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Too Good To Go: acceptance factors of an application to combat food waste

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Abstract: Food waste is a national and international scourge. It is estimated that, for each person in Portugal, between 20 and 30 kg of food are thrown away per year, and the theme of waste is common from the producer to the consumer, including the distributor, and that about 17% of the edible parts of food produced for human consumption are lost or wasted in Portugal. This research work consists of a quantitative and descriptive study in which 107 participants who resided in the national territory participated, to understand the role of IT in combating food waste. The results reflect that the population is aware of the dimension of the scourge of food waste in Portugal, knows several reduction strategies (including IT, such as the TGTG app) and identifies several advantages and disadvantages in the TGTG app, which are presented as points of improvement for a possible process of development.

Keywords: food waste; sustainability; information systems; technology acceptance; mobile applications; Too Good To Go.

1 Introduction

The era we are currently experiencing has been marked by various concepts linked to sustainability, such as recycling, reduction, and reuse.

The focus of this study is to determine how information systems can support the fight against food waste, which is necessary, in a first analysis, to understand the origin of this waste.

Organic waste is the most representative of food waste, since many of these products are already made or unmade foods, often discarded before reaching their expiration date or end of life, leading to greater waste, the scarcity of resources, and the increase in CO2 emissions, causing strong negative impacts on the environment. It is, therefore, imperative to rethink and introduce a way to enhance its reduction, reeducating the consumer so that he starts to choose to reuse the product, instead of discarding it.

In this sense, it is therefore necessary to study and understand the behaviour of consumers when choosing products and the effective use of the mechanisms at their disposal to reduce waste and, consequently, the ecological footprint.

It is in this reasoning that companies introduce new products, taking advantage of changing consumer needs, and thus shortening replacement intervals.

However, awareness of the urgent need to reduce the environmental impact of consumption has become evident, so it is necessary to study and introduce new ways to encourage consumers to move away from a society that discards and does not know how to reuse (van den Berge et al., 2021).

It is considered interesting to follow this approach, especially at a time when the theme of sustainability and the debate around environmental issues have become more important, as well as the urgent need to combat climate change, changing the habits and practices of all citizens. in global terms, a topic discussed at the highest levels and more recently at the 2022 Climate Summit, held in Egypt.

The present research explores the issue of changing consumption habits, more specifically the reduction of food waste, regarding the role played by the use of IT, and in particular the use of the application Too Good To Go. For this purpose, a study was carried out consisting of a quantitative and descriptive study using a questionnaire survey.

The study will be based on the TAM model, so the focus will be on analysing and understanding the perceived ease of use (corresponding to the degree to which a person believes that the use of a given tool can be performed effortlessly) and the perceived usefulness (corresponding to the degree to which a person believes that the use of a certain tool can improve performance, in this case, the reduction of food waste) by users and potential users of this type of App, as well as its value proposition for the respective customers, in this case, the users.

The TRA model is also present, in a way, since it is intended to understand and explain the rationality of the user's choice, applying metrics to assess their attitude towards the App.

Thus, when developing this study, the following objectives were established:

• Explore the population's knowledge and behavior regarding food waste in Portugal;

• Understand expectations and level of adoption and the characteristics of the use of technology in relation to food waste, namely the Too Good To Go.

• Analyse the users' perception of the Too Good To Go app and compare it with other similar apps;

• Analyse the users' perception regarding the ease of use of the Too Good To Go app and determine how the Too Good To Go App can have a good level of acceptance and trust from the target group;

• Understand what the main expectations regarding the systems are and understand if their use is considered discreditable and could be associated with social need.

The following starting question is considered: ‘What factors can contribute to the use of an application that contributes to the reuse of excess food, to significantly reduce its waste?’

2 Literature review

2.1 Food waste

Food waste is a topic that concerns the entire world population, which has been addressed over time, and on which numerous studies have already been carried out, and there is still no consensus on the most efficient, clear, and coherent approach to what defines food waste. or quantifies food waste, thus giving rise to different opinions.

