Citizens' intention to use and recommend e-participation
Drawing upon UTAUT and citizen empowerment

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Abstract

Purpose – The purpose of this paper is to investigate how citizens' perception of empowerment can influence the intention to use and intention to recommend e-participation.

Design/methodology/approach – A research model is evaluated using structural equation modelling. An online survey questionnaire was used to collect data from 210 users of e-participation.

Findings – The results show that psychological empowerment influences the intention to use and recommend e-participation. Performance expectancy and facilitating conditions were the strongest predictors of intention to use; effort expectancy and social influence had no significant effect on the prediction of intention to use e-participation.

Research limitations/implications – The use of psychological empowerment as a higher-order multidimensional construct is still insufficiently researched. Future research may explore the effect of each dimension of psychological empowerment in different scenarios of e-participation adoption. Caution is needed when generalising our findings towards the adoption of e-participation in different locations or with different participants.

Practical implications – The findings can help the local governments to design strategies for the promotion and diffusion of e-participation amongst the citizenry. Those strategies should focus on citizens' perception of empowerment, thereby creating a positive attitude towards intention to use and recommend e-participation.

Originality/value – An innovative research model integrates the unified theory of acceptance, use of technology and psychological empowerment; the last as a higher-order construct.

Keywords Technology adoption, Structural equation modelling, Partial least squares, E-government, E-democracy

Paper type Research paper

1. Introduction

E-participation is defined as a branch of e-government with special focus on citizen engagement for deliberation and decision orientation (Welch, 2012). For instance, the online participatory budgeting platforms (Sintomer *et al.*, 2013) allow citizens to decide on how to spend a part of the public budget managed by local governments. Engaging citizens in consultation and decision-making has a prominent importance to promote a more efficient and inclusive society (Sæbø *et al.*, 2008), citizen participation in digital governance

(Sanford and Rose, 2007), transparency, efficiency and quality of public services (Royo and Yetano, 2015). Electronic consultation and decision-making tools are considered at the highest level of e-participation from the perspective of empowering citizens. However, the implementation of e-participation is still very challenging and vulnerable to failure due to the risk of low adoption rates on the part of citizens (Omar *et al.*, 2017; Kersting, 2016). The literature does not provide a strong theoretical basis to support successful implementations and adoption of e-participation.

Beyond the potential benefits of involving citizens in consultation and decision making, e-participation also has the potential of reducing the costs for democratic and decision-making processes (Vragov and Kumar, 2013). Traditional paper balloting for the same purpose would demand many more resources from both the citizens (time) and the local governments (money). Despite the latest growing number of implementations of the e-participation tools; significant adoption and tangible positive outcomes from citizen interaction with e-participation remain at low levels. For instance, comparing the levels of e-participation within the top 25 countries ranked by the United Nations in 2014 and 2016, the utilisation level rose from 36 (United Nations, 2014) to 62 per cent (United Nations, 2016), but only 20 per cent of the United Nations member states report that "e-consultation outcomes have resulted in new policy decisions, regulation or service" (United Nations, 2016).

Previous studies of the factors that drive the adoption of e-participation have used theoretical models in the context of technology adoption (Naranjo Zolotov *et al.*, 2018). Using only theoretical models of technology adoption may not provide a strong theoretical basis of the general factors that drive the adoption of e-participation. For example, Chiang (2009) used technology acceptance model (TAM) (Davis, 1989) to examine trust in the e-voting system; and Wang and Shih (2009) studied the use of information kiosks by using UTAUT (Venkatesh *et al.*, 2003). Building theory on e-participation adoption is still challenging for researchers due to its interdisciplinary and highly dynamic nature (Medaglia, 2012; Susha and Grönlund, 2012). Using technology adoption models alone may not be enough if we wish to analyse the specific characteristics of e-participation. Venkatesh *et al.* (2016) suggest that "it is necessary to draw on other theoretical perspectives to identify and examine specific characteristics" of e-participation. Even though citizen empowerment has been identified as a key factor for public participation and engagement (Kang, 2014), little research has analysed the perspective of empowerment in the adoption of e-participation for public consultation and decision-making. Consequently, the integration of UTAUT and empowerment in a research model may bring valuable insights on e-participation adoption drivers.

Our work makes three main contributions to the enrichment of the theoretical body of literature in the e-participation context. First, we develop a research model that integrates UTAUT and empowerment theory. The research model allows us to identify that the feeling of empowerment in citizens is indeed a strong motivator of intention to use and intention to recommend e-participation. Second, we analyse how the integration of empowerment with UTAUT increases the intention to use and to recommend e-participation. And third, we contribute to the construct clarity of second-order multidimensional constructs in the context of e-participation. Moreover, this study yields insights for local governments seeking to implement or extend the scope of e-participation.

The rest of the paper is organised as follows: Section 2 provides a literature review of the e-participation context and the description of the theories employed in the research model. Section 3 contains the research model and hypotheses development. Section 4 describes the methods used and the data collected. Section 5 presents the data analysis and results. Then, Section 6 discusses the findings along with theoretical and practical implications, limitations, and future research. Finally, a conclusion presents final thoughts.

2. Background and hypothesis development

2.1 Contextualising e-participation adoption

The United Nations E-Government Survey 2014 report (United Nations, 2014) includes e-participation as one of e-government's core components and describes a three-level e-participation model: e-information, e-consultation and e-decision-making, thus moving from "passive" to "active" engagement with citizens (Kassen, 2017). The highest level in the e-participation model, the decision making, requires an active engagement and involvement of the citizens in the long-term scenario for its success, which means that citizens should be highly motivated to devote their time to activities such as deliberation, decision making, and voting using information and communication technologies (ICTs). Today, most governments have adopted one or more participation technologies to interact with citizens, for instance, open data technologies (Zuiderwijk *et al.*, 2015), information kiosks (Wang and Shih, 2009) and e-voting (Chiang, 2009). Research shows that the adoption of participative technologies facilitates interaction and collaboration between government and citizens (Welch, 2012). However, interaction does not necessarily mean achieving consulting and decision-making levels. Those levels of e-participation may require citizen empowerment.

Previous studies discussed important factors that can influence the process of e-participation adoption, although they did not address the issue of what it is that would attain consulting and decision-making levels. For instance, Oliveira and Welch (2013) studied the use of social media in government for improving public service and engagement and found that the organisational factors, such as innovativeness, technological capacity and external influence, predict the use of social media for different tasks; citizen satisfaction, trust in government and the use of e-participation were found to be interrelated (Welch *et al.*, 2005), Schaupp *et al.* (2010) found evidence that once trust is lost, adoption of e-government and e-participation becomes very challenging; digital divide (Cruz-Jesus *et al.*, 2012), such as lack of computer literacy or limited access to infrastructure and internet connection and accessibility (Martins *et al.*, 2017) can represent important barriers to adoption (Janssen *et al.*, 2012); political factors (Oni *et al.*, 2017) such as political awareness, political efficacy and political culture have been found to play an important role in e-participation usage.

