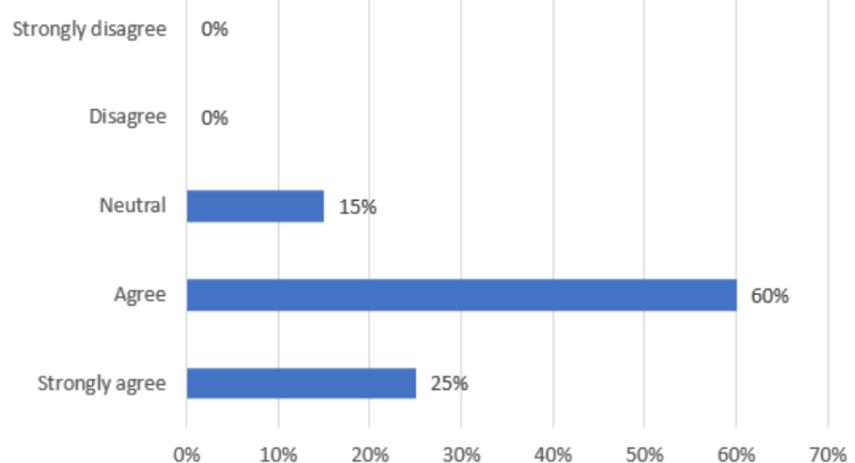
9. I believe that the taxes I pay fully cover the sorting and processing of my waste.



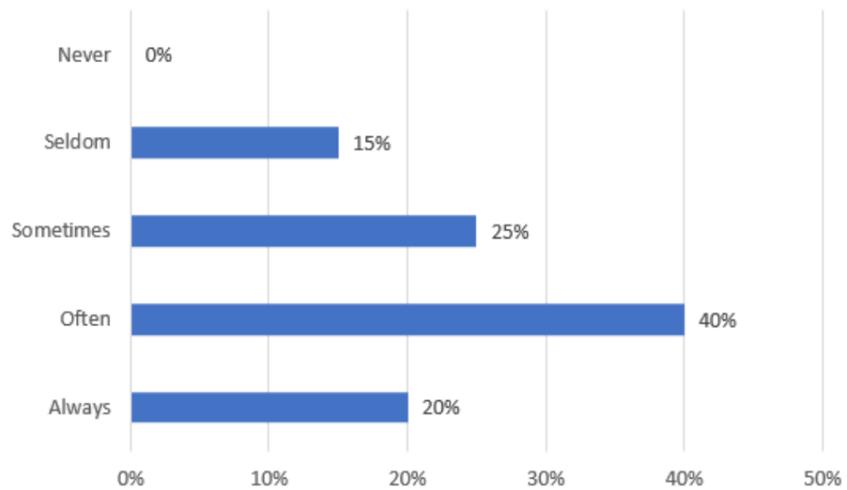
10. I believe that recycling plastic materials is a way of increasing economic development and creating new jobs.



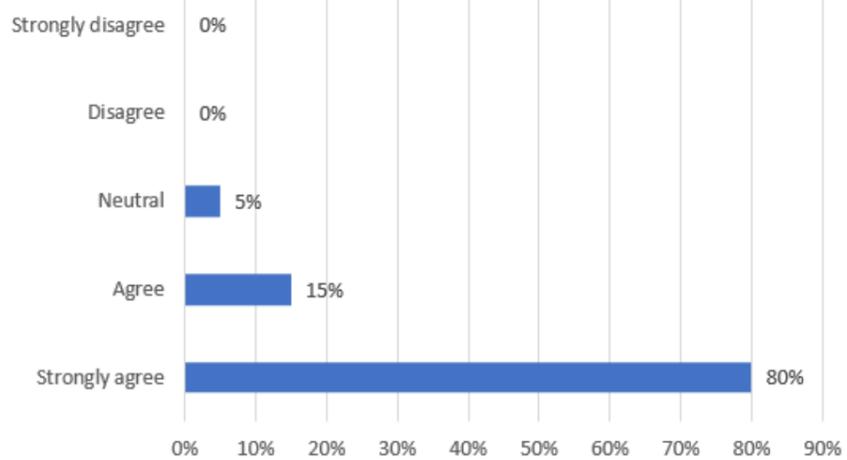
11. I know which products are recyclable or made from recycled materials.



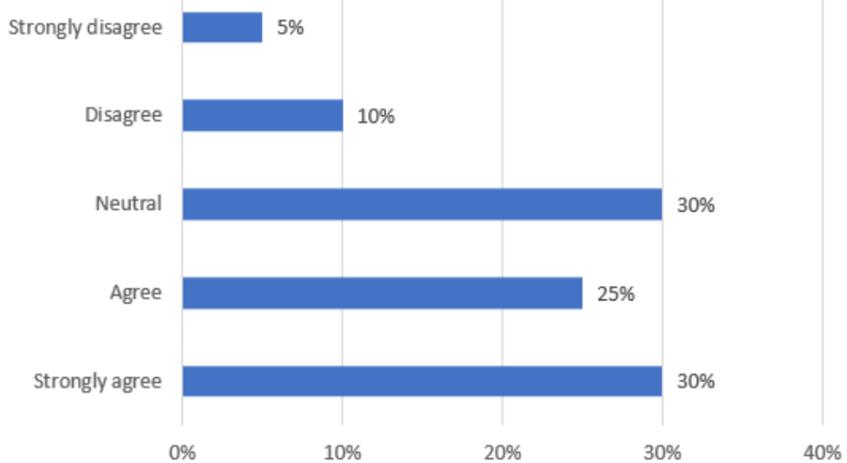
12. I purchase recyclable or recycled products.



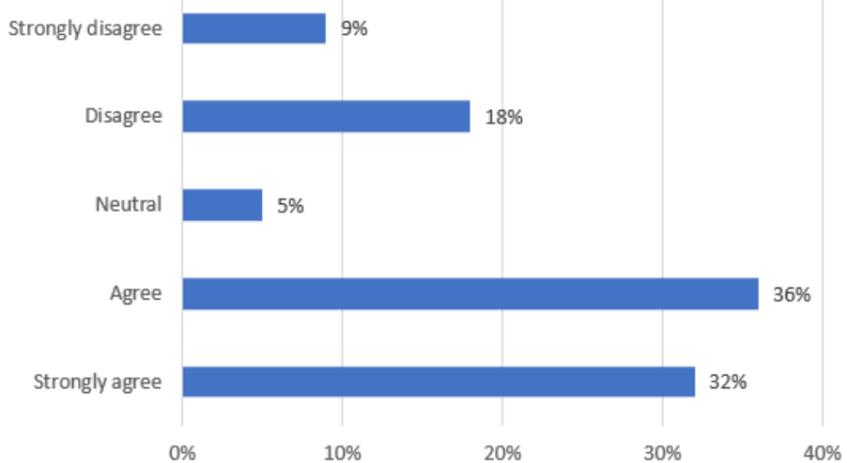
13. I think it is a good idea for the municipality to participate in the European project PlastiCircle, with a focus on recycling plastic materials.



14. I believe I should pay proportionally to the quantity of waste I produce.



15. Recycling plastic materials is important for me, my family and my city.



16. Do you have any questions or comments related to this questionnaire of the PlastiCircle project?

I am glad this project is happening even if only as a pilot and I would like to see recycling implemented on a large scale in the city, with separate recycling for plastic and paper at a minimum.

No

When will this project be implemented? I am impatiently waiting and would like to contribute to this beautiful initiative.

No

Devices for recycling plastic bottles and metal cans

No

Yes. I would like to leave a comment that is not that pleasant. I found the container next to school no. 6 opened twice or so. We have to work more on getting people to act properly and care about nature. Myself and my family have been separating plastic for several years but unfortunately the containers we previously had have disappeared. Still, some people came around and collected those plastics. WE SHOULD ALL CARE ABOUT NATURE

Why has this project been adopted only on specific streets in the city? It should be implemented throughout the city; nobody would dump garbage on the waterfronts anymore.

When and where can we obtain the trash bags for recycling?

No

Really good project

No

Table 12. Results of evaluation of social life post-questionnaire for citizens of Alba Iulia.