According to the Food and Agriculture Organization of the United Nations, the FAO, which in 2017 defined what it means by food loss and by food loss and waste, resulting in the idea that food loss is a decrease, not only in quantity, but also in of quality agricultural, forestry, and fishing products intended for human consumption, and that food loss and waste were defined by the reduction, from production to consumption, of the quantity and quality of food initially intended for human consumption , regardless of the cause that gave rise to it. FAO also clarified what, in its opinion, are the causes of food loss, which occur along the supply chain, from production to harvest, as well as post-harvest handling, from storage to processing and during transport.

In 2014, the High-Level Panel of Experts on Food Security and Nutrition (HLPE) defined food waste as food fit for human consumption discarded or left to deteriorate at the level of the consumer, regardless of the cause and since there is no right or wrong definition, the definition that we will consider throughout this investigation will be the HLPE, as it seems to us the most appropriate.

Regarding questions of what may or may not be avoidable waste or what part of that food waste would already be destined for waste because it is not edible, these questions are a little dubious since we were unable to answer them clearly. Inevitable food losses originate from parts of food that cannot be consumed, such as the bones and shell of eggs or pineapples (Buchner et al., 2012); however, each culture, with its characteristic habits, makes the definition of what is edible, or not, distinct, once again there is no consensus on the volume of food waste that comes from edible foods, which is why, in most cases, the studies and values presented are presented considering simultaneously what whether it would still be edible and what was already considered waste due to its initial predisposition as no consumable.

2.2 TGTG application

Application is defined as software designed through programming language to perform a set of functions, tasks, or programming language to perform a set of coordinated functions, tasks, or activities to be installed on a mobile electronic device, administered by a manager, and used by several profiles that access the available functionalities, through the permissions assigned to them (SetupTech, 2019).

This specific application will be the focus of our work. TGTG was founded in 2015, having started operating in 2016, when, for the first time, it saved its first meal in Copenhagen, where it is currently headquartered, having already managed to save an impressive 29 million meals, translating into the reduction of 72,000 tons of polluting greenhouse gases.

Initially, the idea would be to focus only on losses and waste of food from buffets, an idea that has spread to other sectors, with TGTG now having 18 million registered users and 38,000 partners, including restaurants, supermarkets, bakeries, hotels and cafes in 14 countries, where it has local offices, the company manages to save one meal per second and continues to expand year after year.

The vision behind the TGTG has remained the same since the beginning, the dire need to tackle food waste, inspiring and empowering everyone to fight together against food waste and Sweden became the latest country to join in January 2020.

Although present in many countries, TGTG remains one entity, with everything brought together under a global umbrella, and this means that the company has no franchises and that all local entities are part of the global structure, where each entity has a country manager, who coordinates operations with a local team.

The company generates revenue in two main ways through business partners active on the platform, such as the partner paying an annual subscription or paying a small commission fee to TGTG for each meal sold.

TGTG is currently considered the Business-to-Consumer (B2C) Platform with the largest business-to-consumer platform in the world with the aim of combating food waste, all through a mobile application where companies can add surplus food they have, and consumers can see the available offer.

The application is mainly intended for restaurants, bakeries, supermarkets, hotels and canteens, as already mentioned, where the business perspective is that of a "win-win solution", as it allows companies to make money with food that otherwise way would be wasted while reaching new customers, and consumers to access food at affordable prices to reduce food waste, all parties having a positive impact on the environment and since food waste is a problem that takes place at different times, TGTG decided to establish its objectives taking into account 4 basic pillars, namely households, business, education and politics.

Given that the assumption behind TGTG is that there is a way to turn an environmental issue such as food waste into a win-win situation for all, creating jobs, generating revenue, reducing food waste, and lessening its impacts on the environment, the business model turns out to be profitable and today TGTG is a growing company.