The literature suggests that citizen empowerment is one of the key ingredients for successful citizen participation over time in consulting and decision-making processes (Macintosh, 2004; Kang, 2014; Omar *et al.*, 2017). Empowering citizens implies allowing them to influence the decisions made by the government. Nevertheless, it is not entirely clear how the perception of empowerment affects the behavioural intention to use and recommend e-participation technologies. Most studies rely on single theories from information technology, which does not allow analysing specific effects from e-participation, such as citizen empowerment. On the other hand, UTAUT allows the analysis of the drivers of technology adoption in complex scenarios and can shed light on both the information technology factors and social factors (Zuiderwijk *et al.*, 2015). Analysing the drivers of the behavioural intention to use and intention to recommend e-participation from both the empowerment perspective and UTAUT can provide insights for governments to achieve higher levels of citizen involvement in consulting and decision processes and exploit the potential benefits of citizen electronic participation. In this study, we address these issues by integrating UTAUT constructs with empowerment theory to investigate the effect of these factors on the intention to use and recommend e-participation.

2.2 Unified theory of acceptance and use of technology (UTAUT)

The UTAUT (Venkatesh *et al.*, 2003) is a theoretical model that has been widely used in the study of technology acceptance and adoption. UTAUT is an appropriate theory to study e-participation adoption for three main reasons: first, according to Venkatesh *et al.* (2003),

UTAUT is suitable to study complex organisational technologies. E-participation can be considered a complex technological context due to the number of different tools available (Sæbø *et al.*, 2008), different types and amounts of data generated by the citizens, stakeholders with diverse interests and two-way government-citizen interactions in which citizens usually expect to receive feedback for their actions. These factors make a complex research scenario in which UTAUT can be appropriate to examine the behavioural intention to use the e-participation, which has been suggested as the main predictor of human behaviour (Lee and Rao, 2009). Second, UTAUT has the potential to provide valuable insights in the investigation of e-participation because it takes into account both the information technology factors and social factors (Zuiderwijk *et al.*, 2015).

UTAUT has been used in a broad range of research fields to understand the factors that drive the technology adoption, obtaining diverse results in terms of significance of the constructs – for instance: internet banking (Tarhini *et al.*, 2016), in which performance expectancy, effort expectancy, social influence, perceived credibility, and task technology fit (Goodhue & Thompson, 1995) were found significant on intention to use; e-government services (Alharbi *et al.*, 2017), in which three of the four UTAUT constructs are significant on intention to use (not effort expectancy); and e-learning (Oh and Yoon, 2014) in which performance expectancy, effort expectancy and social influence have a significant effect on intention to use. For the application of the UTAUT model, the hypotheses are usually adapted to the context of the study (Venkatesh *et al.*, 2011). In the case of our study, we have adapted the original UTAUT hypotheses to the context of e-participation. We use four constructs from UTAUT to determine the behavioural intention to use: performance expectancy, effort expectancy, social influence and facilitating conditions.

First, performance expectancy (Venkatesh *et al.*, 2012; Venkatesh *et al.*, 2003) has been found, in most cases, to be the strongest predictor of intention to use an information technology, regardless of the environment (Luo *et al.*, 2010). Herein it is defined as the degree to which the individual considers that using e-participation will help to obtain gains or provide benefits for the community. Performance expectancy implies that the citizen notices that she/he can increase productivity in the participation processes. The existing ICT tools for e-participation, such us e-petition, online incident reporting apps and online participatory budgeting, allow the citizens to express their ideas, opinions and petitions using online resources such as text, pictures and videos. Thus, the use of e-participation may increase the citizen's expectation of performing better when giving their contributions to the community:

H1. Performance expectancy positively impacts the intention to use e-participation.

Second effort expectancy is defined as the degree of ease associated with the use of a given technology, which influences the intention to use that technology (Venkatesh *et al.*, 2012; Venkatesh *et al.*, 2003). E-participation is designed for and oriented towards the citizenry. As e-participation is voluntary and users devote their time for benefits that are not reflected at the individual level, but at the community level, the perception of the effort required to use e-participation may play a critical role in the citizen's intention to use it. One of the main barriers to e-participation use are the digital skills of citizens (van Deursen and van Dijk, 2009). We believe that citizens will expect that e-participation tools are extremely easy to use. Consequently, if they find some level of difficulty to use e-participation, they would probably not adopt the technology:

H2. Effort expectancy positively influences the intention to use e-participation.

Third, social influence is defined as the extent to which an individual perceives that others who are important to her/him, such as family and friends, consider that she or he should use the system (Venkatesh *et al.*, 2003, 2012). The important others are usually members of the

same community in which an online participation takes place. In the case of e-participation, the social influence may also come from the media and politically active individuals (Oni *et al.*, 2017). The positive opinions of those members may encourage other citizens to contribute through e-participation, thus, increasing their intention to use the system:

> *H3.* Social influence positively impacts the intention to use e-participation.

Fourth, facilitating conditions are the degree to which the individual perceives the existence of resources and support to use a certain technology whenever necessary (Venkatesh *et al.*, 2003, 2012). E-participation is mainly provided and supported by local government agencies. A citizen who has easy access to resources like computers, smartphones, internet connection, support chat rooms, phone line or other favourable conditions will increase his or her intention to use e-participation. In the e-participation context the facilitation environment (Venkatesh *et al.*, 2012) can vary across citizens because of different technological devices and different e-participation tools available according to the goal and level of participation. For instance, when reporting an incident through a mobile app, the resources needed to carry out this task are less demanding than the resources needed to participate in deliberation forums or ideas and online project proposals:

> *H4.* Facilitating conditions positively influence the intention to use e-participation.

2.3 Recommending the use of e-participation

Recommendation is considered a form of post-adoption behaviour (Luo *et al.*, 2016), which makes the intention to recommend a key factor for the successful diffusion of e-participation. In the marketing context a positive recommendation has been shown to be very persuasive and effective to influence the behaviour and attitude of other customers (Hsiao and Chuang, 2009; Chen *et al.*, 2004). Hong and Yang (2009) found that the customer-company identification mediates the intention of positive recommendation. Intention to recommend has also been found to be mediated by trust (Vlachos *et al.*, 2009). In the context of e-participation the satisfaction and trust in government (Welch *et al.*, 2005) may mediate the effect of intention to use and empowerment over the intention to recommend e-participation. In the field of mobile government, Liu *et al.* (2014) suggest that after a positive recommendation, the likelihood of adoption may also increase.

