Continued intention to use online participatory budgeting: The effect of empowerment and habit

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ABSTRACT[1]

Online participatory budget, an e-participation platform to engage citizens in decision-making processes, has become more popular in the last decade in several cities across Europe. Nevertheless, to assure its continuity of use and keep the citizens' engagement over time remains a challenge year by year for the local governments. This paper explores the effect of empowerment and habit on the continued intention to use online participatory budget considering the individual differences by age and gender. We develop a research model that is evaluated using structural equation modelling based on the responses of 370 citizens that experienced the online participatory budget in the city of Lisbon, which was the first capital in Europe to implement the online platform in 2008. Results suggest that competence, meaning, and habit positively influence the continued intention to use online participatory budgeting, and that meaning has a stronger effect on older men than younger women. The paper discusses the implications for local governments.

CCS CONCEPTS

• **Applied computing** → **E-government** • *Information systems* → *Information systems applications*

KEYWORDS

Online participatory budget, e-participation, PLS-SEM, Empowerment, habit, multi-group analysis

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1 INTRODUCTION

Participatory budgeting started in Porto Alegre (Brazil) in 1989 [16] and since then rapidly gained popularity all around the world. Participatory budgeting is considered a public participatory instrument, which in most cases is managed by the local governments. It allows regular or non-elected citizens to participate in the allocation process of part of the public finances [26] either providing suggestions on where or how to spend the budget, or by voting for available proposals to be implemented by the local governments. By 2013, participative budgeting has been implemented in around 1500 cities worldwide [5]. Participatory budgeting is implemented in the form of (i) offline versions (public assemblies between local governments and citizens), (ii) online versions using ICT (Information and communication technologies) tools to interact with citizens, for instance receiving project proposals through a web portal or balloting via SMS votes, and (iii) hybrid versions [18], when the citizens can participate both online and in public assemblies. The present article focuses on the motivations of continuous intention to use the online version of the participatory budgeting.

The online participatory budgeting implementations can be considered a form of e-participation, a broader concept defined as "the process of engaging citizens through ICTs in policy and decision-making in order to make public administration participatory, inclusive, collaborative and deliberative for intrinsic and instrumental ends (p. 61)" [7]. Online participatory budgeting is seen as an example of co-governance [1], the involvement of social actors in the activities of the state. Moreover, Matheus et al. [16] suggest that the use of online participatory budgeting is a way to promote citizens' rights and the legitimacy of the democratic system. Despite the potential advantages of using digital participatory budgeting, its diffusion and long-lasting adoption still represent a significant challenge for local governments. For instance, in many German cities, online

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participative budgeting is considered as an online suggestion box and 40% of citizens have rated it as a bad participatory instrument [13]. Omar et al. [22] caution that given the failure of past e-participation platforms due to low adoption, the online participatory budgeting is also at risk. Alves & Allegretti [4] discuss the fragility and volatility of participative budgeting implementations in various cases in Portugal.

Several implementations of digital participatory budgeting around the globe have been examined from the qualitative perspective. For instance, Matheus et al. [16] analysed case studies of digital participatory budgeting in Latin American cities, whereas Mkude et al. [19] contributed to case studies of participatory budgeting in European cities. Nevertheless, quantitative studies on the factors that may motivate the usage of online participatory budgeting in the long-term scenario are scarce. Peixoto [23] highlights that the lack of data at individual level concerning the motivations of the citizens who participated in online participatory budgeting represents a limitation to evaluate each motivational factor or which are more important. This study contributes filling the gap by assessing the influence of the psychological empowerment [17] and habit [32] as inner motivators for the continued intention to use online participatory budgeting. The implementation of online participatory budgeting in Lisbon is an ideal case of research due to its increasing success in the number of votes year after year. The authors build and evaluate a research model that is evaluated using structural equation modelling [8] based on the data collected from the users of the online participative budgeting in the city of Lisbon. Besides the evaluation of empowerment and habit, the article also provides a multigroup analysis to find individual differences in terms of age and gender.