According to its earnings release, it has grown exponentially, not least because revenues increased by 200% in 2019 compared to 2018. The company makes a positive gross profit and a positive operating profit in the most mature markets.

2.3 Technology Adoption

The TAM (Technology Acceptance Model) aims to evaluate the behavior of technology use by analyzing the attitudes to the use of IS (Information Systems) from usefulness to ease of use, consists of adaptation of TRA (Theory of Reasoned Action), originally proposed by Davis (1989) assumes that the acceptance of the information system is mostly linked to two variables: perceived usefulness (PU) and perceived ease of use (PEU) (Alturas, 2021).

According to Lee et al. (2003), the Technology Acceptance Model (TAM) is considered the most influential and applied theory to describe individual acceptance of an information system (Lee et al., 2003).

According to TAM, users first consider the functions performed by computer systems (PU), and subsequently examine the ease or difficulty in using them (PEU). The behavioral intention of use (BI), is thus, defined by the person's attitude (A) in relation to the use of the system, as well as by the conviction that the IS will enhance performance (Parreira et al., 2018). This analysis can be represented in the diagram of Figure 1 (Davis et al., 1989).

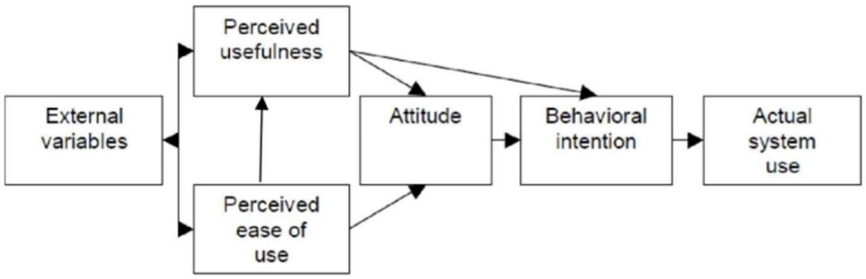


Figure 1Technology Acceptance Model (Davis, Bagozzi, & Warshaw, 1989)

Several analyzes have concluded that this model gives a dominant role to behavioral intent, in the use of technology, compared to the perception of usefulness or the perception of ease of use. However, among these two variables, the one that best predicts the acceptance of use and technology is the perception of usefulness (Legris et al., 2003; Turner et al., 2010).

Basically, the PEU is represented as the degree to which the person believes that the use of IS is effortless and the PU seeks to measure how much the person believes that the use of technology will contribute to an improvement in their performance. This perception on the part of the user appears to have a positive influence on the behavioral intention to use this technology (Parreira et al., 2018).

Davis (1989) presented the TAM model with the intention of focusing on why users accept or reject information technology and how to improve its acceptance, thus offering a support to predict and explain acceptance.

The TAM is useful for predicting, but also for characterizing, so that researchers and others can recognize why users do not accept a particular system or technology, and consequently implement the appropriate corrections (Davis et al., 1989). The TAM model is still the most popular among researchers engaged in Acceptance and Use of Technology (Alturas, 2021).

According to Dwiyana Putra (2019), perceived utility is defined as "the degree to which an individual believes that using a particular system will increase his or her performance." This definition was generated from the word “utility”, which elucidates for an advantage in use. However, perceived ease of use defines the degree to which the user believes that using a given system will not require physical and mental effort (Dwiyana Putra, 2019).

According to Dulipovici and Vieru (2015), TAM cannot be used as it was because it does not consider the nature of shared knowledge (Dulipovici and Vieru, 2015). Venkatesh and Davis (2000), using the foundation laid in TAM, developed TAM2 and TAM3 which elucidate perceived usefulness and usage intention in terms of external variables, namely, social influence processes and the instrumental cognitive process (Venkatesh and Davis, 2000).

TAM has already been applied in different technologies, having also been applied to mobile applications, for example by Tavallaee, Shokouhyar, and Samadi (2017).