Recommending a technology has not been widely studied due to a much greater focus on the use behaviour construct. Miltgen *et al.* (2013), Oliveira *et al.* (2016) and Lee *et al.* (2011) provide evidence that citizens with high levels of intention to use an information technology are more likely to recommend the technology to others. The rationale to hypothesise an effect of intention to use over intention to recommend is that when a citizen has the intention to use e-participation, she/he may also have an interest in other citizens supporting the same goals and getting involved in e-participation. The behaviour of recommending the technology may play a critical role in supporting the diffusion of e-participation. Since the use of e-participation implies that the citizen already has access to internet, providing recommendations online is just one more step ahead. The existing technologies such as online social networks (e.g. Facebook, Twitter) allow the rapid dissemination of positive recommendations regarding the e-participation technologies. When a citizen has the intention to use e-participation, she/he may also have an interest in other citizens supporting the same goals and getting involved in e-participation. For instance, when there is an e-voting process to choose some projects to be implemented in the city amongst several candidate projects, the citizens interested in the execution of a given project may recommend the technological platform to others to promote the projects. It is also important to keep in mind that e-participation

processes will be successful in the long term only if a sufficient number of citizens contribute to them:

H5. Intention to use e-participation positively influences the intention to recommend the technology to others.

2.4 Citizen empowerment

Psychological empowerment theory (Rappaport, 1987; Zimmerman and Rappaport, 1988; Zimmerman, 1995) is described as "the connection between a sense of personal competence, a desire for, and a willingness to take action in the public domain" (Zimmerman and Rappaport, 1988). This theory has been mainly applied in efforts to understand motivations in the work environment. Spreitzer (1995) developed a multidimensional measure of psychological empowerment in the work context that has been widely used and adjusted in many studies. For instance, Ergeneli *et al.* (2007) examined the relationship between psychological empowerment and bank managers' cognition-based trust in immediate managers; and Hochwälder and Brucefors (2005) studied the relationship between psychological empowerment in the workplace and aspects of ill health. Despite the extensive use of psychological empowerment in the work context, to the best of our knowledge, it has not yet been applied in the context of e-participation adoption. Empowerment has been approached as a set of dimensions, rather than as a singular concept (Spreitzer, 1995; Thomas and Velthouse, 1990; Peterson, 2014). We measure the effect of citizen empowerment as a second-order construct on the intention to use and intention to recommend e-participation. Empowerment is defined by its first-order dimensions: impact, competence, meaning, and self-determination:

(1) Competence (Thomas and Velthouse, 1990) or self-efficacy (Bandura, 1986) is defined as the degree to which a citizen can perform an e-participation activity with sufficient required skills, for example, complete a search for a candidate project on e-participation and send an SMS to vote for that project.

(2) Meaning refers to the individual judgment of the value of an e-participation action or purpose, seen according to the citizen´s own ideas or standards (Thomas and Velthouse, 1990). For instance, if there is a participative online discussion about a project that has a value for the citizen, it is more likely that he or she will join the online discussion.

(3) Impact refers to the degree to which a behaviour or action on the e-participation is seen as producing the effects or influence intended by the citizen (Thomas and Velthouse, 1990; Sjoberg *et al.*, 2017), as for instance, an electronic vote for a project that later is implemented in the community.

(4) Self-determination (Deci and Ryan, 1985), also known as choice, is the perception of causal responsibility for an outcome of e-participation derived from an activity of the citizen (Thomas and Velthouse, 1990). When a citizen submits a proposal for a project through e-participation, he or she becomes the origin of that project's existence, which is evaluated by the local government and other citizens, thereby causing empowerment in the citizen.

Psychological empowerment has been described as the highest expression of participation (Macintosh, 2004). Earlier studies have found that several activities such as consulting, exchange of opinions, and involving citizens in decision-making processes increase the intention to participate in e-government initiatives (Bataineh and Abu-Shanab, 2016; Phang and Kankanhalli, 2008). Furthermore, Kang (2014) found empowerment to be a key dimension for public engagement, which may lead to positive recommendations.

These findings suggest that the psychological empowerment theory may contribute to theoretical knowledge in the field of e-participation, specifically, to understand its pre- and post-adoption behaviour. We posit that a citizen who has the perception of being empowered by the actions performed on e-participation will experience a greater intention to use, and later recommend, this technology:

H6. Empowerment positively influences the intention to use e-participation.

H7. Empowerment positively impacts the intention to recommend e-participation.

3. Research method

3.1 Research model

The integration of UTAUT with empowerment fills a gap in the analysis of e-participation adoption. UTAUT has been widely used in the study of technology adoption, yet the use of psychological empowerment has been rather marginal in the context of e-participation adoption. Given the unique characteristics of e-participation (Sæbø *et al.*, 2008; Medaglia, 2012), we explore the inner motivations that may trigger the citizen's desire to be involved in the public participatory process using ICT and contribute to its diffusion. In other words, we consider intention to use and intention to recommend as a first and second dependent variable, respectively. Even though intention to recommend has received very little attention in the literature of technology adoption, due to the massive focus on use (Miltgen *et al.*, 2013), intention to recommend may be of great interest for government agencies that implement e-participation, as it can help to identify insights for dissemination and diffusion of e-participation initiatives. The research model is shown in Figure 1.
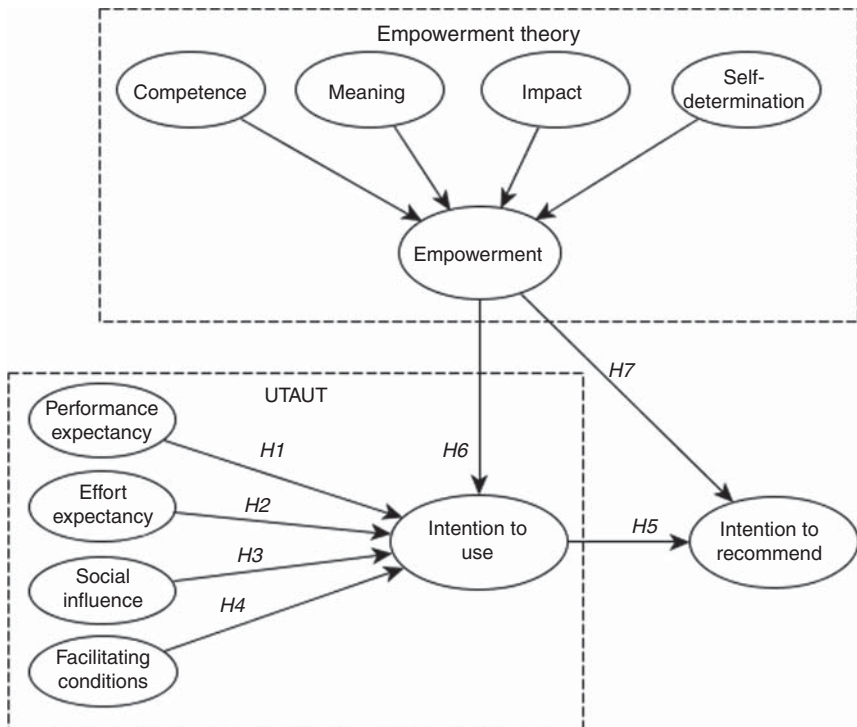