The rest of the paper is organized as follows, in section 2 the authors describe the online participatory budgeting in the city of Lisbon. Section 3 provides the theoretical background for the research model and hypothesis development. Section 4 describes the methodology used. Section 5 shows the calculations for the measurement and structural models. Section 6 discusses the results. And lastly, section 7 presents the conclusions.

2 ONLINE PARTICIPATORY BUDGETING IN THE CITY OF LISBON

Participatory budgeting is an e-participation instrument implemented by the local governments to involve regular citizens in the process of suggesting, debating and/or deciding on the allocation of a portion of public budget managed by the local government [26]. Some implementations of online participatory budgeting have been described as a form of online suggestion box [13], whereas the Lisbon case, was described as providing "effective decision-making power to the citizens" [3].

By 2017, according to negocios.pt [21], one of the best local business newspapers, Portugal accounted for 118 participatory budgeting implementations, making it one of the leading countries in Europe in the implementation of participatory budgeting. The city of Lisbon was the first capital city in Europe to implement the online participatory budgeting in 2008 [3]. The participatory budgeting in Lisbon (https://www.lisboaparticipa.pt/) has a hybrid approach, offering online and on-site space for participation. For instance, in the edition 2016, the participatory budgeting in Lisbon received 362 proposals online and 205 proposals in the participatory assemblies [3], a total of 567 proposals. The case of participatory budgeting in Lisbon can be considered successful, due to the increasing rate of citizen participation on the voting process from 2008 (see Figure 1). In 2016 overpassed the fifty thousand votes for a city of approximately 550000 inhabitants, each citizen can vote one or two times. As such, the city of Lisbon provides an ideal scenario to investigate the motivational factors that drive the success in similar online participatory budgeting projects.

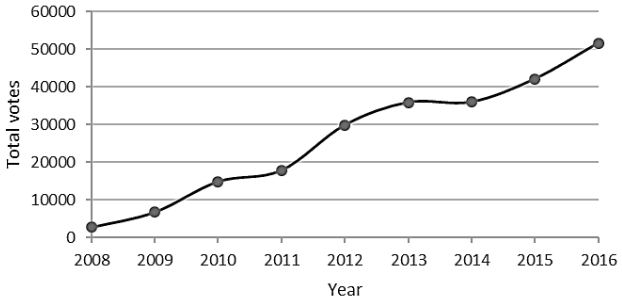

Figure 1. Voting in the Lisbon participatory budgeting. (Data from: www.lisboaparticipa.pt)

The yearly cycle of the participatory budgeting in Lisbon can be summarized in 5 stages: (1) from April to June the submission of proposals either online or through public assemblies; (2) from June to mid-September technical analysis of the proposals, merging of similar proposals, and transformation of proposals into projects; (3) from late-September to early-October publication of the preliminary projects list and reception of possible complaints; (4) from mid-October to mid-November the voting process takes place, mostly by SMS, but also, on a lesser extent, through the web portal and on paper; and finally, (5) the announcement of the winners. The web portal of the Lisbon participatory budgeting allows to follow up the status of implementation of the winner projects.

3 RESEARCH MODEL DEVELOPMENT

Empowerment is considered as a key motivator for public participation and engagement [12]. In the context of online participatory budgeting, Omar et al. [22] suggest that the use of these systems promotes citizens' empowerment. Empowerment is defined as a set of individual components: competence, impact, meaning, and self-determination. This article assesses the effect of each dimension on the continued intention to use (CIU).