Questions citizens Post-questionnaire	Post-pilot impact										
1. What is your general opinion about the project, PlastiCircle?	<table border="1"> <tr><td>Very negative</td><td>0%</td></tr> <tr><td>Negative</td><td>6%</td></tr> <tr><td>Neutral</td><td>18%</td></tr> <tr><td>Positive</td><td>24%</td></tr> <tr><td>Very positive</td><td>53%</td></tr> </table>	Very negative	0%	Negative	6%	Neutral	18%	Positive	24%	Very positive	53%
Very negative	0%										
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Very positive	53%										
2. You replied that you have a negative opinion about the project. Could you please explain why?	<p>The project was not implemented very well. The dedicated containers are open most of the time, the labelling system does not work all the time. Sometimes Polaris come to empty the garbage from the containers, including plastic. I can sort, wash and press plastic package, but it should not be mixed with other garbage.</p>										
3. How often do you fill and throw an orange bag with recyclable plastic in the container?	<table border="1"> <tr><td>Every 1-2 days</td><td>6%</td></tr> <tr><td>Every 3-4 days</td><td>12%</td></tr> <tr><td>Every 5-6 days</td><td>18%</td></tr> <tr><td>Every week</td><td>41%</td></tr> <tr><td>After more than one week</td><td>24%</td></tr> </table>	Every 1-2 days	6%	Every 3-4 days	12%	Every 5-6 days	18%	Every week	41%	After more than one week	24%
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4. What is your opinion about the orange bag for recyclable plastic? You can choose several options	<table border="1"> <tr><td>The bag is adapted, large enough, durable and easy to use</td><td>88%</td></tr> <tr><td>Bag is not large enough</td><td>6%</td></tr> <tr><td>Bag is not very durable</td><td>6%</td></tr> <tr><td>The bag cannot be closed properly</td><td>0%</td></tr> <tr><td>Other opinions, please specify</td><td>0%</td></tr> </table>	The bag is adapted, large enough, durable and easy to use	88%	Bag is not large enough	6%	Bag is not very durable	6%	The bag cannot be closed properly	0%	Other opinions, please specify	0%
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5. I have read the information about how to recycle plastics and understood which packages should be put in the orange bag.	<table border="1"> <tr><td>Strongly disagree</td><td>6%</td></tr> <tr><td>Disagree</td><td>0%</td></tr> <tr><td>Neutral</td><td>0%</td></tr> <tr><td>Agree</td><td>53%</td></tr> <tr><td>Strongly agree</td><td>41%</td></tr> </table>	Strongly disagree	6%	Disagree	0%	Neutral	0%	Agree	53%	Strongly agree	41%
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<p>6. Do you think that the user card and the label device on container are easy to use? You can choose several options</p>	<table border="1"> <thead> <tr> <th>Opinion</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>I never experienced any problem with my card user and the label device on the...</td> <td>6%</td> </tr> <tr> <td>Sometimes it took a long time to get the label out of the device.</td> <td>12%</td> </tr> <tr> <td>The label did not come out in one piece once or several times.</td> <td>12%</td> </tr> <tr> <td>The label did not come out of the device at all once or several times.</td> <td>41%</td> </tr> <tr> <td>My user card did not work once or several times.</td> <td>12%</td> </tr> <tr> <td>It was hard to keep the label stuck to the bag.</td> <td>0%</td> </tr> <tr> <td>I had to go once or several times to another container with a label device to throw...</td> <td>12%</td> </tr> <tr> <td>Other opinions, please specify</td> <td>6%</td> </tr> </tbody> </table> <p>People should be more careful in using such containers</p> <p>Unfortunately, I've lost my card</p>	Opinion	Percentage	I never experienced any problem with my card user and the label device on the...	6%	Sometimes it took a long time to get the label out of the device.	12%	The label did not come out in one piece once or several times.	12%	The label did not come out of the device at all once or several times.	41%	My user card did not work once or several times.	12%	It was hard to keep the label stuck to the bag.	0%	I had to go once or several times to another container with a label device to throw...	12%	Other opinions, please specify	6%
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<p>7. I think that I received enough information and support to sort the plastics and use the container correctly.</p>	<table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Completely disagree</td> <td>0%</td> </tr> <tr> <td>Disagree</td> <td>0%</td> </tr> <tr> <td>Neutral</td> <td>6%</td> </tr> <tr> <td>Agree</td> <td>35%</td> </tr> <tr> <td>Completely agree</td> <td>59%</td> </tr> </tbody> </table>	Response	Percentage	Completely disagree	0%	Disagree	0%	Neutral	6%	Agree	35%	Completely agree	59%						
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<p>8. Do you think that the other project activities (Facebook, questionnaires, online meetings, info kiosk) were helpful?</p>	<table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Not at all helpful</td> <td>0%</td> </tr> <tr> <td>Slightly helpful</td> <td>0%</td> </tr> <tr> <td>Somewhat helpful</td> <td>35%</td> </tr> <tr> <td>Very helpful</td> <td>47%</td> </tr> <tr> <td>Extremely helpful</td> <td>18%</td> </tr> </tbody> </table>	Response	Percentage	Not at all helpful	0%	Slightly helpful	0%	Somewhat helpful	35%	Very helpful	47%	Extremely helpful	18%						
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<p>10. As part of PlastiCircle, citizens can receive symbolic rewards in line with the points they have accumulated, based mainly on the quantity and quality of the plastic they have selected. What is your opinion? You can choose several options</p>	<table border="1"> <thead> <tr> <th>Opinion</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Households should be rewarded for properly separating recyclable materials...</td> <td>6%</td> </tr> <tr> <td>Households should get points and then exchange them for gifts.</td> <td>0%</td> </tr> <tr> <td>Households should receive discount coupons for local shops and services</td> <td>24%</td> </tr> <tr> <td>Rewards should be used for improving the neighborhood (children park equipment,...</td> <td>24%</td> </tr> <tr> <td>Households should pay a lower local tax for waste if they are recycling properly</td> <td>12%</td> </tr> <tr> <td>Households should pay local taxes based on the quantity of waste they produce and...</td> <td>35%</td> </tr> <tr> <td>Other. Please specify</td> <td>0%</td> </tr> </tbody> </table>	Opinion	Percentage	Households should be rewarded for properly separating recyclable materials...	6%	Households should get points and then exchange them for gifts.	0%	Households should receive discount coupons for local shops and services	24%	Rewards should be used for improving the neighborhood (children park equipment,...	24%	Households should pay a lower local tax for waste if they are recycling properly	12%	Households should pay local taxes based on the quantity of waste they produce and...	35%	Other. Please specify	0%		
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<p>11. The project helps me understand the importance of recycling and the impact it has on my life, my family and my town.</p>	<table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Completely disagree</td> <td>0%</td> </tr> <tr> <td>Disagree</td> <td>0%</td> </tr> <tr> <td>Neutral</td> <td>0%</td> </tr> <tr> <td>Agree</td> <td>41%</td> </tr> <tr> <td>Completely agree</td> <td>59%</td> </tr> </tbody> </table>	Response	Percentage	Completely disagree	0%	Disagree	0%	Neutral	0%	Agree	41%	Completely agree	59%
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<p>13. I believe that plastic recycling improves the environment, economic development and creates new jobs.</p>	<table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Completely disagree</td> <td>0%</td> </tr> <tr> <td>Disagree</td> <td>0%</td> </tr> <tr> <td>Neutral</td> <td>0%</td> </tr> <tr> <td>Agree</td> <td>24%</td> </tr> <tr> <td>Completely agree</td> <td>76%</td> </tr> </tbody> </table>	Response	Percentage	Completely disagree	0%	Disagree	0%	Neutral	0%	Agree	24%	Completely agree	76%
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<p>15. What do you like most about the project?</p>	<p>Difficult to choose</p> <hr/> <p>Helps create a healthier environment, more involvement and responsibility</p> <hr/> <p>As we rid the planet of the plastic that pollutes a lot, I would like it to be a project that covers the whole city, not only certain streets or neighborhoods. Romania has the greatest need for such a thing.</p> <hr/> <p>It helps create a more civilized society and brings a contribution to environmental protection</p> <hr/> <p>I don't like that often plastic is collected together with other waste</p> <hr/> <p>First of all, the idea must be appreciated. We live in modern times; it is time to start collecting selectively. It's a good idea to reward people, maybe that's how they stimulate people a little more. The idea of the card is also good, as other options can be added.</p> <hr/> <p>The fact that at least the recycling and sorting process was trialed in a society where people are not used to this activity</p> <hr/> <p>The fact that the activity of educating the population has started. Every time I met people at containers and told them, they were interested in sorting. But a flower does not make it spring. At least it starts :)</p> <hr/> <p>What I liked most was that the project managed to bring this awareness to recycling. As far as I know, other similar initiatives over time have not borne fruit. What is very annoying is that people do not understand. They don't understand the importance of recycling. They do not understand that if a container is not intended for them, they should not use it. I believe that only by charging plastic packaging can we reduce its consumption or lead to an opening for recycling. It's sad when you check the labels of each container, wash it before putting it in the recycling bin, take up extra space with it in addition to garbage and other people simply ignore the presence of a container that is part of a project that does not look similar to them.</p> <hr/> <p>The fact that I had the opportunity to sort, the fact that plastic no longer reaches nature</p> <hr/> <p>It changed the way I think about sorting garbage.</p> <hr/> <p>Plastic waste exists anyway, the important thing is to use and recycle it :)</p> <hr/> <p>Everything</p> <hr/> <p>Education on selective collection</p> <hr/> <p>It would be nice to have larger containers and better marked and with different colours, so that citizens can easily identify the dedicated container for waste.</p>
<p>16. What do you like the least about the project? What do you think could be improved?</p>	<p>I don't like that sometimes when the truck comes to empty plastic containers, is mixing with household garbage; the labelling system doesn't work all the time, the containers are open and any type of garbage can be thrown away by some people.</p> <hr/> <p>That not all recycled bags were registered. There were several days in which I did not receive the points, although I recycled correctly. I couldn't label the bags. I walked from one container to another.</p> <hr/> <p>Container labelling machines. Containers closed with a lock and when we touch with the card from the project to open the dedicated trash container. Would be much better to throw there only plastic or plastic bottles and seal the bags with plastic deposited in the container.</p> <hr/> <p>The fact that the containers are open and some citizens throw anything in them.</p> <hr/> <p>Usually, plastic is not collected separately from household waste</p> <hr/> <p>The overall management of the initiative should be improved. As I said, this idea is welcome and must be continued, but the people involved must really get involved. Containers were often full of household waste. If it is still a card device, they could be locked and accessed only on a card basis, to avoid such situations. To avoid vandalism, specially arranged pens can be made, also with card-based access. Even in that pen a small recycling guide can be displayed. I had the misfortune to lose the card, and I did not receive another access card. In addition to all this, certain sanctions can also be applied in case of bad recycling with bad intention, also based on the access card.</p> <hr/> <p>1. The colour of the Plastic Circle container should be other than black; a good idea would be for a group of artists to paint the container so that anyone passing by this container is aware that it is used to collect plastic of all sizes. 2. People in my area ignored the fact that this container is used exclusively for plastic and threw any kind of waste there. 3. I think it should be placed a little further away from the rest of the containers and more strongly highlighted the role of this container.</p> <hr/> <p>Ugh plastic containers have often been filled with all sorts of other waste. It often seemed to me a work of Sisyphus. It is necessary to educate the population. Starting with kindergarten. Seriously, before they are flooded with their own garbage. I'm glad I was part of the project too. I hope to continue.</p> <hr/> <p>Container control ... is difficult, but a solution must be found. A direct contact could be made between the one who collects plastic for recycling and the company that deals with this aspect.</p> <hr/> <p>Sometimes, the label printing device did not work properly; people are not educated enough, many who do not participate in the project throw other waste in the containers for plastic. It is gratifying, however, that others, who did not participate in the project, sorted plastic, I saw in containers plastic bottles or bags with plastic waste not labelled and other than the orange bag.</p> <hr/> <p>As a minus I would see the situation of the container. Many times when I went with the bag, I had nowhere to put it because it was full of other garbage, which was not only plastic. :) Maybe in the future you will find a way to throw only plastic in those containers.</p> <hr/> <p>A closer check of the containers; the one in our area is wide open for everyone, no matter what they want to throw away, for a few weeks...</p> <hr/> <p>The only problem was with the label in my case, the paper was probably missing</p>