Nowadays, the smartphone is much more than a simple mobile phone that people use to make calls. Is a device used by different age groups that allows to be used as a work tool, for leisure, among other tasks (Caracol et al., 2019).

Data from the 2018 "Marktest Telecommunications Barometer" study, showed that the smartphone penetration in Portugal continues to increase and is in the hands of 3 out of 4 mobile phone users. In the July 2018, this study counted about 6.9 million people who have a smartphone. This study also indicates that the penetration rate of smartphones is higher among males, residents of Greater Lisbon, the younger population, and higher social classes (Marktest, 2018).

According to data from the Statista website, it appears that the age group that most adopts smartphones in the United States of America are the ages between 18 and 29 years old, and the one with the lowest values is the age group of individuals over 65 years old (Statista, 2021).

One of the factors that may relate to this difference in age groups may be social needs, which is one of the main factors for consumers' dependence on smartphones. These consist of an individual's social interaction needs. Represent the need for communication with friends, family, groups, clubs, churches, and at work (Tikkanen, 2009). This need happens to smartphones because they have become much more versatile, allowing consumers to use them more to communicate and maintain relationships between individuals (Lippincott, 2010). This statement can be complemented by the fact that some studies show that most people using smartphones are teenagers and young adults (Caracol et al., 2019).

Another of the dependencies that can be mentioned, in addition to social needs, is the current dependence on the Internet and the modernization of mobile devices, where it was found that the smartphone, together with the ease of mobile connection, can also cause dependency (Ortega et al., 2020).

3 Methodology

The objective of this investigation was to determine the impact of IT in the fight against food waste, since most of the population has access to a smartphone and as such, become eligible as potential users of the TGTG App.

In the present study, it is verified whether the population is aware of the App and its potential, the reason why they use it, or not, as well as the frequency of use, as well as other varied aspects, analyzed through the questions posed and which are present for consultation in Annex A.

The questionnaire participants who would or would not already be used by the TGTG App are established as a sample.

The questionnaire was answered 165 times, of which 107 of the responses obtained were considered valid. From the validated responses, the corresponding age groups varied between 19 and 60 years or more, with different academic degrees and with different types of occupation, ranging from students to retired people.

After the analysis, it is expected to find out how effective the App is in supporting the fight against food waste, how it can be improved and, in general, which way to go and what measures to take so that the reduction of waste is effective.

The data collection method used was the survey method by applying an online questionnaire that was later analyzed using the SPSS statistical data processing program.

This was the method chosen because it was the most found in similar studies, because it was the one that best suited the intended sample size and because it was the most conclusive. The quantitative method provides numerical information about consumer behavior.

The questionnaires were sent via e-mail or social networks, and participants were asked to collaborate in forwarding the questionnaire to other known contacts.

For the author Parasuraman (1991), a questionnaire is a set of questions carried out to conceive the necessary data to reach the objectives of the study.

In quantitative research, the result is based on samples that can be taken as conclusive answers to make a definitive decision. The sample data collection approach may vary depending on the type of sample structure.

search. The most common in quantitative research is highly structured research, such as when the questionnaire questions are multiple choice, which is more accurate and more reliable when collecting data (Malhotra & Birks, 2007).

Since this study was carried out on the availability of a questionnaire, with a quantitative methodology, it was made available in a single moment of time, whose group of questions is divided into essentially two groups.

In the first block of questions, the first 5, we tried to determine the age, gender, educational qualifications, occupation, and district of residence of the respondents.

In the second block of questions, this can be subdivided, and in the first part questions related to food waste were asked, namely, what is the level of food waste that citizens consider to exist in Portugal, what practices they consider important for the fight against this same waste, how they evaluate their individual contribution, whether they consider the use of IT useful to combat waste, whether they still consider the existing applications, designed for this purpose, effective, and whether they are still aware of the role of retail companies In this theme, and in the second part of this same block, we first tried to understand what the citizens' knowledge of existing applications was, and which applications were best known by the population. Being Too Good Too Go the most popular application among citizens, it then became the focus of this study, trying to find out if they had the App installed on their mobile device, and for how long, how often they use the application, or, for on the other hand, why they don't use it and if, after answering the survey, they would feel willing to use it. This set of questions allowed one to understand the level of interest of individuals in relation to the application.