The four empowerment dimensions can be described as follows: (1) Competence (COM) can be defined as the extent to which a citizen can use the online participatory budgeting system with enough skills and ability. For instance, be able to search and obtain information about the candidate projects and send an SMS to vote for a project. (2) Impact (IMP) is defined as the degree of perception that an action on the online participatory budgeting

will produce the desired effect [27] by the citizen who performs the action. For instance, a citizen that provides a vote for a project that later is implemented may perceive that she/he influenced the implementation of that project. (3) Meaning (MEA) refers to which degree each citizen perceives the value of an action in the online participatory budgeting. For instance, if the citizen perceives that a candidate project in the system will bring some benefit to the community, is more likely that the citizen vote to support the project. Finally, (4) self-determination (SDET) refers to the perception of the degree of autonomy and freedom to interact with the online participatory budgeting. For instance, if a citizen can vote for a candidate project without restrictions regarding location or schedule, that citizen may be more likely use the system.

Habit [32] refers to which extent a citizen performs a use behaviour of the online participatory budgeting automatically. For the Lisbon case study, every year a new edition of the online participatory budgeting in Lisbon is opened to call for new project proposals and, a few months later for electronic voting to select the winning projects. This yearly cyclical workflow may influence to develop a habit in the citizens that use the system. Habit has been evaluated in different contexts of the information systems adoption. For instance, in mobile banking [6], online social networks [11], and e-government services [2]. In all those studies, the results show a statistically significant and positive impact of habit on the intention to use the technology.

According to Venkatesh et al. [31], individual differences such as age and gender can affect the way citizens perceive technology, in this case online participatory budgeting. For instance, Vicente & Novo [34] found that men are more likely than women to express political opinions or sign petitions online. Venkatesh et al. [33] found that age has significant impact on intention to use e-government; Moores & Chang [20], found that moral judgement in ethical decision-making process was significant only for the older age group.

This article evaluates the impact of the four dimensions of psychological empowerment theory [24,28], i.e., competence, impact, meaning and self-determination, on the continued intention to use of online participatory budgeting (H1 – H4 respectively). Additionally, in line with Venkatesh et al. [32], and since the online participatory budgeting in Lisbon yearly opens a new edition since 2008, we posit that habit may play a role on the citizens' continued intention to use (H5). Finally, consistent with Venkatesh et al. [31] age and gender are used to carry out a multi-group analysis (H6 and H7 respectively). Figure 2 depicts the research model.

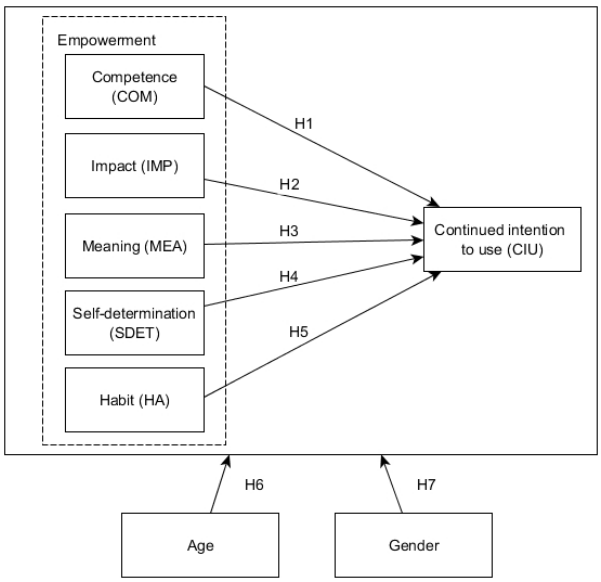

Figure 2. Research model and hypotheses

H1. Competence positively influences the continued intention to use online participatory budgeting.

H2. Impact positively influences the continued intention to use online participatory budgeting.

H3. Meaning positively influences the continued intention to use online participatory budgeting.

H4. Self-determination positively influences the continued intention to use online participatory budgeting.

H5. Habit positively influences the continued intention to use online participatory budgeting.

H6. Age moderates the effect of empowerment and habit variables on the continued intention to use online participatory budgeting.

H7. Gender moderates the effect of empowerment and habit variables on the continued intention to use online participatory budgeting.