<p>17. Do you have any other questions or comments related to this questionnaire or PlastiCircle project?</p>	<p>No</p> <p>Thank you for the opportunity to be part of the project. And I hope to continue with more involvement from others</p> <p>It should not finish this project, is very beneficial for Alba Iulia</p> <p>When a project PaperCircle? We should have projects for paper, glass, etc...</p> <p>What happens next to the collected plastic? I saw some videos, but I'm not convinced that this is really recycled. Will such a project be implemented in the future? Will we be able to collect selectively from now on?</p> <p>No, thanks. Further, make another project like this taking into account the completed surveys and suggestions.</p> <p>The survey helps to find out the partial opinion of the city population. Does the PlastiCircle project continue?</p> <p>I would like to continue recycling, plastic, metal, paper, glass and pay less for household waste, in order to compensate for the fact that we recycle. Tax for household garbage / person is huge compared to what the sanitation company offers (dirt, smell, etc.)</p> <p>No</p>
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2.2.2.2. Block administrators

Table 13. Results of evaluation of social life pre- and post-questionnaires for block administrators of Alba Iulia.

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions block administrators	Pre-pilot impact	Post-pilot impact
Consumer (citizens)	Health and safety	Existence of policies in favor of consumer protection or consumer complaints	Satisfaction of citizens regarding health and safety issues	B.1 Waste management system in my municipality ensures health and safety living conditions	66,88%	60,00%
			Number of complaints identified regarding waste management service within 6 months period	B.2 Number of complaints identified regarding waste management service within 6 months period	At least 6 verbal complaints for lack of cleaning around the containers	Inconclusive
			Accomplishment of legal requirements			
	Service satisfaction	Level of consumer's satisfaction with the waste management service	Level of waste management system acceptability by citizens	B.3 Citizens have access to an adequate system of waste management	51,76%	46,00%
				B.4 Citizens have access to an adequate system of plastic packaging waste management	38,82%	42,00%
	Consumer privacy	Consumers personal data is well stored and managed	Number of consumer complaints related to breach of privacy or loss of data within 6 months period	B.5 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	0	0
	Feedback Mechanism	Existence of Feedback channels to support consumers queries	Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	B6. Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	3 (Phone number, email, technical service phone number)	4 (Phone number, email, technical service phone number, administration portal box)
				Existence of consumer satisfaction questionnaires.	B.7 Existence of consumer satisfaction questionnaires.	No
	Transparency	If the organization clearly communicates its social responsibility and the aspects	Number of consumer complaints regarding transparency within 6 months period	B.8 Number of consumer complaints regarding transparency within 6 months period	0	0

			Communication of the results of social and environmental life cycle impact assessment	B.9 The results of social and environmental life cycle impact assessment have been communicated	No	Some/No
	End of life responsibility	If the organization communicates clearly to consumers how they should properly manage their waste	Do internal management systems ensure that clear information is provided to consumers on end-of-life options (if applicable)?	B.10 Internal management systems ensure that clear information is provided to consumers on end-of-life options	59,41%	52,00%
Local community	Local Employment	How does the organization's role affect local employment? Evaluate if the organization hires local people	Number of new jobs created			
			Number of jobs lost during the reporting period			
	Community engagement	Level of engagement of the community with sustainability issues	Number of meetings with community stakeholders	B.11 Number of meetings with community stakeholders	0	1-3
	Access to immaterial resources	Level of organizations working to give the Community greater access to intangible resources (services, intellectual property rights, freedom of expression and access to information)	Presence/strength of community education initiatives	B.12 Number of community education initiatives regarding waste management or environment (last 6 months period)	0	1
Society	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and reduce its environmental impact. Existence of commitments ...	Level of engagement of society regarding sustainability due to changes in waste management systems	B.13 Number of public commitment actions by waste management stakeholders	0	1
	Technology development	Evaluates if the organization participates in joint research and the development of safe, efficient and environmental technologies	Sector efforts in technology development			

	Contribution to economic development	Evaluates if the organization contributes to the economic development of the country	Contribution of the service to economic development			
				B.14 I believe that the waste management system in my municipality boosts economic development	63,13%	50,00%

2.2.2.3. Waste managers

Table 14. Results of evaluation of social life pre- and post-questionnaires for waste managers of Alba Iulia.