In the questionnaire presented, there were no open response options, to condition the responses to the existing options and thus ensure that the validity of the responses could not be in question. Response options ranged from various concepts, reasons or opinions, and Likert scale, from 1 (Completely disagree or Extremely Dissatisfied) to 5 (Completely agree or Extremely Satisfied).

4 Analysis and discussion of results

Objective 1: Explore the knowledge and behavior of the population regarding food waste in Portugal.

Within the scope of the analysis of results regarding the knowledge and behavior of the population regarding food waste in Portugal, it appears that most participants (n = 61) consider the current level of food waste verified at national level to be high.

With regard to the practices considered important for the fight against food waste, the majority considered the following options very important, namely planning meals and reusing food leftovers (n = 59), choosing to freeze ready-made products and monitoring the expiry dates of products they have at home and ensure their rotation (n = 52), take prepared meals with them when they travel (n = 50) and resort to take-away food leftovers at commercial food outlets (n = 38). Regarding the practice of shopping more frequently and in smaller portions, 43 considered it relatively important in combating food waste.

Regarding the knowledge and behavior of the population regarding food waste in Portugal, the results obtained confirm the antecedents of openness to changing consumption habits and show a broad perception of the level of food waste in Portugal. Additionally, this perception converges with statistical data that reflect the national reality, since it is estimated that, for everyone, between 20 and 30 kg of food are thrown away annually and that around 17% of edible parts of the food produced for human consumption are lost, or wasted (INE, 2018).

The fact that participants recognize the high level of waste in Portugal is an antecedent that promotes a change in consumption habits that will positively influence their perception of the value proposition and usefulness of strategies to reduce it, and, in the same sense, their actions (based on the rational consideration that waste is indeed high and that they can act to minimize it).

Regarding the practices considered important for the fight against food waste, and in conjunction with the perception of the dimension of this scourge evidenced by the participants, the identification, by them, of various waste reduction practices whose responsibility falls on them is relevant, reflecting not only their awareness of the problem and its dimension, but also recognizing their role in reducing it.

Regarding the perception of their contribution against food waste, the participants effectively recognized the usefulness of information technologies to reduce food waste, considering them an effective tool for this purpose. These results are in line with the current technological evolution, considering the growing adoption of digital tools to streamline processes that individuals prioritize (in this case, the fight against food

waste). At the same time, most of them are unaware of the role of retail companies in combating food waste.

Objective 2: Understand expectations and the level of adoption and the characteristics of use of technology regarding food waste, namely the app Too Good To Go

Within the scope of the analysis of results regarding the expectations and the level of adoption and the characteristics of use of technology regarding food waste, namely the App Too Good To Go, it was found that the majority (n = 73) of the participants do not have the application installed on your mobile device. Of the 34 that have the application installed, 4 have had it for less than six months, 12 for more than six and less than twelve months, and 18 for more than a year and less than three. In addition, 17 indicate having used the application one to three times a month, 6 four to six times a month and 2 more than twelve times a month.

Objective 3: Analyze the users' perception of the Too Good To Go app and compare it with other similar apps.

As part of the analysis of results regarding the users' perception of the App Too Good To Go, it appears that most participants indicate being partially satisfied with the application (n = 15) and extremely satisfied with the concept of the application and the Magic Box (n = 12).

With regard to the users' perception of the Too Good To Go and comparing it with other similar applications, it was found that the majority of participants fully agreed that they would recommend TGTG to their acquaintances and indicated that they were partially satisfied with the application and extremely satisfied with it. the concept of the app and the Magic Box. In the same sense, most participants partially agree that the TGTG application facilitates access to various types of products, has an impact on sustainability, improves the quality of life of citizens, has a positive impact on the environment, causes an effective reduction of waste food and contributes to the promotion of various commercial spaces. Most of the members agreed that the purpose of its use is associated with a lower cost of products and the reduction of food waste. These conclusions show the participants' perception of the value proposition of TGTG (TAM model).