4 METHODOLOGY

The research model is evaluated using the partial least squares structural equation modelling (PLS-SEM) method [8]. For all constructs, the measurement items were adapted from previously validated scales to the context of e-participation. We used reflective measures for all constructs. Age and gender are used to create separate groups of observations to detect whether the differences in the path coefficient estimates are statistically significant between those separate groups. The questions were multiple-type close ended on a seven-point range scale from 1 (totally disagree) to 7 (totally agree). The questions for empowerment were adapted from Kim & Gupta [14], the questions for habit from Venkatesh et al. [32], and the questions for continued intention to use from Hsu et al. [10]. Please see the appendix A1.

An invitation email containing a hyperlink to the questionnaire was sent to the users registered in the municipality

e-participation systems. The hyperlink could be used only once. We obtained 370 valid responses from December 1 to December 18, 2016, after the ninth edition of the online participatory budgeting in Lisbon. All responses corresponded to citizens that have experienced the online participatory budget in the past. Table 1 provides detail about the demographic profile of the respondents.

Table 1. Demographic profile

Characteristics	Freq.	%
Gender		
Feminine	187	50.54
Masculine	183	49.46
Age groups (years)		
40 or less	164	45.14
41 and more	206	54.86
Education		
Bachelor	110	29.73
Master degree	100	27.03
Post-graduation	60	16.22
High school	57	15.41
Doctorate	39	10.54
Primary school	3	0.81
NS/NR	1	0.27
Profession		
Employed	229	61.89
Self-employed	39	10.54
Retired	27	7.3
Freelancer	26	7.03
Unemployed	19	5.14
Other	17	4.59
Student	13	3.51

5 RESULTS

5.1 Measurement Model

We follow the guidelines of Hair et al. [8] to evaluate the measurement model. Internal consistency, convergent validity, and discriminant validity are analysed for the measurement items. We used SmartPLS 3.0 software [25] for the model estimation. The criteria to assess for internal consistency are Cronbach's alfa (CA) and composite reliability (CR), which are both above 0.7 for all latent variables. Average variance extracted (AVE) and the loadings are used to assess the convergent validity, both results above 0.5 and 0.7 respectively in almost all cases, except for HA2 (0.68). Although, due to its proximity to 0.7 we decided to keep the item (see Table 2). Finally, we tested discriminant validity by two criteria: the cross-loadings, where the loading of each indicator must be greater that the cross-loadings (Table 2), and using Fornell & Larker [7], which states that the square root of AVE should be greater than its correlation with any other construct (see Table 3).

Table 2. Loadings and cross-loadings

Construct	Item	COM	IMP	MEA	SDET	HA	CIU
Competence CA=0.97 CR=0.98 AVE=0.94	COM1	0.96	0.25	0.47	0.45	0.30	0.49
	COM2	0.98	0.27	0.48	0.48	0.29	0.48
	COM3	0.97	0.24	0.46	0.46	0.31	0.49
Impact CA=0.92 CR=0.95 AVE=0.86	IMP1	0.25	0.94	0.55	0.31	0.34	0.42
	IMP2	0.27	0.96	0.51	0.28	0.36	0.40
	IMP3	0.19	0.87	0.47	0.27	0.40	0.31
Meaning CA=0.94 CR=0.96 AVE=0.9	MEA1	0.46	0.52	0.93	0.40	0.56	0.59
	MEA2	0.47	0.54	0.96	0.48	0.52	0.61
	MEA3	0.44	0.51	0.95	0.46	0.48	0.56
Self-Determination CA=0.95 CR=0.97 AVE=0.92	SD1	0.48	0.32	0.45	0.95	0.30	0.40
	SD2	0.44	0.30	0.46	0.97	0.32	0.40
	SD3	0.45	0.28	0.45	0.95	0.31	0.39
Habit CA=0.71 CR=0.83 AVE=0.62	HA1	0.30	0.33	0.50	0.28	0.86	0.50
	HA2	0.08	0.42	0.37	0.08	0.68	0.25
	HA3	0.28	0.25	0.42	0.34	0.81	0.49
Continued intention to use (CIU) CA=0.95 CR=0.97 AVE=0.91	CIU1	0.48	0.37	0.57	0.41	0.53	0.96
	CIU2	0.49	0.37	0.58	0.41	0.52	0.97
	CIU3	0.46	0.44	0.61	0.36	0.52	0.93

Note: CA = Cronbach's Alfa, CR = Composite Reliability, AVE = Average Variance Extracted.