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions waste managers	Pre-pilot impact	Post-pilot impact
Consumer (citizens)	Health and safety	Existence of policies in favor of consumer protection or consumer complaints	Satisfaction of citizens regarding health and safety issues	C.1 Waste management system in my municipality ensures health and safety living conditions	89,00%	40,00%
			Number of complaints identified regarding waste management service within 6 months period	C.2 Number of complaints identified regarding waste management service within 6 months period	20	8
			Accomplishment of legal requirements	C.3 Which legal requirements / standards regarding environment are being accomplished (ISO 14000, EMAS...)?	ISO 14001 ISO 9001 OHSAS 18001	Mainly Law 101/2014 (Law regarding waste management in localities) and amendments; Law 51/2006 (actualized 2020) – Community services; ISO 9001, 14001, 45001
	Service satisfaction	Level of consumer's satisfaction with the waste management service	Level of waste management system acceptability by citizens	C.4 Citizens have access to an adequate system of waste management	93,00%	60,00%
				C.5 Citizens have access to an adequate system of plastic packaging waste management	87,00%	70,00%
	Consumer privacy	Consumers personal data is well stored and managed	Number of consumer complaints related to breach of privacy or loss of data within 6 months period	C.6 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	0	0
	Feedback Mechanism	Existence of Feedback channels to support consumers queries	Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	C.7 Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	2 (Phone number, email)	5 (General number, dispatch number, mail, Facebook, written address)
				Existence of consumer satisfaction questionnaires.	C.8 Existence of consumer satisfaction questionnaires.	No
	Transparency	If the organization clearly communicates its social responsibility and the aspects	Number of consumer complaints regarding transparency within 6 months period	C.9 Number of consumer complaints regarding transparency within 6 months period	5	0 (no complaints); info is published weekly in local newspaper

			Communication of the results of social and environmental life cycle impact assessment	C.10 The results of social and environmental life cycle impact assessment have been communicated	Yes	No
	End of life responsibility	If the organization communicates clearly to consumers how they should properly manage their waste	Do internal management systems ensure that clear information is provided to consumers on end-of-life options (if applicable)?	C.11 Internal management systems ensure that clear information is provided to consumers on end-of-life options	87,00%	70,00%
Local community	Local Employment	How does the organization's role affect local employment? Evaluate if the organization hires local people	Number of new jobs created	C.12 Number of new jobs created in the last 6 months	12	9
			Number of jobs lost during the reporting period	C.13 Number of jobs lost during the last 6 months	12	0
	Community engagement	Level of engagement of the community with sustainability issues	Number of meetings with community stakeholders	C.14 Number of meetings with community stakeholders	3-5	2 (with block associations)
	Access to immaterial resources	Level of organizations working to give the Community greater access to intangible resources (services, intellectual property rights, freedom of expression and access to information)	Presence/strength of community education initiatives	C.15 Number of community education initiatives (last 6 months period)	2-5	1
Society	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and reduce its environmental impact. Existence of commitments ...	Level of engagement of society regarding sustainability due to changes in waste management systems			
				C.16 I believe that citizens are committed with sustainability issues	Yes	Yes
	Technology development	Evaluates if the organization participates in joint research and the development of safe, efficient and environmental technologies	Sector efforts in technology development	C.17 Economic effort by the company in the development of new technologies compared to the sector	86,00%	80,00%
C.18 Percentage of employees of the company assigned to R&D with respect to the total number of employees				2,00%	2-3% (at holding level)	

	Contribution to economic development	Evaluates if the organization contributes to the economic development of the country	Contribution of the service to economic development	C.19 I believe that plastic recycling can contribute to economic development of the municipality	89,00%	50,00%
				C.20 I believe that the waste management system in my municipality boosts economic development	97,00%	80,00%

2.2.2.4. Municipality

Table 15. Results of evaluation of social life pre- and post-questionnaires for municipality of Alba Iulia.

Stakeholders	Subcategory	What does it evaluate?	Inventory indicator	Questions municipality	Pre-pilot impact	Post-pilot impact
Consumer (citizens)	Health and safety	Existence of policies in favor of consumer protection or consumer complaints	Satisfaction of citizens regarding health and safety issues	D.1 Waste management system in my municipality ensures health and safety living conditions	68,97%	61,00%
			Number of complaints identified regarding waste management service within 6 months period	D.2 Number of complaints identified regarding waste management service within 6 months period	Inconclusive	Inconclusive
			Accomplishment of legal requirements	D.3 Which legal requirements / standards regarding environment are being accomplished (ISO 14000, EMAS...)?	ISO 14000	ISO 9001 ISO 14000 Law 31/2019 Law. 137/1995 Gov. decision 195/2005
	Service satisfaction	Level of consumer's satisfaction with the waste management service	Level of waste management system acceptability by citizens	D.4 Citizens have access to an adequate system of waste management	54,48%	57,00%
				D.5 Citizens have access to an adequate system of plastic packaging waste management	57,14%	49,00%
	Consumer privacy	Consumers personal data is well stored and managed	Number of consumer complaints related to breach of privacy or loss of data within 6 months period	D.6 Number of consumer complaints related to breach of privacy or loss of data within 6 months period	0	0
	Feedback Mechanism	Existence of Feedback channels to support consumers queries	Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	D.7 Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)	6 (Phone number, email, incident sheets, technical service phone number, media channels, dispatch, civil-alert app)	6 (Phone number, email, incident sheets, technical service phone number, media channels, dispatch, civil-alert app)
				Existence of consumer satisfaction questionnaires.	D.8 Existence of consumer satisfaction questionnaires.	No
	Transparency	If the organization clearly communicates its social responsibility and the aspects	Number of consumer complaints regarding transparency within 6 months period	D.9 Number of consumer complaints regarding transparency within 6 months period	0	0

			Communication of the results of social and environmental life cycle impact assessment	D.10 The results of social and environmental life cycle impact assessment have been communicated	Some	Inconclusive (Yes=1, No=5, Some=4)
	End of life responsibility	If the organization communicates clearly to consumers how they should properly manage their waste	Do internal management systems ensure that clear information is provided to consumers on end-of-life options (if applicable)?	D.11 Internal management systems ensure that clear information is provided to consumers on end-of-life options	51,79%	48,00%
Local community	Local Employment	How does the organization's role affect local employment? Evaluate if the organization hires local people	Number of new jobs created			
			Number of jobs lost during the reporting period			
	Community engagement	Level of engagement of the community with sustainability issues	Number of meetings with community stakeholders	D.12 Number and quality of meetings with community stakeholders	0	Inconclusive
	Access to immaterial resources	Level of organizations working to give the Community greater access to intangible resources (services, intellectual property rights, freedom of expression and access to information)	Presence/strength of community education initiatives	D.13 Number of community education initiatives (last 6 months period)	0	1-2
Society	Public commitment to sustainability issues	Evaluates if the company is carrying out actions to improve its sustainability and reduce its environmental impact. Existence of commitments ...	Level of engagement of society regarding sustainability due to changes in waste management systems	D.14 I believe that citizens are committed with sustainability issues	51,72%	63,00%
	Technology development	Evaluates if the organization participates in joint research and the development of safe, efficient and environmental technologies	Sector efforts in technology development			

	Contribution to economic development	Evaluates if the organization contributes to the economic development of the country	Contribution of the service to economic development	D.15 I believe that plastic recycling can contribute to economic development of the municipality	93,10%	80,00%
				D.16 I believe that the waste management system in my municipality boosts economic development	87,93%	71,00%

2.2.2.5. Main conclusions of social impact in Alba Iulia

Based on the results obtained, the social impact was calculated for each of the subcategories studied. The impact values were determined by comparing the answers to the questionnaires before and after the pilot. This impact was calculated on a scale from 0 to 5, where 5 would be the highest possible impact and 0 no impact.