Figure 1.
Research model

3.2 Control variables
We include age, gender and level of education as control variables on the intention to use and recommend e-participation. Control variables are external to the theories being tested. Individual differences such as age, gender and level of education may affect the way users perceive technology (Venkatesh *et al.*, 2000; White Baker *et al.*, 2007). Nevertheless, results from earlier studies differ in the conclusions about the preference for technology adoption regarding age and gender. For instance, Venkatesh *et al.* (2016) found that age had significant impact on a citizen's intention to use e-government, although gender was not significant; Al-Somali, Gholami, and Clegg (2009) found that age and gender had no effect on attitude towards use of online banking; Vicente and Novo (2014) found that age was not significant while gender was significant for citizen online engagement with e-participation, where men are more likely than women to express opinions about political issues or sign online petitions; Choi and Kim (2014) analysed the effect of word-of-mouth on online social networks and found that men are more likely than women to share online brand-related content and product information. In the case of education, earlier research reports evidence that citizens with higher levels of education are more likely to adopt e-participation (Lindner and Riehm, 2011).

3.3 Measurement
We use previously validated scales for all the constructs in our research model, adjusted to the context of e-participation (see Appendix 1). We use reflective measures for all first-order constructs in the model. All the variables pertaining to the main constructs were measured by multiple-type close-ended questions on a seven-point Likert scale ranging from 1 (totally disagree) to 7 (totally agree). The items for performance expectancy, effort expectancy, social influence, facilitating conditions, and intention to use are adapted from Venkatesh *et al.* (2012). For intention to recommend, two of their items were adapted from Oliveira *et al.* (2016), and another from Hoehle and Venkatesh (2015a, b). Gender was coded as a 0 or 1 dummy variable where 1 represents men. Age was measured in years. Level of education is a categorical variable for which the categories correspond to the Portuguese education system from primary school to the PhD level. When evaluated in the model, level of education was translated into years of schooling. Following the suggestion of Peterson (2014), we consider empowerment as a second-order reflective-formative type construct represented by its first-order dimensions: competence, meaning, impact and self-determination. Their items were adapted from Kim and Gupta (2014). The hierarchical model is of a reflective-formative type (Becker *et al.*, 2012; Ringle, 2012).

The questions were originally written in English and reviewed for content validity by a group of university researchers. The questionnaire was translated from English to Portuguese by a professional translator, and then back to English by a different professional to check for equivalence. Wording of the translated questions in Portuguese were discussed and polished with local colleagues in academia and public officials of the municipality, who also provided us with their database of contacts for the electronic survey. Previously, we carried out a pilot study with 27 complete answers to test the questionnaire and correct possible errors. The data from the pilot test were not used in the next phase of data analysis.

3.4 Data collection
This study takes place in Portugal, where municipalities in several cities across the country have implemented e-participation tools for the direct involvement of and contribution from citizens. The so called online participatory budget (Allegretti and Antunes, 2014) is amongst the most popular ones. The electronic participative budget allows citizens to submit project initiatives through a web portal, and to vote for the available projects on the platform.

Most of the citizens vote by means of an SMS message from their mobile phone. These platforms stand out in the e-participation context as they facilitate the inclusion of a larger number of citizens that are willing to contribute with project proposals and/or by voting for the available projects to be implemented by the municipality.

In Portugal, 74 per cent of families had access to internet at home by 2016 (INE-Instituto Nacional de Estadística, 2016). The access to internet at home is higher in the urban areas and big cities (e.g. 82 per cent in the metropolitan area of Lisbon). Regarding the political attitudes and political action, Magalhães (2005) found that citizens are increasingly dissatisfied with the democratic performance. This may be due to a negative perception of political responsiveness of representative institutions (Torcal, 2014) and the economic crisis in Portugal one decade ago that negatively influenced the political attitude (Brito Vieira *et al.*, 2017) and the political trust (van der Meer and Hakhverdian, 2017). The e-participation tools oriented for decision making may open an interesting opportunity to allow the citizens themselves to propose and decide on local issues, which could help to recover the trust and satisfaction in representative institutions.

Data were collected through an electronic survey. An invitation e-mail containing a hyperlink to the questionnaire was sent to a database of registered users in the municipality systems of a Portuguese city; the hyperlinks could be used only once. At the beginning of the questionnaire the respondents were presented an explanatory introduction of the goal of the survey, including electronic participative budget as one example of e-participation tool. Participation in the survey was voluntary. We offered prizes as incentives to participants. The questionnaire was available from 6 September to 30 October of 2016. A total of 210 valid responses were collected. Details of respondents' demographic characteristic are in Table I.

Characteristics ($n = 210$)	Obs	%
Gender		
Feminine	112	53.33
Masculine	98	46.67
Age		
From 40 to 55	123	58.57
From 26 to 39	47	22.38
56 or more	35	16.67
25 or less	5	2.38
Level of education		
Bachelor's degree	92	43.81
High school	59	28.10
Master's degree	29	13.81
Post-graduation	19	9.05
NA/NR	4	1.90
Doctorate	4	1.90
Primary school	3	1.43
Profession		
Worker for third parties	121	57.62
Self-employed	35	16.67
Retired	13	6.19
Unemployed	13	6.19
Freelancer	11	5.24
Other	10	4.76
Student	7	3.33

Table I.
Sample demographic characteristics (ordered by number of observations)

4. Data analysis and results

We assess the research model using the partial least squares structural equation modelling (PLS-SEM) method (Hair *et al.*, 2014). We use SmartPLS 3.0 software (Ringle *et al.*, 2015). PLS is a variance-based technique, which is data driven and suitable for predictive analysis to test the causal relationships that were theoretically derived as hypotheses and using empirical data (Hair *et al.*, 2011). Although the study does not use longitudinal data, the participants that answered the electronic questionnaire have previously experienced the online participatory budgeting platform (Hibberts *et al.*, 2012). Our model complies with several considerations stated in Hair *et al.* (2014) for choosing the PLS method: the goal is to predict key drivers of e-participation adoption; the structural model is complex, comprising 11 constructs (empowerment as second-order construct) and its 31 indicators; and the sample size ($n = 210$) fulfils the rule of being at least ten times more than the largest number of paths directed to a construct in the model; in this case the largest number of structural paths is five.

