Motivations and Obstacles in the Implementation of Public Policies Encouraging the Sorting of Organic Waste: The Case of a Metropolis of 400,000 Citizens

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Abstract—In the face of new regulations related to waste management, it has become essential to understand the organizational process that accompanies this change. Through an experiment on the sorting of food waste in the community of Grand Reims, this research explores the acceptability, the behavior and the tools needed to manage the change. Our position within a private company, SUEZ, a key player in the waste management sector, has allowed us to set up a driven team with concerned public organizations. The research was conducted through a theoretical study combined with semi-structured interviews. This qualitative method allowed us to conduct exchanges with users to assess the motivations and obstacles linked to the sorting of bio-waste. The results revealed the action levers necessary for the project's sustainability. Making the sorting gestures accessible and simplified makes it possible to target all populations. Playful communication adapted to each type of persona allows the user and stakeholders to be placed at the heart of the strategy. These recommendations are spotlighted thanks to the combination of theoretical and operational contributions, with the aim of facilitating the new public management and inducing the notion of performance while providing an example of added value.

Keywords—Bio-waste, Corporate Social Responsibility, CSR, stakeholders, public policies.

I. INTRODUCTION

WASTE management is one of the challenges of sustainable development. It obliges local authorities to review their approach in this field. This is why the Reims local authority, "Le Grand Reims", a French urban community (300,000 h) located in the department of Marne and the Grand Est, in charge of managing the agglomeration, is asking private and public stakeholders to rethink bio-waste management over the next three years. Stakeholders are seeking to reorganize themselves to meet this injunction through a CSR (Corporate Social Responsibility) approach [23]-[28]. They are encouraged to improve, restructure or even reinvent the management of bio-waste in this agglomeration of 300,000 inhabitants and its 700 thousand tons of residual waste.

- From a managerial point of view: by 2024, the stakeholders will have to find a sustainable operation and a functional articulation of their units.
- From a societal point of view: people expect communities to manage their waste responsibly and sustainably [24].
- From a normative point of view: the European Union encourages the promotion of new regulations regarding waste recovery before 2024. Cf. directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste.

Waste management in Greater Reims has been entrusted for more than 60 years to the company SUEZ, which is in charge of both its management and recovery, but the CSR (Corporate Social Responsibility) or OSR (Organization social responsibility) approach that will eventually be imposed on all stakeholders, (in a local authority, the stakeholders are the State, other local authorities, users, citizens, companies, employees and associations), requires reorganization and adaptation to this normative logic [17]. Greater Reims and SUEZ must rethink their relationship, in a CSR approach, in order to manage bio-waste. The approach here is twofold (CSR for SUEZ and CSR for Grand Reims) and assumes a common approach to this issue [3]. For this agglomeration, waste management is becoming increasingly complex and costly. Only one fifth of the waste produced in Reims is currently recycled, the remaining are either buried or incinerated. The cost of treating this waste is constantly increasing and taxed, under the General tax on polluting activities (TGAP). Beyond the sustainable development aspect, it is also an important financial issue for the inhabitants/users since they indirectly bear it by the increase of one of the so-called local taxes, the housing tax via the household waste tax. In this context, a call for tenders was launched by the city of Reims. It was decided to set up, before 2024, a new collection system for bio-waste. This waste production could be recovered, for example, through composting and/or energy production (methanization) and thus become a performance factor [25].

One of the strategies envisaged which motivates the officials of Greater Reims would be to reuse locally, and in a sustainable way, the raw materials that can be recovered from the waste produced by its population and by the local economic activity. This is a multidimensional issue with economic, financial, legal, social and environmental impacts. Users must be convinced of the need to sort and, to sort well, on a voluntary approach [26].

Initially, it is mainly a question of understanding the behavior of users [14] concerning waste sorting. This leads to our research question: What is the perception of users with regard to this new waste sorting? This theme has hitherto not been widely addressed by researchers and we have therefore chosen

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World Academy of Science, Engineering and Technology
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to explore it in this research.