Table 3. Correlation matrix and the square root of AVE (in bold)

Construct	COM	IMP	MEA	SDET	HA	CIU
Competence (COM)	**0.97**					
Impact (IMP)	0.26	**0.92**				
Meaning (MEA)	0.48	0.55	**0.95**			
Self-determination (SDET)	0.48	0.31	0.47	**0.96**		
Habit (HA)	0.31	0.39	0.55	0.32	**0.79**	
Continued intention to use (CIU)	0.50	0.41	0.62	0.41	0.55	**0.95**

5.2 Structural Model and Multi-Group Analysis

The model is evaluated with the full set of data (370 observations). The research model explains 50.1% (see Figure 3 – Full sample) of the variation in the continued intention to use online participatory budgeting, considered as moderate predictive power [9]. The statistical significance of the path coefficients was assessed using the bootstrapping technique [8] with 5000 iterations. The significance of the path coefficients indicates whether the hypotheses are supported or not. Five hypotheses are evaluated in this study. Three were supported (H1, H3, and H5 resulted statistically significant). Unexpectedly, H2 and H4 were found not significant, thus not supported (Figure 3). Individuals are different in their intention and use behaviour of information technology [8]. For this reason, we assess the observable heterogeneity in the data, namely the characteristics of age and gender. We use these characteristics to partition the dataset into four separate groups: A1 group - 41 years and older (206 observations); A2 group - 40 years and younger (164

observations); G1 group - women (187 observations); And, G2 group - men (183 observations). The sub-group models are consistent with the full-sample model, except for A2 group, where the effect of meaning over continued intention is not significant (see Figure 3 – A2 group).

The path coefficients for the separate groups resulted numerically different. We calculate the t-value to determine whether the differences of path coefficients by age and gender are statistical significant. The hypotheses on the individual differences by age (H6) and gender (H7) were supported only for meaning. Differences between age and gender groups for other constructs were found not statistically significant, where the differences were statistically significant in both groups: age and gender. Please see Table 4.