4.1 Exploratory factor analysis and model fit

We conduct exploratory factor analysis with varimax rotation to check whether the measurement items are adequately related to their constructs. The Kaiser–Meyer–Olkin test resulted in 0.9, which is considered "marvellous" (Sharma, 1996), indicating that the data are appropriate for factor analysis. All the items loaded above 0.5 (Costello and Osborne, 2005) except for FC4. We eliminated FC4 from the model (please see Appendix 2). The adequacy of measurements items is confirmed.

For a tenable model fit, Hair *et al.* (2014) suggest 0.08 or smaller cut-off value for standardized root mean square residual (SRMR). Ziggers and Henseler (2016) reported a good model fit based on a normal fit index (NFI) of 0.865 or higher using PLS-SEM. Results for SRMR (0.04) and NFI (0.87) support a good model fit.

4.2 Measurement model

We have reflective and formative constructs in our model. For reflective constructs we analysed the internal consistency, convergent validity and discriminant validity (Hair *et al.*, 2014). Cronbach's α and composite reliability are the two criteria used for internal consistency. As reported in Table II, both have values above 0.7 for all latent variables, which suggests internal consistency (Mackenzie *et al.*, 2011; Hair *et al.*, 2014). Convergent validity is also assessed by two criteria, the average variance extracted (AVE) and the indicator reliability. The AVE and the loadings are above 0.5 and 0.7, respectively (Table II), in almost all cases, showing a good convergent validity (Hair *et al.*, 2014). Loadings below 0.4 should be dropped (Henseler *et al.*, 2009), which was not necessary for any item in the measurement model.

Constructs	CA	CR	AVE	1	2	3	4	5	6	7	8	9	10
1. Performance expectancy	0.85	0.91	0.77	*0.88*									
2. Effort Expectancy	0.91	0.93	0.78	0.52	*0.88*								
3. Social influence	0.95	0.97	0.91	0.39	0.20	*0.95*							
4. Facilitating conditions	0.83	0.90	0.75	0.37	0.58	0.17	*0.87*						
5. Behavioural intention	0.91	0.94	0.85	0.50	0.48	0.24	0.51	*0.92*					
6. Recommendation	0.90	0.94	0.84	0.47	0.45	0.24	0.45	0.49	*0.91*				
7. Competence	0.97	0.98	0.95	0.37	0.62	0.19	0.66	0.42	0.49	*0.97*			
8. Meaning	0.96	0.98	0.93	0.43	0.32	0.33	0.48	0.52	0.49	0.53	*0.96*		
9. Impact	0.94	0.96	0.89	0.32	0.21	0.31	0.16	0.27	0.45	0.31	0.32	*0.94*	
10. Self-determination	0.95	0.96	0.90	0.37	0.50	0.11	0.52	0.47	0.52	0.58	0.39	0.34	*0.95*

Notes: CA, Cronbach's α; CR, composite reliability; AVE, average variance extracted. Square root of AVE in italics

Table II.
Quality criteria

We use two criteria to test discriminant validity. Fornell and Larcker (1981), which states that the square root of AVE should be greater than its correlation with any other construct (see Table II), and the Hetrotrait–Monotrait Ratio (HTMT) (Henseler *et al.*, 2015), which requires the HTMT ratios to be below the threshold of 0.9 (see Table III). Therefore, the model presents a good discriminant validity.

For formative constructs we assessed the multicollinearity, statistical significance and sign of the weights. Psychological empowerment is modelled as a higher-order construct of a reflective-formative type (Becker *et al.*, 2012; Ringle, 2012). Multicollinearity is evaluated by the variance inflation factor (VIF). The VIF ranges from 1.191 to 1.804, which is below 5, indicating no collinearity issues (Hair *et al.*, 2014). All the weights are statistically significant ($p < 0.01$) and positive(Table IV).

4.3 Structural model
To assess our research model, we follow the approach of Hair *et al.* (2014): coefficient of determination (R^2), f^2 effect size, predictive relevance Q^2 and structural model path coefficients.

(1) R^2 is a measure of the model's predictive power. For this study we follow the suggested rule of thumb in marketing research for the interpretation of R^2 values (Hair *et al.*, 2014; Henseler *et al.*, 2009), according to which, 0.75, 0.50 and 0.25, can be described as substantial, moderate and weak, respectively. Both intention to use (0.442) and intention to recommend (0.458) obtained moderate R^2 values.

(2) From the constructs that were significant, most of the values in f^2 yield small effects: age on recommendation (0.028), psychological empowerment on intention to use (0.062), facilitating conditions on intention to use (0.044), gender on intention to use (0.028), intention to use on intention to recommend (0.034) and performance expectancy on intention to use (0.060). The only exception is psychological empowerment on intention to recommend (0.329), considered as a medium effect (Hair *et al.*, 2014). The path coefficient of education level on recommendation was

Constructs	1	2	3	4	5	6	7	8	9	10
1. Performance expectancy										
2. Effort expectancy	0.59									
3. Social influence	0.44	0.21								
4. Facilitating conditions	0.44	0.66	0.19							
5. Behavioural intention	0.57	0.53	0.26	0.58						
6. Recommendation	0.54	0.50	0.26	0.52	0.53					
7. Competence	0.41	0.66	0.20	0.74	0.45	0.52				
8. Meaning	0.48	0.34	0.35	0.54	0.56	0.53	0.55			
9. Impact	0.35	0.22	0.33	0.18	0.29	0.49	0.32	0.33		
10. Self-determination	0.40	0.55	0.11	0.59	0.51	0.56	0.60	0.41	0.36	

Table III.
Hetrotrait–Monotrait ratio

Higher-order formative construct	First-order reflective constructs	VIF	Weight
Empowerment	Competence	1.804	0.363***
	Meaning	1.462	0.355***
	Impact	1.191	0.257***
	Self-determination	1.585	0.346***
Notes: *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$			

Table IV.
Measurement model evaluation for higher-order formative constructs

also found to be statistically significant. However, since its effect size f^2 is less than 0.02, level of education has no meaningful effect on recommendation ($f^2 = 0.013$).

(3) The blindfolding technique was used to calculate Q^2, with omission distance set to 7. All three of the Q^2 values of endogenous latent variables are above zero, with the smallest $Q^2 = 0.338$. This means that all exogenous variables have predictive relevance for the endogenous constructs in the model (Hair *et al.*, 2014).