The impact values of Figure 6 were calculated as the mean of the social impact obtained from the results of each questionnaire (citizens, block administrators, waste managers and municipality).



Figure 6. Social impact assessment in Alba Iulia pilot by impact category.

1. Consumer privacy

No complaints have been received from consumers about breach of privacy or loss of data during the period in which the pilot took place.

2. Local employment

During the development of the pilot, 9 new jobs have been created. The organization (waste manager) mainly hires local citizens, that is, from Alba Iulia or surroundings.

3. Feedback mechanism

It has been detected a general increase in the number of communication channels with citizens. However, the non-existence of consumer satisfaction questionnaires is a point to improve. The possibility of changing this aspect should be evaluated in order to increase the citizen's options to communicate with the different stakeholders involved.

4. Technology development

The waste management company maintains its level of development of new technologies, slightly increasing the percentage of employees who work on R&D tasks.

5. Transparency

The total number of consumer complaints about transparency has dropped to 0 since the start of the pilot (in the case of waste

managers this info was published weekly in local newspaper). However, the results of the social and environmental life cycle impact assessment have not been fully communicated to citizens. Stakeholders should communicate the full results of this evaluation through the different media available to be more socially transparent.

6. Community engagement

The number of meetings with community stakeholders has increased in the case of block administrators and municipality but has decreased in waste managers. Therefore, more meetings should be regularly held to improve the level of engagement of the community with sustainability issues.

7. Public commitment to sustainability issues

The number of public commitment actions by waste management stakeholders carried out by the block administrators has increased from 0 to 1, which is apparently insufficient. However, the belief that citizens are committed with sustainability issues is common among stakeholders at a general level.

8. Service satisfaction

No variation has been in the level of consumer satisfaction. These results can be used as a starting point to improve this aspect, especially in the case of block administrators and municipality.

9. End of life responsibility

No notable changes in terms of end of life responsibility issues have been established.

10. Access to immaterial resources

The same trend was determined as in the impact category "Community engagement".

11. Health and safety

Citizen satisfaction regarding health and safety issues has remained fairly stable. Only one deviation has been detected in the case of waste managers, but as there is only one person who answered the post-pilot questionnaire, it can be said that it is not 100% conclusive. There is a decrease in the number of complaints about the waste management service, and what is more remarkable, a general increase in compliance with legal requirements. This makes clear the impact that the project has had on this impact category.

12. Contribution to economic development

Although the overall results obtained are admissible, a slight decrease in this indicator has been detected in several aspects. It would be advisable for organizations to assess whether their contribution to the economic development of the country could be addressed through new available channels.

2.2.3. Evaluation of Social Impact in Utrecht

In the case of Utrecht, ITENE was working with Municipality of Utrecht to collect sufficient questionnaires to have representative study. However, the social evaluation was not carried out due to low user participation and because the participating users could not to be identified for ethical reasons. Consequently, the questionnaires could not to be sent to the involved stakeholders. However, several questions were asked to participants to evaluate their point of view about waste recycling. Some of the collected answers are presented in Table 16.

Table 16. Results of evaluation of social life pre-questionnaire for citizens of Utrecht.

Questions citizens	Pre-pilot impact
<p>1. Do you believe in waste separation and recycling?</p>	<p>0 5 10 15 20 25 30 35 40%</p> <p>STRONGLY AGREE (Green house icons: 6)</p> <p>AGREE (Green house icons: 8, Orange house icons: 4)</p> <p>NEUTRAL (Green house icons: 6, Orange house icons: 4)</p> <p>DISAGREE (Green house icons: 4, Orange house icons: 8)</p> <p>STRONGLY DISAGREE (Orange house icons: 8)</p> <p> 🏠 I think that the plastics I separate from the rest of my waste are effectively recycled. 🏠 I believe that after the truck picks up the containers, the trash is all mixed up together at the sorting plant. </p>
<p>2. Are you aware of plastic recycling initiatives in Utrecht?</p>	<p>0 5 10 15 20 25 30 35%</p> <p>STRONGLY AGREE (Blue house icons: 5)</p> <p>AGREE (Blue house icons: 8)</p> <p>NEUTRAL (Blue house icons: 4)</p> <p>DISAGREE (Blue house icons: 8)</p> <p>STRONGLY DISAGREE (Blue house icons: 0)</p>
<p>3. How far from your house is the nearest container for plastic packaging material?</p>	<p>0 5 10 15 20 25 30 35 40%</p> <p>I have a container for my home (Green house icons: 8)</p> <p>I have a mini-container for personal use (Blue house icons: 7)</p> <p>2-5 minutes walk (Green house icons: 4)</p> <p>5-10 minutes walk (Orange house icons: 4)</p>

As can be seen, citizens have a positive image of how waste separation and recycling takes place in their city. More than 50% of the people interviewed believe that the plastics that they separate at source are subsequently recycled effectively. Furthermore, in general they know that after the truck picks up the containers, the trash is not all mixed up together at the sorting plant. The function of the sorting plants is to select the content of the incoming material that arrives there with the option of separating the recoverable fractions and preparing them for commercialization. The non-separated materials are prepared to be processed with a final treatment.

Regarding the question of whether they are aware of the initiatives on plastic recycling carried out in Utrecht, more than 50% believe that they are, while around 30% think that they are not aware of the initiatives taking place in their city. Therefore, to encourage interest in recycling, a weekly newsletter has been sent to the participants with information about recycling, how to recycle, updates about analyses and sometimes an answer in general to a question. Figure 7 shows an example of this newsletter.



PlastiCircle: Keep up the good work!

Nog 60 dagen te gaan, we zijn benieuwd: Welke plastic verpakking moet volgens jou direct verboden worden?

In dit bericht lees je over:

- o oproep voor panelleden bij werkbezoek van de Europese Commissie
- o Herinnering enquête
- o Plasticsoorten en Symbolen
- o Resultaten van de 0-meting in Terwijde
- o Plasticafval in het nieuws



"Beste Europese Commissie.....Europa zou zijn eigen rotzooi moeten opruimen!"

Dinsdagmiddag 3 december 2019 komt de Europese Commissie op werkbezoek in Utrecht. Wij zijn op zoek naar drie deelnemers die spreekvaardig zijn in het Engels en die de commissie tijdens een paneldiscussie wel eens het vuur nader aan de schenen willen leggen...

Wil jij meedoen? Meld je dan gauw aan via [deze link](#)!

Was je al toegekomen aan het invullen van de Europese enquête? Jouw antwoorden helpen de Europese Unie om de opvattingen over de recycling van plastic te begrijpen. Het invullen van de vragenlijst duurt ongeveer 10 minuten en je antwoorden blijven anoniem. Je vindt de vragenlijst [hier](#).

Zoek de verschillen! Plastic Soorten en Symbolen hoe herken je ze?

Maar eerst nog even dit...
Op producten uit de supermarkt tref je vaak onderstaande weggevoersymbolen aan. Het is een eigen keuze van de supermarkt om dit erop te vermelden!



Figure 7. Example of newsletter sent to citizens during Utrecht pilot.

Regarding the distance of the containers, the vast majority have a container for their home and they hardly have to move to deposit their garbage bags.

Just before, during and after the Utrecht pilot samples were taken for analyses of the collected plastic packaging, metal packaging and drinking cartons. The composition of the collected packaging waste has been examined. Figures Figure 8 and Figure 9 show what was found in the mini-containers and in the underground container just before and after the pilot. As can be seen, the fraction of plastic non-packaging and contamination deposited in the containers was reduced as a consequence of the implementation of the pilot.