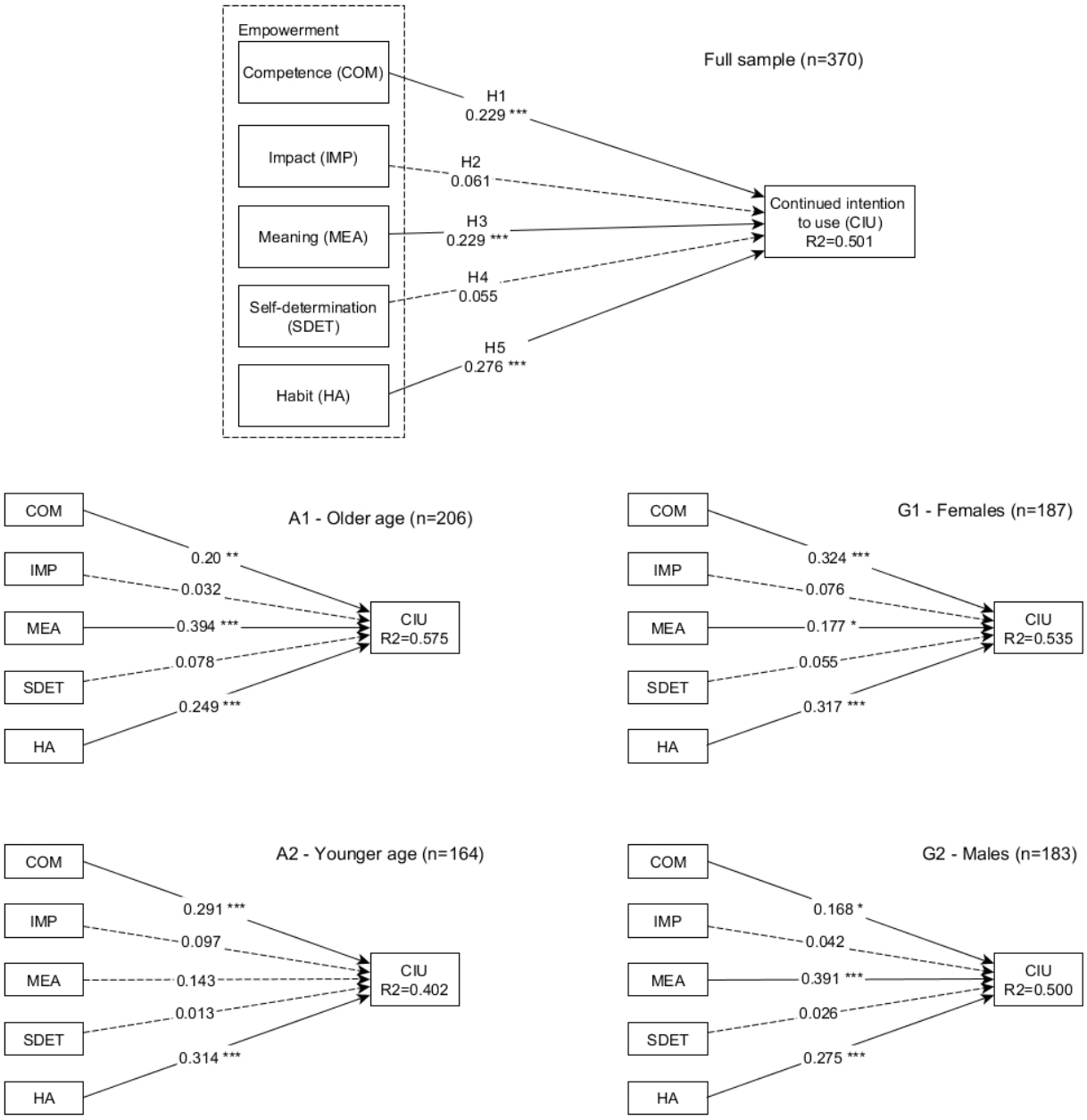

Figure 3. Structural model results by groups.
Notes: significant at *10%; **5%; ***1%. Non-significant paths are in dotted arrows.

Table 4. Multi-group analysis

Construct	Age groups (A)				Gender groups (G)			
	Beta			t-value	Beta			t-value
	A1	A2	|A2-A1|	A2 vs A1	G1	G2	|G1-G2|	G1 vs G2
COM	0.20	0.29	0.09	0.70	0.32	0.17	0.16	1.28
IMP	0.03	0.10	0.07	0.70	0.08	0.04	0.03	0.38
MEA	0.39	0.14	0.25	2.03	0.18	0.39	0.21	1.71
SDET	0.08	0.01	0.07	0.53	0.06	0.03	0.03	0.23
HA	0.25	0.31	0.06	0.53	0.32	0.28	0.04	0.35

Notes: A1= 41 years or more; A2= 40 years or less; G1= Females; G2= Males

6 DISCUSSION

This study evaluates the effect of the four dimensions of the psychological empowerment theory and habit on the continued intention to use online participatory budgeting. The influence of competence, meaning, and habit of the continued intention resulted positively significant, being habit the strongest predictor. On the contrary, impact and self-determination both were found not significant on continued intention to use. Regarding the individual differences, results show significant differences only for meaning. The effect of meaning over the continued intention is stronger for older men than for younger women.

The positive influence of competence on the continued intention to use, this is, the perception of having enough capabilities and skills to use the online participatory budgeting, may be an indicator that most of the citizens are able to complete seamlessly the intended actions in the system. For instance, search for information about projects or vote electronically, which gives them confidence to continue to use the system. The system design and the workflow process implementation and management of the participatory budgeting depend on the local government. Consequently, the main implication for local government that implement online participatory budgeting is to follow the best practices of system usability and keep the workflow as simple as possible. This will preserve the feeling of competence in the citizens and they will be more willing to continue using the system over time.