(4) Significance of the path coefficients indicates whether our hypotheses are supported or not, and was assessed using the bootstrapping technique (Hair *et al.*, 2014) with 5,000 iterations. Results are compared with the critical values for two-tailed tests. Amongst the seven hypotheses posited in our study, five are confirmed by the results. The model explains 44.0 per cent of variation in the intention to use and 46.1 per cent of variation in the intention to recommend. Figure 2 illustrates the values for path coefficients, their significance, R^2 and predictive relevance Q^2.

Evidence shows that psychological empowerment improves the predictive power of UTAUT. We evaluated two structural models: UTAUT alone and UTAUT with psychological empowerment. Hair *et al.* (2014) caution that problems emerge when comparing the R^2 of different models, since adding constructs slightly correlated with the endogenous variable will increase its R^2 value. Instead, they suggest the adjusted coefficient of determination (R^2_{adj}), which allows avoiding bias in complex models. We compare the path
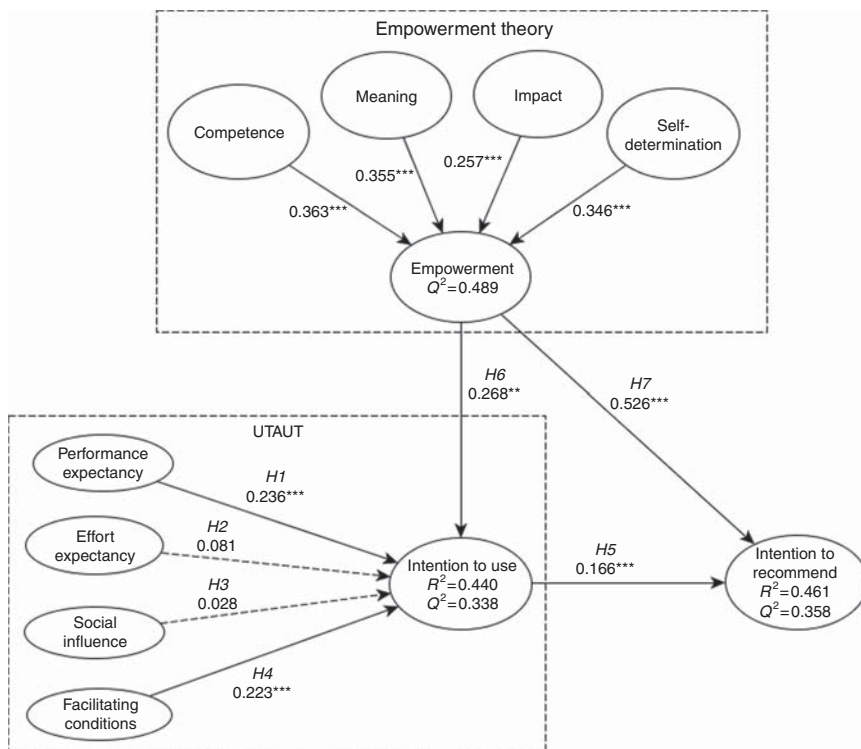
Notes: *,**,***Significant at 10, 5, 1 per cent levels, respectively. Non-significant paths are in dotted arrows

Figure 2.
Structural model
result

coefficients, significance, and R^2_{adj} for the two models. Based on R^2_{adj} we can conclude that the full research model (UTAUT + empowerment) performs better than UTAUT alone in the e-participation context. The increment of R^2_{adj} in the full model in comparison to the UTAUT alone model is more substantial for intention to recommend. The increment for intention to use is rather modest. Table V compares the results of the two models.

As can be seen in Table VI and Figure 2, of the seven hypotheses five are confirmed. *H1* −*H4* are about the constructs of UTAUT theory. Performance expectancy (*H1*) and facilitating conditions (*H4*) are significant in explaining intention to use e-participation ($\beta = 0.236$, $p < 0.01$ and $\beta = 0.223$, $p < 0.1$, respectively). Effort expectancy (*H2*) and social influence (*H3*) have no significant effect on intention to use. *H5* concerns the relationship between intention to use and intention to recommend e-participation, which is significant ($\beta = 0.166$, $p < 0.05$) and thus *H5* is confirmed. *H6* and *H7* are about the effect of empowerment theory of intention to use ($\beta = 0.268$, $p < 0.05$) and intention to recommend ($\beta = 0.526$, $p < 0.01$), respectively. Both are supported. The results show that the relationship between empowerment and intention to recommend is the strongest of the model.

5. Discussion
The current study builds and evaluates a model to understand the drivers of the intention to use and recommend e-participation. This model is based on UTAUT and psychological empowerment. We found that in addition to two of the UTAUT constructs, namely, performance expectancy and facilitating conditions, psychological empowerment

Independent variable	Dependent variable	UTAUT Only Path coefficient	Adj. R^2	UTAUT + Empowerment Path coefficient	Adj. R^2
Performance expectancy	Intention to use	0.287***	0.385	0.236***	0.417
Effort Expectancy		0.130		0.081	
Social influence		0.056		0.028	
Facilitating conditions		0.339***		0.223*	
Empowerment		−		0.268**	
Age		0.001		0.022	
Gender		−0.131**		−0.128**	
Level of education		−0.043		−0.029	
Intention to use	Intention to recommend	0.462***	0.272	0.166**	0.447
Empowerment		−		0.526***	
Age		−0.212***		−0.127*	
Gender		0.025		−0.028	
Level of education		−0.086		−0.086*	

Table V.
Comparison of results

Notes: *,**,***Significant at 10, 5 and 1 per cent levels, respectively. Hypotheses are derived from the full model (UTAUT + empowerment)

Hypotheses	Supported?
H1: Performance expectancy → Intention to use	Yes
H2: Effort expectancy → Intention to use	No
H3: Social influence → Intention to use	No
H4: Facilitating conditions → Intention to use	Yes
H5: Intention to use → Intention to recommend	Yes
H6: Empowerment → Intention to use	Yes
H7: Empowerment → Intention to recommend	Yes

Table VI.
Summary of hypotheses testing

also influences the intention to use e-participation. Our results also reveal that women are more willing to use e-participation than men, and younger citizens are more willing to recommend e-participation than older citizens (see Table V). Our model explains 44.0 per cent of the variance in the intention to use, and 46.1 per cent of the variance in the intention to recommend e-participation (see Figure 2).