We first present a theoretical framework based on the CSR approach and the stakeholder theory. Then, we present the methodology used and the results obtained and discuss them.

II. THEORETICAL FRAMEWORK

For the bio-waste management company and the local authorities (Grand Reims and SUEZ), a CSR approach to sustainable development and the circular economy means relying on organizational innovation. The research highlights the managerial implications and the development of influence strategies according to the categories of actors involved. They will aim to facilitate the implementation of new practices leading to new behaviors, or even new regulations. This study allows us to conceptualize the notion of change management [1].

A major problem of social, political and managerial legitimacy is raised in the management of the common "goods" by public organizations [3]. A new social contract between stakeholders is possible from CSR approach. Stakeholders, although some have contingencies and/or a mission to carry out, must assume the consequences of choices or non-choices that would create negative externalities [2].

These externalities generated by our consumption could be mitigated by an effective and responsible organization of the waste management chain by enabling each stakeholder to play their part. Thus, Freeman's stakeholder theory can provide elements for analyzing the management mechanisms to be introduced into the organization of bio-waste collection. According to Freeman [13], "A stakeholder is an individual or group of individuals who may affect or be affected by the achievement of organizational objectives." This theory has remained stable although mobilized, over time, in different studies on many topics with managerial aspects [3].

Stakeholder theory allows us to conceive of an organization as a web of social, cultural, moral, societal, and economic contracts. This vision of stakeholders [13] tells us that the organization is also a voluntary association of individuals interacting to achieve a specific goal, in this case the efficient management of bio-waste produced in a territory. A few authors [26] highlight a convergence of views in the literature on the voluntary or involuntary contribution of stakeholders (individuals or organizations) to creating value for activities for which they may or may not benefit or bear the risks. Thus, we need to look for actionable levers that would make a paradigm shift in waste management acceptable to all stakeholders. Some authors [18] recommend a study based on the analysis of resources and skills of the stakeholders concerned.

Our questions arise from readings on the use of stakeholder theory over time [5], [6], [10]. We mobilize recommendations, which are to use the stakeholder theory along three axes: descriptive, instrumental and normative [18].

- Descriptive - Organizations are composed of stakeholders with common or opposing interests. The activity of organizations impacts stakeholders and vice versa. The research consists in listing, inventorying and cataloguing these interactions;

- Instrumental - We need to focus our research on the connections that do or do not exist between organizational performance and stakeholders. The nature of these connections is interesting, because if the goal of value creation is to be achieved, then the interests of stakeholders must be known;

- Normative - Each stakeholder must be considered according to their legitimacy in the governance of the project.

Our research focused on this legitimacy use of the stakeholder theory to propose managerial actions that respect common interests. The normative logic is particularly suited to the ideas of institutionalizing CSR within a community [17]. In this logic, public bodies must exercise control over companies, if only because they set the standards. The companies concerned must follow the social obligations dictated by their CSR approach and the general interest through an environmental ethic, whereas public organizations have adopted a specific strategic management of CSR. The convergence of public and private CSR/SO strategies is based on four pillars: social, ecological and political, but also economic. These pillars are the references that a company or public organization will choose to adopt according to the contemporary sustainable development issues that are important to their strategic stakeholders. This observation is in line with the observations made by some authors [25] who consider that a CSR approach is a source of sustainable progress that translates into performance in terms of social justice, economic prosperity and environmental quality. The advantages of this strategy are based on a competitive advantage in terms of user adherence either to a party or to a pre-defined course of action [14].

Thus, several questions concerning the place of public policies and the importance of the field approach during a managerial change within a community are raised. We also reflect on the causes and effects of a positioning that is too focused on the satisfaction of a population, given the current events and electoral stakes. The foundations of this research are based on the awareness of the complexity of the issues, the need to implement a strategy based on stakeholder orientation and, among other things, on the new opportunities offered in this area by the tools of participatory democracy [2].