The significant and positive effect of meaning as a motivator of the continued intention to use online participatory budgeting implies that citizens indeed perceive that there is a value derived from the utilization of the system, a meaningful participation [29]. This perception of value could be attributable to the implementation of the winning projects in benefit of the community. Different from competence, the perception of meaning does not only rely solely on the actions of local governments but also on the proposals submitted by the citizens to the online participatory budgeting. If voters do not perceive value in the proposals, the motivation to keep using the system in the upcoming editions may decrease. Nevertheless, local governments may play a critical role to attract meaningful proposals. For instance, defining the areas of interest in which the proposals should be framed. The results from the multi-group analysis show that differences between separate groups by age and gender are significant only for the effect of meaning over continued intention, being stronger for older men than younger women. This finding may suggest for local governments to devote more efforts and define strategies to promote the online participatory budgeting among younger citizens, especially young women. The strategies should focus on increasing the perception of value derived from using the online participatory budgeting.

Habit was found as the stronger predictor of the continued intention to use. Since the online participatory budgeting in Lisbon started in 2008 and is still ongoing, this result is not a surprise. The online participatory budgeting has a yearly general cyclical workflow, where most of the citizens participate using electronic voting every year, this behaviour may be considered a habit to a certain extent. Former studies demonstrated that habit is able to drive repeated behavioural patterns regarding the use of information technology [15]. This finding could have positive implications for local governments. The citizens that already perceive the use online participatory budgeting as a habit may be more willing to try and engage in new forms of e-participation.

The effect of impact and self-determination was found not significant over continued intention to use. In the case of impact, this may imply that the citizens do not perceive their individual votes as a strong influence on the result of the selected projects for implementation given the large number of votes (51591 votes in 2016). The degree of autonomy (self-determination) to interact with online participatory budgeting seems to play a minor role over continued intention, this may be due to the limited interaction in terms of tasks that citizens perform in the system, which in the most of cases is limited to the search of information and electronic voting.

7 CONCLUSION

The existence of a perception of empowerment in the citizens that may motivate the continued intention to use online participatory budgeting is not confirmed by this study. Although, two out of four dimensions of empowerment showed a significant and positive effect on continued intention to use. The strongest predictor of the continued intention to use was habit, which probably has been developed due to participation in previous editions of online participatory budgeting. Individual differences of age and gender had no effect on the variables analysed in this study, except on meaning, suggesting that older males perceive a higher value than young females in the participatory budgeting. Local governments should keep the citizen perceptions of competence and meaning high to ensure the use of online participatory budgeting over time. Additionally, local governments should design strategies to increase the perception of meaning regarding participatory budgeting among the young population, especially the younger women.

A APPENDIX

A.1 Measurement Items

Construct	Item

Empowerment [14]	Competence (COM)	I have mastered the skills necessary for using the e-participation.
		I am self-assured about my capabilities to use the e-participation.
		I am confident about my ability to use the e-participation.
	Impact (IMP)	Based on e-participation usage, my impact on what happens at community is large.
		Based on e-participation usage, I have significant influence over what happens at community.
		Based on e-participation usage, I have a great deal of control over what happens at community.
	Meaning (MEA)	The e-participation I use is very important to me.
		The e-participation I use is meaningful to me.
		My e-participation activities are personally meaningful to me.
	Self-Determination (SDET)	I have significant autonomy in determining how I use the e-participation
		I have considerable opportunity for independence and freedom in how I use the e-participation
		I can decide on my own how to go about using the e-participation
Habit (HA) [32]		The use of e-participation has become a habit for me
		I am addicted to using e-participation
		I must use e-participation
Continued intention to use (CIU) [10]		I intend to continue using e-participation in the future
		I will continue using e-participation in the future
		I will regularly use e-participation in the future

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