Regarding the UTAUT constructs, performance expectancy was found to be significant and the strongest predictor of intention to use e-participation. This finding is consistent with earlier research (Luo *et al.*, 2010; Zuiderwijk *et al.*, 2015), implying that when a citizen perceives that her/his productivity increases by participating in e-participation, she/he is more willing to adopt e-participation. The results also show that effort expectancy and social influence have no significant effect on the prediction of intention to use. This finding differs from findings in previous studies (Wang and Shih, 2009; Kollmann and Kayser, 2010), reporting those constructs as significant. Facilitating conditions is significant on intention to use, which is in line with other studies (Wang and Lo, 2012; Rodrigues *et al.*, 2016). This indicates that the extent to which the citizen has the ICT resources to use e-participation significantly influences the intention to use e-participation.

The finding of effort expectancy as not significant on intention to use coincides with studies in other contexts of information technology adoption, such as mobile banking (Oliveira *et al.*, 2014; Baptista and Oliveira, 2015), which suggest that when users are already familiar and find it easy to use e-participation tools, the influence of effort expectancy on behavioural intention decreases (Alharbi *et al.*, 2017). Regarding the non-significance of social influence, this factor was introduced in UTAUT for the organisational context as the next version of subjective norms (Venkatesh *et al.*, 2003). In the case of e-participation, different from the organisational settings, the usage is completely voluntary, which may explain the non-significance of social influence. This finding goes in line with previous literature suggesting that when the use is perceived as voluntary, social influence is less important (Venkatesh *et al.*, 2003; Hartwick and Barki, 1994). Moreover, as e-participation is not yet widely used in the city where the data were collected, its usage cannot yet be considered the norm. The actual users of e-participation do not receive a direct influence from the other citizens who are so far not yet involved in e-participation projects. The initial influence to use e-participation tools may well be the result of the marketing promotion and advertisement done by the local government that hosts the system.

Psychological empowerment is defined as a higher-order construct. We found its first-order formative components, namely competence, meaning, impact, and self-determination to be significant and positive on the construct empowerment. This positively influences intention to use e-participation. This result is consistent with another study in the e-participation context (Abu-Shanab, 2015), in which empowerment was evaluated as a first-order construct in the context of open government. This implies that if citizens perceive a feeling of empowerment with e-participation, it will positively affect their intention to use e-participation. Furthermore, we found that intention to use and psychological empowerment positively influence intention to recommend. This finding is consistent with other studies that found intention to use to impact significantly over intention to recommend; for instance, Miltgen *et al.* (2013) in the context of biometrics and Oliveira *et al.* (2016) in the context of mobile payment.

5.1 Theoretical implications
The first theoretical implication is derived from the proposed integrated research model to analyse the behavioural intention and the action to recommend e-participation technologies. We explore the inner motivations of the individual by integrating psychological empowerment theory with UTAUT. The positive values in each of the dimensions of psychological empowerment may contribute, in some degree, to the perception of empowerment in the citizen

regarding the intention to use and recommend e-participation. Thus, competence may imply that the more skills the user has to use e-participation, the greater her/his intention to use e-participation; meaning may indicate that when the purpose of using e-participation has a value for the citizen, she/he will be more willing to use and recommend e-participation to others; impact may suggest that if the citizen has the perception that his usage of e-participation will have a final positive outcome for the community, she/he may be more motivated to use and recommend the technology; and finally self-determination could indicate that when citizens have a perception of responsibility for an outcome of e-participation, they will also have a greater intention to use and recommend the system.

Second, our results confirm an acceptable explanatory power in predicting intention to use and recommendation of e-participation. The results indicate that when psychological empowerment is integrated with UTAUT the effect on intention to use and intention to recommend e-participation is increased. The R^2_{adj} increases from 38.5 per cent (UTAUT only) to 41.7 per cent (full model) for intention to use, and from 27.2 per cent (UTAUT only) to 44.7 per cent (full model) for intention to recommend (Table V). The stronger impact of empowerment on intention to recommend than on intention to use may imply that once the citizens have a perception of empowerment, they will be much more willing to recommend the usage to others, as for instance sharing the e-participation ideas in social networks and inviting others to join.

Third, we contribute to the construct clarity of higher-order multidimensional constructs (Johnson *et al.*, 2012) in the context of e-participation. We provide a model in which psychological empowerment is used as a higher-order construct to explain intention to use and recommend e-participation. And finally, when the context of technology usage is completely voluntary and easy to use, which is the case for e-participation, the effect of effort expectancy and social influence, as they are defined in UTAUT, become little or non-significant over the behavioural intention to use the technology.

5.2 Practical implications

Understanding the behavioural intention to use and intention to recommend of e-participation tools and platforms is critical for entities that implement and promote the use of those technologies (usually local government institutions). The hypotheses tested from both theories integrated in the model provide interesting insights for practitioners.

Regarding the empowerment-related hypotheses: positive effect of empowerment on intention to use and recommend e-participation implies, for the public sector, that the strategies for promotion and diffusion of e-participation should focus on citizens' positive perception of the four components of psychological empowerment: competence, meaning, impact and self-determination. For instance, in the case of impact, the e-participation platform should keep the citizens informed about the effects produced by their participations through the platform (Royo and Yetano, 2015). This may contribute to the perception of empowerment in the citizens, thereby creating a positive attitude towards intention to use and recommend the technology over time.

Regarding the UTAUT-related hypotheses: the positive and significant effect of performance expectancy over intention to use suggests that citizens may perceive that their use of e-participation is producing a positive outcome in the community. Local governments should not only promote the use of e-participation tools, but also the positive final effects of that usage on the community. The positive effects of facilitating conditions on intention to use may indicate that local governments should keep a facilitating environment around e-participation, as for instance support chat rooms or call centres. The non-significant effect of effort expectancy and social influence suggest that local governments should keep the e-participation simple and easy to use, oriented to all citizens without conditions or restrictions for using it.

5.3 Limitations and future research
The first limitation of our work concerns the location of participants in the questionnaire, which was conducted in Portugal. Caution is needed when generalising our findings towards the adoption of e-participation in different locations or with different participants. This study offers researchers a basis for future research by refining the model and testing it in different countries, age groups, and identifying new constructs that may help to increase the predictive power of the model. Second, we found effort expectancy and social influence to have no significant effect on intention to use. Future research can investigate these constructs in different scenarios in which they may become significant over the intention to use. Third, the measurement and use of psychological empowerment as a higher-order multidimensional construct is still under research (Johnson *et al.*, 2012; Peterson, 2014). Future research may explore each of the dimensions of psychological empowerment on e-participation adoption separately and combine psychological empowerment with other theories of technology adoption to compare the predictive power compared to our model. And finally, the data were collected from 210 citizens who already experienced e-participation, which implies that they are probably more digitally savvy and experienced than the rest of the population in the city. This may have created a limitation regarding the random sample selection and may have influenced the result of non-significance of effort expectancy on intention to use, since the users may find e-participation easy to use and expect few or no problems when using it. Future research may address this limitation by collecting data from a broader sample of citizens, thereby allowing a comparison between the more and less experienced participants with e-participation.