Objective 4: Analyze the users' perception regarding the ease of use of the Too Good To Go App and determine how the Too Good To Go App can have a good level of acceptance and trust by the target group.

Within the scope of the analysis of results regarding the users' perception of the ease of use of the Too Good To Go App, it appears that the majority neither agree nor generally disagree with the reasons given for not using the application, with disagreement (partial or total) is more significant with regard to the lack of knowledge of the existence of the application, which indicates that this will not be the origin of non-adherence to the application. In turn, for the remaining reasons, agreement (partial or total) is more significant than disagreement, which indicates that these tend to undermine the use of TGTG, namely the fact that it does not provide home deliveries, that the window of time for collection to be short, of not being able to be someone other than the one who ordered to collect the Magic Box and of not being possible to choose boxes with specific characteristics (for specific moments of feeding, such as lunch, dinner, dessert, snacks; vegetarian and/or meet dietary restrictions (eg gluten-free)).

Objective 5: Understand the main expectations regarding the systems and understand whether their use is considered discreditable and can be associated with social deprivation.

Within the scope of the analysis of results regarding the main expectations regarding systems such as TGTG, the majority partially agreed that they expect it to provide information to users about food waste (n = 18), to be active in policy about food waste (n = 17) and organize events about food waste and promote educational packages in schools (n = 15). Only 12 participants said they did not expect additional activities in the field of food waste from Too Good To Go.

Regarding the main expectations regarding the systems and understanding whether their use is considered discreditable and may be associated with social deprivation, regarding systems such as TGTG, the majority partially agreed that they expect it to provide information to users about food waste, be active in food waste policy, and organize food waste events and promote educational packs in schools. Given these expectations, it is suggested that the TGTG app invests not only in the developments mentioned in the previous paragraph but also in the aspects just mentioned, namely the sharing of reliable information on food waste, political intervention about food waste, and the organization of awareness-raising events in contexts such as schools. These conclusions show the participants' perception of (the expectations of) usefulness of the TGTG (TAM model).

Additionally, it was decided to carry out a principal components analysis (PCA), since having applied a Likert-type scale from 1 to 5, the intervals obtained between each value were short and equidistant from each other.

Considering the 34 respondents who have the application installed and answers to questions 23, 24, 26 and 27, which make it possible to evaluate the degree of acceptance of the technology, in this case, the TGTG App, five components were defined, named as: Perception of Usefulness (consisting of 4 items with a Cronbach's Alpha of 0.83), Effective Use of the System (consisting of 5 items with a Cronbach's Alpha of 0.86), Attitude (consisting of 4 items with a Cronbach's Alpha of 0.83), Behavioral intention (consisting of 3 items with a Cronbach's Alpha of 0.71) and Perception of Ease of Use (consisting of 2 items with a Cronbach's Alpha of 0.70).

Finally, a correlational analysis was carried out (Table 1), where we can infer that the levels of correlation between the variables under study are high, that is, they have a strong correlation, and in all of them it appears that when one of the variables varies the other with which it is related varies in the same direction.

The highest correlation observed is the correlation of the variable “Perception of Usefulness” with the variable “Effective Use of the System”, and it is expected that when evaluating the acceptance of the technology, the perception of usefulness that using the TGTG App has will make so that, in this case, its effective use increases.

In the opposite direction, the variables that register a lower level of correlation are “Behavioral intention” with the variable “Perception of Ease of Use”. By observing the responses obtained to the questionnaire carried out, we can deduce that this could be due to the limitations imposed by the platform and its associates, including the periods of time in which Magic Boxes can be collected, their contents being completely unknown to whoever is purchasing them and as such may be completely inappropriate to

the type of meal the user will have or even the impossibility of adjusting their content to specific dietary needs, as is the case of some food intolerance or even vegetarianism, for example.