According to the CSR approach, the sustainability of an organization's management of the mitigation of a negative externality, created by practices common to a large set of stakeholders, lies amidst market, ecological and political aspects of the problem. The fact that the link between what is sustainable and what is perennial is made when stakeholder engagement contributes to the overall accountability, it was argued, is not always the case [15]. Organizational learning would be a response to the need for adjustment in the dynamics of change, especially those based on a paradigm shift [9].

In this search for sustainability, there is a dynamic and integrative concept that can be apprehended after a systemic analysis [8]. It is therefore advisable to consider several levels of analysis: the individual, the groups and the company, and in the context of the search for a sustainable organization, to

World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:17, No:12, 2023

apprehend the inter-organizational levels, i.e., the relationships between all the stakeholders without exception.

Table I summarizes the theoretical framework used: that of stakeholders, which we apply to a corporate social responsibility approach, which is intended to be a condition for the sustainability of the biowaste collection organization. This theoretical framework allows us to study the complex system linking the stakeholders to waste management. The aim is to identify efficient and useful managerial practices to make the collection of bio-waste, sustainable and responsible, acceptable and convenient for the different actors.

A necessity given the societal and environmental stakes with the integration of the CSR/SR approach for stakeholders and in particular users of the bio-waste project, hence our research question: What is the perception of the users in relation to this new waste sorting?

TABLE I
SUMMARY OF THE THEORIES MOBILIZED

Theoretical frame	Authors	Stream of thought	Questions
Stakeholder Theory (SP)	Freeman [16]	Relational	Do PDs have a direct relationship with organizations?
	Donaldson and Preston [10]	Legitimacy	Do they have attributes such as power or legitimacy?
	Mitchell et al. [20]		Are they inevitably to be taken into account in the decision-making process?
	Mercier [18]		
CSR/RSO	Freeman [16]	Ethics	How to respond to societal and environmental challenges?
	Carroll [4]	Normative vision	What are the responsibilities in relation to PP? Which CSR/RSO dimensions in a
	Cazal [5]	Performance model	context of social acceptability?
	Postel and Sobel [26]		
Organizational sustainability	Collins and Porras [7]	Population ecology	How to make a project acceptable? What strategy leads to sustainability?
	Harrison and Freeman [16]	Evolutionary theories	How to respond to societal, environmental and organizational issues?
	Dumez [11]		What tools can be used to ensure its effectiveness?

III. METHODOLOGY

To answer our research question (What are the users' perceptions of this new waste sorting system?), we conducted a case study in the Greater Reims metropolis, in partnership with the company SUEZ.

The case study was carried out in the four experimental biowaste collection districts of Greater Reims. Our position, around a doctoral student from Reims, under the training through research program, CIFRE (Convention Industrielle de Formation par la Recherche) is to ensure that a thesis is carried out with three main actors namely, a laboratory, a company and a researcher. The research undertaken within the company, in this case SUEZ, with the local authority as our main client, allows us to have several visions. This research work was carried out with the aim of analyzing behaviors and the rate of acceptability with regards to this organizational change. The aim was to understand motivations and obstacles, and to be able to recommend actions to be implemented to perpetuate this change, through the CSR approach that respects the values of the community and the citizens.

A. Data Collection

We carried out a qualitative survey to complement the quantitative study carried out by the community. The latter had targeted, through a questionnaire sent by e-mail, all the users registered for the bio-waste collection. The community was able to contact 432 people in order to assess their satisfaction with the proposed offer.

This qualitative survey, in co-construction with the company SUEZ and the Urban Community of Greater Reims, was planned to solicit all 14,000-targeted inhabitants, through semi-directive interviews conducted door-to-door.

In July 2022, for a period of 3 days, we met the users of this experimentation. We went to the districts concerned in order to exchange with the citizens on this experimentation. This qualitative method raised questions about the interest of this new sorting gesture, how it was constructed, what are the consequences and the aims [22]. This exploratory survey allowed us to talk to 83 people. The semi-structured interviews took place at meeting points (busy squares, shops, neighborhood centers, social centers, etc.) but also in households.