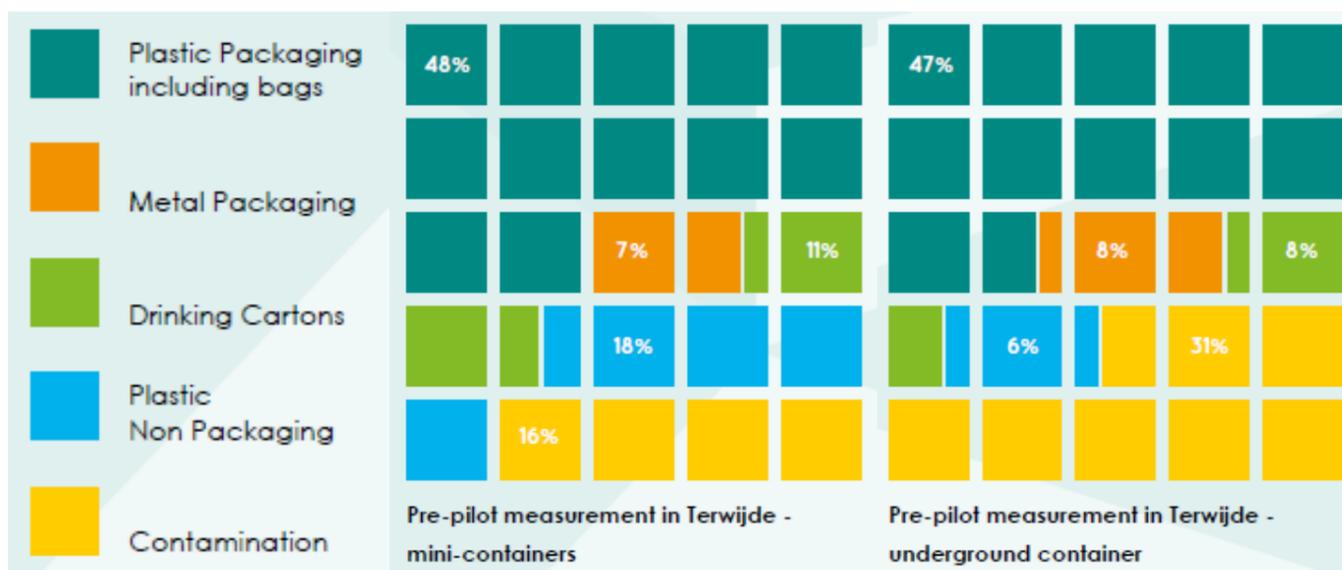


Figure 8. Composition of the collected packaging in mini-containers and underground container in Utrecht pre-pilot.

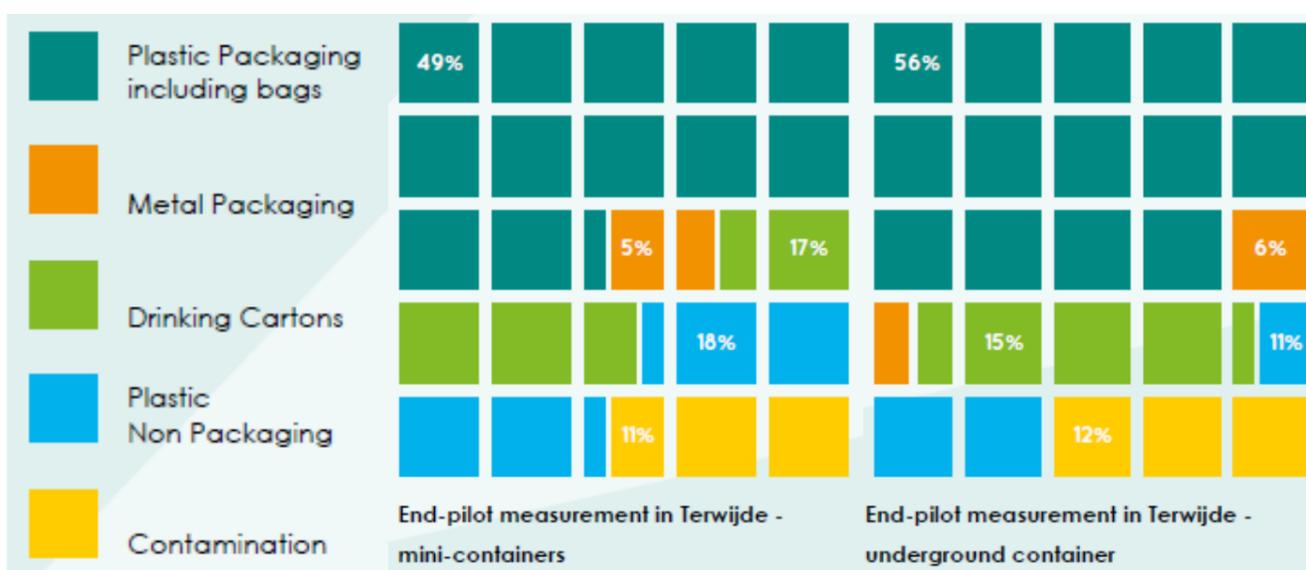


Figure 9. Composition of the collected packaging in mini-containers and underground container in Utrecht post-pilot.

3. Conclusions

This deliverable provides information on social impact of plastic packaging waste management systems of the three cities involved on PlastiCircle project: Valencia, Alba Iulia and Utrecht. The comparison between the situation before and after the implementation of the pilot have provided information on the social benefits of applying the PlastiCircle concept to the waste management systems in the European countries.

This assessment has adapted the UNEP *Guidelines for Social Life-Cycle Assessment of Products* (2020) which correspond to ISO 14040 and 14044 standards for *Life-Cycle Assessment*. Indicators were identified and linked to impact categories. Questionnaires were prepared and sent to relevant project participants and plastic waste management actors. In order to compare the pre- and post-pilot situation, relevant data from all stakeholders were collected. Results of this social impact assessment after the the complete evaluation of the answers obtained from the stakeholders are shown in the Figure 10 (blue: Valencia pilot, orange: Alba Iulia pilot, grey: average value of both pilots).