Table 1. Pearson correlation between components

		Perception of Usefulness	Effective Use of the System	Attitude	Behavioral intention	Perception of Ease of Use
Perception of Usefulness	Pearson Correlation	1				
	N	34				
Effective Use of the System	Pearson Correlation	,667**	1			
	N	34	34			
Attitude	Pearson Correlation	,502**	,500**	1		
	N	34	34	34		
Behavioral intention	Pearson Correlation	,453**	,707**	,355*	1	
	N	34	34	34	34	
Perception of Ease of Use	Pearson Correlation	,567**	,596**	,351*	,453**	1
	N	34	34	34	34	34
** Correlation is significant at the 0.01 level (2 tailed).						
* Correlation is significant at the 0.05 level (2 tailed).						

5 Conclusion

The present investigation work allowed to conclude that:

• There is a wide perception of the level of food waste in Portugal, which is an antecedent that promotes a change in consumption habits that could positively influence their perception of the value proposition and usefulness of strategies to reduce it and, in the same sense, their actions (based on the rational consideration that waste is indeed high and that they can act to minimize it);

• The vast majority of participants are familiar with the TGTG, but this is not reflected in adherence to it, results that translate the result of the iterative process of analyzing the value proposition, ease of use and usefulness (TRA model);

• Most participants partially agree that the TGTG application facilitates access to various types of products, has an impact on sustainability, improves citizens' quality of life, has a positive impact on the environment, causes an effective reduction of food

waste, and contributes for the promotion of the various commercial spaces. These results reflect the participants' perception of TGTG's value proposition (TAM model);

• The following disadvantages were identified, in which intervention is suggested with a view to improvement: the fact that home deliveries are not available, that the time window for collection is short, that it cannot be anyone other than the one who ordered the lifting the Magic Box and not being able to choose boxes with specific characteristics (for specific meal times, such as lunch, dinner, dessert, snacks; vegetarian and/or that meet dietary restrictions (eg gluten-free)). These results reflect the participants' perception of the TGTG value proposition (TAM model), regarding the improvements to be made. However, the majority fully agreed that to date, the purpose of its use is associated with a lower cost of products and the reduction in food waste;

• The majority partially agreed that they expect it to provide information to users about food waste, be active in policy about food waste and organize events on food waste and promote educational packages in schools. Given these expectations, it is suggested that the TGTG app invest in these areas, which highlight the participants' perception of (the expectations of) the usefulness of the TGTG (TAM model).

From the study's conclusions, a clear contribution emerges for the business community, namely an improvement action plan for the TGTG app or similar ones, to improve the way they meet user expectations. In fact, it is suggested:

• Development of new app features:

o Provide home deliveries;

o Extend the time window for picking up orders;

o Enable the collection of orders by several people;

o Enable the choice of options with specific characteristics (for specific mealtimes, such as lunch, dinner, dessert, snacks; vegetarian and/or that meet dietary restrictions (e.g., gluten-free)).

• Development of actions in the community on waste:

o Act as a provider of reliable information to users about food waste;

o Actively intervene, in the political dimension, on the issue of food waste;

o Organize events on food waste;

o Promote educational packages in schools.

The study presents as a limitation its reduced geographic range in relation to the location of the participants, who were concentrated in certain cities/national areas, which may have biased the results obtained through certain contextual variables (as discussed in point 4.1, regarding the programs that exist in those regions on which the participants focused).

For future work, the following proposals are presented:

• Use other methodologies to analyze data, such as structural equation modeling, in order to test a model.

• Develop research by area of the country, in order to consider contextual variables related to the region (namely the existence and implementation of local policies to reduce food waste).

• Gather information on applications other than TGTG, to enable comparative analyzes on the interaction between value proposition, utility, ease of use and result (adherence).

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