B. Analysis of the Data

Several methods for analyzing textual data have been proposed by the scientific community [12]. We have chosen to follow the model proposed by Moscarola [21]. It consists in identifying the key areas of a corpus by grouping them into themes and then extracting the relevant verbatims. We combined this model with a methodology which consists in "breaking down the content of a discourse or text into units of analysis (words, sentences, themes, etc.) and integrating them into categories selected according to the research object" [27].

To facilitate the analyses, a color code was used to identify each of the four experimental districts. The exchanges could easily be grouped into different sub-sections: strong barriers, moderate barriers, barriers associated with adherence to the service, and barriers to action in sorting. The researcher must condense and code the data collected using tables and matrices, so as not to lose the richness of the results obtained [19].

The analytical reports were coded and grouped according to the experimental area, motivation categories and identified barriers. The bio-waste sorting experiment targeted 3.5% of the population of Reims (14,000 inhabitants). Our 83 semi-structured interviews represent less than 1% of the targeted population. The sample is small and does not allow us to imagine that their words represent those of all users.

IV. RESULTS

The experimentation mainly responded to the request of committed and willing inhabitants to valorize their waste. Other inhabitants, equally motivated, already had a solution for some

World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:17, No:12, 2023

time: "I have a shared garden and I make my compost there for more than 8 years, it is just 1 km away". The shared composters were implemented in 2018 in the metropolis to meet a real need. Each composter has two referring residents who are in charge of federating a community and ensuring the quality of the compost. Training is offered to each member in order to learn how to better manage his or her waste. A composter serves an average of 30 households. They are very successful and can be seen as competing with the recent solution. Another part of the profiles does not adhere to the implementation of this food waste collection. They consider this service too polluting and in disagreement with the carbon footprint and the protection of the environment: "Total which massacres the Amazonian Forest (in reference to the garbage trucks which come to collect and which pollute).", "It is a question of money, there is a guy who sells the garbage cans and another who sells the tires."

Some users also say they are limited in sorting bio-waste, because it is perceived as complex: "To go and get the badge, it is painful and abusive. The administration takes my head off". Indeed, the proposed service obliges people to go to the town hall to register for access control, to bring specific equipment, and to walk a maximum of 200 meters to reach a terminal. Our experience shows us that by multiplying the barriers to entry, the user finds oneself slowed down in their motivation.

The exchanges with users have shown us that communication must be at the heart of the strategy for change. An essential pillar must be adapted to the target audience. Our analysis showed us that it is important to diversify communication channels available to encourage as many people as possible, given the diversity of users in a metropolis. Users are waiting for an inclusive and inciting communication, direct and human: if we knocked on their door and brought them all the material, they would volunteer to sort their food waste. "At first, I was waiting for someone to come by our house like for the other garbage cans". They need to identify a referent to understand the stakes and the interest of this change. More than one out of two people say that if the population had been consulted for this project, they would be more motivated and willing, as with the shared composters.

The focus is also on technology implementation. Previous sorting solutions were simple and accessible. Recent regulations, such as the Energy Transition Law for Green Growth of 17/08/2015, require the integration of more technological complexity for better sorting. This law also requires the creation of databases for the future.

People are gradually adapting to the technological advances of their time, but many users remain resistant: "I do not like the idea of having to put in place technology such as badges and transporting waste, plastic buckets made of kraft paper when bins with soil underneath would be so simple... as in our gardens ..."

The analysis of these interviews revealed the behavior of users with respect to the sorting of bio-waste at the curbside. We were able to determine several types of profiles: a-Sorters, b-Interested, c-Not concerned, d-Non sorters (see Table II).

TABLE II
REPRESENTATION OF SORTERS/NON-SORTERS PROFILES

	Sorters	Interested	Not concerned	Non-sorters
Profile	Families with children Active Singles	Parent with child at home Parents without children at home	Retirees Young parents	Students Young couple
Habitat	Owners Residential areas	Vertical habitats Social housing	Single-family homes Residential neighborhoods	Single-family homes Working-class neighborhoods
Solution/ Collection device	Shelters Voluntary bins	Shelters	Shelters	Voluntary bins

The sorting profiles are the users registered in the experiment, who participate on a daily basis. The interested users are people who would like to sort, but who did not have the necessary information, or who still have many questions about the principle. The non-sorters already have a solution, in individual or shared composting. The profile of the non-sorters includes all the respondents who do not see the interest of sorting food waste or who do not already sort their selective waste.