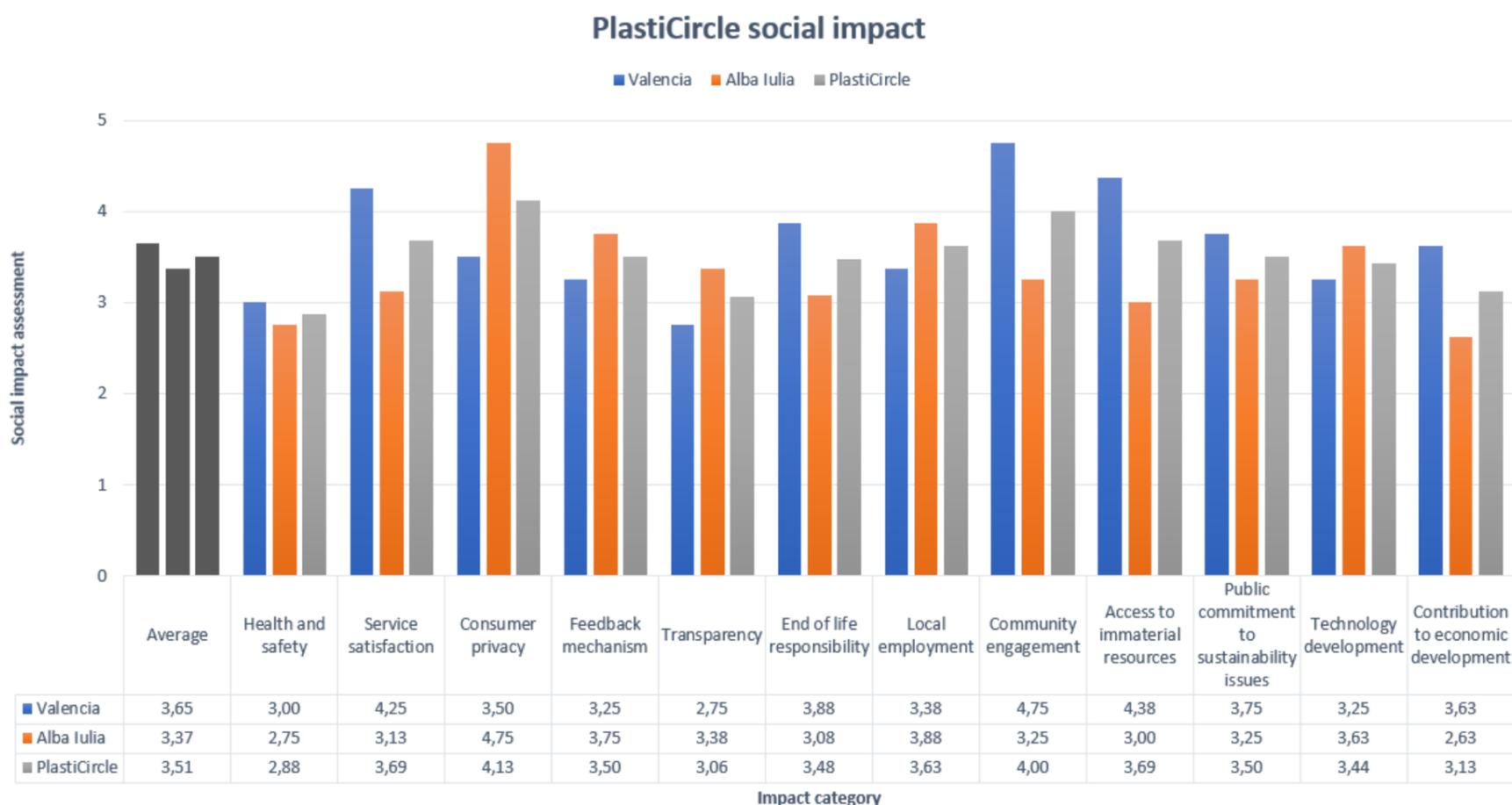


Figure 10. Social impact assessment in Valencia and Alba Iulia pilot and in PlastiCircle project by impact category.

In the case of **Valencia**, the greatest impact has been obtained in **“Community engagement” (4,75)**, mainly due to the substantial increase of meetings between community stakeholders: citizens associations (from 1.4 to 12.5) and waste managers (from 0 to 24). In contrast, **“Transparency” (2,75)** is the least valued impact category. Although organizations have shown that there have been no complaints from consumers, the complete results of the social and environmental life cycle impact assessment are not communicated. In addition, citizens believe that they are not well informed, which can lead to citizen dissatisfaction with the waste collection system implemented in their municipality.

Carrying out the same analysis in **Alba Iulia**, the excellent score obtained by the **“Consumer privacy” (4,75)** stands out. No complaints have been from consumers about breach of privacy or loss of data during the period in which the pilot took place. This means that the implementation of the pilot has been well received by citizens. In fact, 100% of the interviewed citizens agreed that once the project has been finished, they would like to continue sorting their waste. On the contrary, **“Contribution to economic development” (2,63)** has the lowest score. It would be advisable for organizations to assess whether their contribution to the economic development of the country could be addressed through new available channels.

The social impact of **PlastiCircle** has been also calculated, determining that the best evaluated impact category was **“Consumer privacy” (4,13)** and the worst valued was **“Health and safety” (2,88)**.

In the case of **Utrecht**, the social evaluation was not carried out due to low user participation and because the participating users could not to be identified for ethical reasons. However, several questions were asked to participants to evaluate their point of view about waste recycling. Citizens have a positive image of how waste separation and recycling takes place in their city. Regarding the distance of the containers, the vast majority have a container for their home and they hardly must move to deposit their garbage bags. The composition of the packaging waste in Utrecht was examined determining that the fraction of plastic non-packaging and contamination deposited in the containers was reduced because of the implementation of the pilot. Finally, to encourage interest in recycling, a weekly newsletter was sent to the participants with information about recycling issues.

To summarize, this S-LCA has been applied to calculate the social impact of PlastiCircle. S-LCA provides a consistent view of social hotspots along the life cycle or value chain; ensures hotspots are understood rather than overlooked in product sustainability efforts; and results help focus stakeholder questionnaires on certain aspects and add depth to sustainability reports. Finally, performed together with E-LCA, helps to understand the intersection of social and environmental issues, better aligning environmental sustainability efforts with social efforts.

4. Annexes

ANNEX 1. SLCA QUESTIONNAIRES

PLASTICIRCLE - Social Life Cycle Assessment: CITIZENS (participants)

In order to compile information about the Social Impact that implementing PLASTICIRCLE is going to have in a municipality, we would be very grateful if you could answer the following questions. You will have to answer these questions again, once the pilot has been implemented in your municipality.

1. *Mark only one oval.*

Option 1

Terms and conditions

Please, before answering this questionnaire, read the PARTICIPANT INFORMATION SHEET which will be attached to this questionnaire

2. **MUNICIPALITY'S NAME**

Mark only one oval.

Valencia

Alba Iulia

Utrecht

HEALTH AND SAFETY

3. **A.1 Waste management system in my municipality ensures health and safety living conditions**

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

4. **A.2 I have access to an adequate system of waste management**

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

5. **A.3 I am satisfied with the recycling system of my municipality**

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

6. A.4 I have access to an adequate system of plastic packaging waste management

Mark only one oval

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

7. A.5 I have regular waste collection in my area

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

CONSUMER'S PRIVACY

8. A.6 I believe that my personal data and information is well stored

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

FEEDBACK MECHANISM

9. A.15 Transforming plastic packaging to other products is a good way to obtain valuable resources

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

10. A.8 I have access to consumers' satisfaction questionnaires

Mark only one oval.

Yes

No

TRANSPARENCY

11. A.9 I believe that waste management system in my municipality is transparent

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

END OF LIFE RESPONSIBILITY

12. A.10 Recycling helps to conserve the environment

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

13. A.11 Recycling reduces the amount of waste going to landfill

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

14. A.12 Landfilling waste harms the environment

Mark only one oval.

- Yes
- No
- Yes, but I would like to learn more

15. A.13 Waste incineration discourages recycling

Mark only one oval.

- Yes
- No
- Yes, but I would like to learn more

16. A.14 I know how to separate waste according to the directives of my country

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

17. A.15 Transforming plastic packaging to other products is a good way to obtain valuable resources

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

18. A.16 I know how to separate all plastic packaging

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

19. A.17 Internal management systems ensure that clear information is provided to consumers on end-of-life options

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

COMMUNITY ENGAGEMENT

20. A.18 I have participate in workshops and awareness campaigns and meetings on waste management

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

21. A.19 I am a aware of education initiatives on waste management in my municipality

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

22. A.20 Whether I recycle or not does NOT make a difference

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

23. A.21 Recycling is rewarding

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

24. A.22 Sustainability issues are relevant to our daily life

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

25. A.23 Recycling of plastic packaging is relevant to our daily lives

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

26. A.24 Recycling is rewarding

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

27. A.25 I would prefer to receive individual/collective incentives for recycling

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

28. A.26 I believe my efforts in sorting plastic packaging have a direct benefit

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

29. A.27 I feel guilty if I don't recycle

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

30. A.28 I believe that waste managers are making an effort to improve technology development

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

31. A.29 I believe that the waste manager in my municipality is working to reduce their environmental impact

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

32. A.30 I believe that plastic recycling can contribute to economic development of the municipality

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

33. A.31 I believe that the waste management system in my municipality boosts economic development

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

34. Additional Comments

35. Describe any complaints you have

36. Gender

Mark only one oval.

Male

Female

37. Age

Mark only one oval.

- 18 - 25
- 25 - 35
- 35 - 45
- 45 - 55
- 55 - 65
- Over 65

38. Working conditions

Mark only one oval.

- Employed full-time
- Employed part-time
- Unemployed
- Student
- Other

39. Level of studies

Mark only one oval.

- No studies
- Elementary school
- High school
- College
- PhD
- Other

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PLASTICIRCLE - Social Life Cycle Assessment: Stakeholder: CONSUMERS / CITIZENS ASSOCIATION

In order to compile information about the Social Impact that implementing PLASTICIRCLE is going to have in a municipality, we would be very grateful if you could answer the following questions.

Terms and conditions

Please, before answering this questionnaire, read the PARTICIPANT INFORMATION SHEET which will be attached to this questionnaire

1. NAME OF THE ORGANISATION

2. MUNICIPALITY'S NAME

Mark only one oval.

- Alba Iulia
- Valencia
- Utrecht

HEALTH AND SAFETY

3. B.1 Waste management system in my municipality ensures health and safety living conditions

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

4. B.2 Number of complaints identified regarding waste management service within 6 months period

5. B.3 Citizens have access to an adequate system of waste management

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

6. B.4 Citizens have access to an adequate system of plastic packaging waste management

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

CONSUMER'S PRIVACY

7. B.5 Number of consumer complaints related to breach of privacy or loss of data within 6 months period

FEEDBACK MECHANISM

8. B6. Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)

Tick all that apply.

- Phone number (general)
- Email
- Incident sheets
- Technical service phone number
- Other: _____

9. B.7 Existence of consumer satisfaction questionnaires

Mark only one oval.

- Yes
- No

TRANSPARENCY

10. B.8 Number of consumer complaints regarding transparency within 6 months period

Mark only one oval.

- Yes
- No
- Yes, but I would like to learn more

11. B.9 The results of social and environmental life cycle impact assessment have been communicated

Mark only one oval.

- Yes
- No
- Some

END OF LIFE RESPONSIBILITY

12. **B.10 Internal management systems ensure that clear information is provided to consumers on end-of-life options**

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

13. **B.11 Number of meetings with community stakeholders regarding waste management**

14. **B.12 Number of community education initiatives regarding waste management or environment (last 6 months period)**

15. **B.13 Number of public commitment actions by waste management stakeholders**

16. **B.14 I believe that the waste management system in my municipality boosts economic development**

Mark only one oval.

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

17. **Additional Comments**

18. **Describe any complaints you have**

19. Gender

Mark only one oval.

- Male
- Female

20. Age

Mark only one oval.

- 18 - 25
- 25 - 35
- 35 - 45
- 45 - 55
- 55 - 65
- Over 65

21. Working conditions

Mark only one oval.

- Employed full-time
- Employed part-time
- Unemployed
- Student
- Other

22. Level of studies

Mark only one oval.

- No studies
- Elementary school
- High school
- College
- PhD
- Other

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PLASTICIRCLE - Social Life Cycle Assessment: Stakeholder: WASTE MANAGER

In order to compile information about the Social Impact that implementing PLASTICIRCLE is going to have in a municipality, we would be very grateful if you could answer the following questions. You will have to answer these questions again, once the pilot has been implemented in your municipality.

1. ORGANISATION'S NAME

HEALTH AND SAFETY

2. C.1 Waste management system in the municipality ensures health and safety living conditions

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

3. C.4 Citizens have access to an adequate system of plastic packaging waste management

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

END OF LIFE RESPONSIBILITY

4. C.11 Internal management systems ensure that clear information is provided to consumers on end-of-life options

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

5. C.16 I believe that citizens are committed with sustainability issues

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

6. C.17 Economic effort by the company in the development of new technologies compared to the sector

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

7. C.19 I believe that plastic recycling can contribute to economic development of the municipality

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

8. C.20 I believe that the waste management system in my municipality boosts economic development

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

9. Additional Comments

10. Describe any complaints you have

11. Gender

Mark only one oval.

Male

Female

12. Age

Mark only one oval.

- 18 - 25
- 25 - 35
- 35 - 45
- 45 - 55
- 55 - 65
- Over 65

13. Role in the organisation

14. Level of studies

Mark only one oval.

- No studies
 - Elementary school
 - High school
 - College
 - PhD
 - Other
-

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PLASTICIRCLE - Social Life Cycle Assessment: Stakeholder: WASTE MANAGER

In order to compile information about the Social Impact that implementing PLASTICIRCLE is going to have in a municipality, we would be very grateful if you could answer the following questions. You will have to answer these questions again, once the pilot has been implemented in your municipality.

1. ORGANISATION'S NAME

HEALTH AND SAFETY

2. C.2 Number of complaints identified regarding waste management service within 6 months period

3. C.3 Which legal requirements / standards regarding environment are being accomplished (ISO 14000, EMAS...)?

CONSUMER'S PRIVACY

4. C.6 Number of consumer complaints related to breach of privacy or loss of data within 6 months period

FEEDBACK MECHANISM

5. C.7 Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)

Tick all that apply.

- Phone number (general)
- Email
- Incident sheets
- Technical service phone number
- Other: _____

6. C.8 Existence of consumer satisfaction questionnaires

Mark only one oval

- Yes
 No

TRANSPARENCY

7. C.9 Number of consumer complaints regarding transparency within 6 months period

8. C.10 The results of social and environmental life cycle impact assessment have been communicated

Mark only one oval.

- Yes
 No
 Some

END OF LIFE RESPONSIBILITY

9. C.12 Number of jobs created in the last 6 months

10. C.13 Number of jobs lost during the lasts 6 months

11. C.14 Number of meetings with community stakeholders regarding waste management

12. C.15 Number of community education initiatives regarding waste management or environment (last 6 months period)

13. Additional Comments

14. Describe any complaints you have

15. Gender

Mark only one oval.

- Male
- Female

16. Age

Mark only one oval.

- 18 - 25
- 25 - 35
- 35 - 45
- 45 - 55
- 55 - 65
- Over 65

17. Role in the organisation

18. Level of studies

Mark only one oval.

- No studies
- Elementary school
- High school
- College
- PhD
- Other

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PLASTICIRCLE - Social Life Cycle Assessment:

Stakeholder: PUBLIC AUTHORITY

In order to compile information about the Social Impact that implementing PLASTICIRCLE is going to have in a municipality, we would be very grateful if you could answer the following questions. You will have to answer these questions again, once the pilot has been implemented in your municipality.

1. MUNICIPALITY'S NAME

Mark only one oval.

- Alba Iulia
- Valencia
- Utrecht

HEALTH AND SAFETY

2. D.1 Waste management system in the municipality ensures health and safety living conditions

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

3. D.2 Number of complaints identified regarding waste management service within 6 months period

4. D.3 Which legal requirements / standards regarding environment are being accomplished (ISO 14000, EMAS...)?

5. D.4 Citizens have access to an adequate system of plastic packaging waste management

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

6. D.5 Citizens have access to an adequate system of plastic packaging waste management

Mark only one oval

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

CONSUMER'S PRIVACY

7. D.6 Number of consumer complaints related to breach of privacy or loss of data within 6 months period

FEEDBACK MECHANISM

8. D.7 Number of communication channels with the citizen (Email, phone number, incident sheets, fax, technical service, etc.)

Tick all that apply.

- Phone number (general)
- Email
- Incident sheets
- Technical service phone number
- Other: _____

9. D.8 Existence of consumer satisfaction questionnaires

Mark only one oval.

- Yes
- No

TRANSPARENCY

10. D.9 Number of consumer complaints regarding transparency within 6 months period

11. D.10 The results of social and environmental life cycle impact assessment have been communicated

Mark only one oval.

- Yes
- No
- Some

END OF LIFE RESPONSIBILITY

12. **D.11 Internal management systems ensure that clear information is provided to consumers on end-of-life options**

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Totally disagree	<input type="radio"/>	Totally agree									

13. **D.12 Number of meetings with community stakeholders regarding waste management**

14. **D.13 Number of community education initiatives regarding waste management or environment (last 6 months period)**

15. **D.14 I believe that citizens are committed with sustainability issues**

Mark only one oval.

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

16. **C.15 I believe that plastic recycling can contribute to economic development of the municipality**

Mark only one oval.

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

17. **C.16 I believe that the waste management system in my municipality boosts economic development**

Mark only one oval.

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

18. **Additional Comments**

19. Describe any complaints you have

20. Gender

Mark only one oval.

- Male
 Female

21. Age

Mark only one oval.

- 18 - 25
 25 - 35
 35 - 45
 45 - 55
 55 - 65
 Over 65

22. Working conditions

Mark only one oval.

- Employed full-time
 Employed part-time
 Unemployed
 Student
 Other

23. Level of studies

Mark only one oval.

- No studies
 Elementary school
 High school
 College
 PhD
 Other



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