V. DISCUSSION AND RECOMMENDATIONS

The data are the result of a theoretical and field analysis, combined with feedback from the population. Our expertise has enabled us to highlight certain recommendations with the aim of facilitating the management of change and inducing the notion of performance. The avenues for improvement are emerging through communication and operationalization of the service.

The language used in this situation must be adapted to each persona typology. Different channels can be used to meet this demand. Social networks can particularly reach the youngest, school exchanges can motivate children, door to door can raise awareness among the oldest, and responsible communication could help to raise awareness of the act of sorting. Our experience has shown us that valuing the act is important to sustain behavior and give meaning to change [1].

Some communities organize site visits and compost distributions to integrate users and build community. All stakeholders should be included in the project [15]. Schools, community centers, and social outlets seem to be close to the community and potentially to non-sorters.

Workshops and filmed feedbacks can be considered to arouse curiosity and even give the desire to be part of a movement. The solutions will certainly have to be multiplied tenfold to match each type of persona, and thus multiply the chances of conquest.

We can imagine that we should not oppose different solutions but link them to strengthen the territorial network [8]. In addition, it would be relevant to identify prejudices in order to implement operational solutions. For example, odors and pests are among the obstacles identified even before the collection is set up. Solutions to overcome these fears exist and will certainly reassure users (setting up the washing history on the bins, natural deodorant, anti-insect stickers). The strategy of change must be adopted in order to reduce the brakes and encourage citizens to sort their waste.

World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:17, No:12, 2023

TABLE III
REPRESENTATION OF SORTERS/NON-SORTERS PROFILES

	Weaknesses identified	Recommendations	Added value
Hardware/Operationalization	Go to the town hall to register and pick up the material	Distribution of the material door to door or in relay point	Direct contact with the contact person
	Access control	Delete the system	Open to the entire population without registration requirements
	Odors and pests	Anticipate with impeccable hygiene and close collections	Guarantee of quality and involvement of the community and SUEZ
	Equipment use restricted to that provided by the community (kraft bags)	Possibility to use large surface kraft bags	Reducing constraints
	Technology of the terminal (QR code + badge to open)	Go door-to-door for registration and/or removal of access control, provide instructions on how to badge and scan the QR code for claims	Supporting the population and creating links
Communication	Terminal hygiene	Table on the terminals with the dates of washing	Transparency with the population and follow-up of actions
	Population does not feel concerned by this new service	Communicating the issues	Giving meaning to the act of sorting
	Untargeted communication	Use of different channels to diversify the offer	Federating a community
	Many questions from users on the principle and use of the	Identify biases and create a FAQ to publish on the website	Modernize the community and meet various demands

VI. CONCLUSION

The management of bio-waste is part of a sustainable development approach according to a CSR process involving the various stakeholders. Greater Reims was one of the first local authorities to experiment with the collection of bio-waste on a voluntary basis.

This field study allowed us to transcribe the perceptions of users regarding this new service. A change of habits is not without consequences, and it seemed essential to us to go as close as possible to the population to understand the motivations and the reticence. The quantitative study did not identify the non-sorters and their associated behaviors. Our analyses helped us to identify the elements necessary to facilitate and accompany the act of sorting. We were able to determine that a transparent discourse would radiate more easily to the population.

Indeed, raising awareness on the purpose of waste, the reduction of household waste, the added value for the planet and the climate appeals to the sensitivity of the user. The change is therefore no longer perceived as a constraint. Children have been identified as real drivers of the transition. The communication linked to word of mouth and social events represents a significant lever to highlight the new project.

Our research needs to be supplemented with other user studies to highlight the concept of new public management.

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