Beyond citizen empowerment and the UTAUT constructs, a myriad of other factors can influence the adoption of e-participation. Future research may create new models based on UTAUT and integrate constructs such as sense of community (Talò *et al.*, 2014), sense of place (Acedo *et al.*, 2017) and place identity (Cuba and Hummon, 1993), which have been shown to potentially influence citizens' willingness to engage in participation activities. However, very little literature reports having measured the relationship between the degree of identification with the community and the adoption of e-participation, which would be a fruitful path forward.

6. Conclusions
This paper provides insights on how citizens' perceptions of empowerment can influence the intention to use and intention to recommend e-participation systems, using a novel theoretical model. The model integrates UTAUT and psychological empowerment theory. It was evaluated based on data from 210 citizens in Portugal. Performance expectancy, facilitating conditions, and empowerment were found to be significant on the intention to use e-participation. Psychological empowerment significantly impacts intention to use and recommend e-participation. These findings can help the public sector to design strategies to promote and diffuse e-participation amongst the citizenry for a long-term use; for instance, keeping and reinforcing the perception of empowerment in citizens who use e-participation tools. The model offers researchers a basis for future examination of inner motivations of citizens to adopt e-participation.

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Further reading

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Appendix 1

Construct	Item	Loading	Source
Performance expectancy	I find e-participation useful in my daily life	0.87	(Venkatesh *et al.*, 2012)
	Using e-participation helps me accomplish things more quickly	0.88	
	Using e-participation increases my productivity	0.89	
Effort Expectancy	Learning how to use e-participation is easy for me	0.83	
	My interaction with e-participation is clear and understandable	0.90	
	I find e-participation easy to use	0.90	
	It is easy for me to become skilful at using e-participation	0.90	
Social Influence	People who are important to me think that I should use e-participation	0.95	
	People who influence my behaviour think that I should use e-participation	0.95	
	People whose opinions that I value prefer that I use e-participation	0.95	
Facilitating Conditions	I have the resources necessary to use e-participation	0.75	
	I have the knowledge necessary to use e-participation	0.88	
	E-participation is compatible with other technologies I use	0.90	
Intention to Use	I intend to continue using e-participation in the future	0.91	
	I will always try to use e-participation in my daily life	0.92	
	I plan to continue to use e-participation frequently	0.94	
Empowerment	Competence		(Kim and Gupta, 2014)
	I have mastered the skills necessary for using the e-participation	0.96	
	I am self-assured about my capabilities to use the e-participation	0.97	
	I am confident about my ability to use the e-participation	0.98	
	Meaning		
	The e-participation I use is very important to me	0.97	
	The e-participation I use is meaningful to me	0.97	
	My e-participation activities are personally meaningful to me	0.96	
	Impact		
	Based on e-participation usage, my impact on what happens in the community is large	0.96	
	Based on e-participation usage, I have significant influence over what happens in the community	0.97	
	Based on e-participation usage, I have a great deal of control over what happens in the community	0.91	
	Self-Determination		
	I have significant autonomy in determining how I use the e-participation	0.96	
	I have considerable opportunity for independence and freedom in how I use the e-participation	0.95	
	I can decide on my own how to go about using the e-participation	0.94	
Intention to recommend	I will recommend to my friends to subscribe to e-participation	0.92	(Oliveira *et al.*, 2016)
	If I have a good experience with e-participation I will recommend friends to subscribe to the platform	0.89	
	I would recommend the e-participation to someone who seeks my advice	0.94	(Hoehle and Venkatesh, 2015b)

Table AI.
Measurement items and factor's loadings

Appendix 2

					Factor					
	1	2	3	4	5	6	7	8	9	10
PE1	*0.660*	0.220	0.134	0.100	0.203	0.135	0.036	0.142	0.072	0.191
PE2	*0.724*	0.141	0.229	0.096	0.158	0.110	0.045	0.116	0.169	0.068
PE3	*0.728*	0.200	0.189	0.047	0.156	0.187	0.181	0.164	0.102	0.031
EE1	0.243	*0.511*	0.053	0.298	0.108	0.124	0.394	0.188	−0.038	0.129
EE2	0.187	*0.828*	0.093	0.095	0.171	0.118	0.167	−0.006	0.153	0.196
EE3	0.131	*0.863*	0.039	0.087	0.196	0.097	0.156	−0.005	0.049	0.134
EE4	0.295	*0.626*	0.053	0.321	0.086	0.144	0.334	0.077	−0.011	0.206
SI1	0.118	0.074	*0.901*	0.070	0.045	0.047	0.049	0.139	0.077	0.012
SI2	0.165	0.020	*0.897*	0.006	0.077	0.042	0.019	0.115	0.125	0.012
SI3	0.146	0.057	*0.883*	0.020	0.072	0.079	0.056	0.088	0.197	−0.011
FC1	0.187	0.074	0.018	*0.506*	0.178	0.112	0.165	0.207	−0.015	0.195
FC2	0.053	0.201	0.051	*0.727*	0.097	0.135	0.408	0.174	0.092	0.220
FC3	0.043	0.289	0.071	*0.663*	0.285	0.149	0.277	0.147	−0.039	0.141
BIP1	0.235	0.233	0.045	0.169	*0.708*	0.187	0.121	0.104	0.089	0.159
BIP2	0.142	0.144	0.120	0.111	*0.771*	0.137	0.064	0.261	0.104	0.138
BIP3	0.180	0.139	0.081	0.167	*0.806*	0.114	0.115	0.250	0.060	0.195
REC1	0.128	0.144	0.062	0.121	0.189	*0.734*	0.104	0.191	0.275	0.142
REC2	0.194	0.070	0.056	0.133	0.088	*0.691*	0.247	0.199	0.098	0.212
REC3	0.172	0.192	0.117	0.116	0.201	*0.772*	0.098	0.134	0.271	0.211
COMP1	0.099	0.208	0.040	0.314	0.103	0.128	*0.775*	0.221	0.127	0.227
COMP2	0.088	0.244	0.068	0.186	0.106	0.158	*0.807*	0.221	0.123	0.242
COMP3	0.091	0.244	0.061	0.220	0.116	0.158	*0.832*	0.232	0.125	0.228
MEAN1	0.148	0.027	0.165	0.148	0.184	0.179	0.215	*0.834*	0.118	0.099
MEAN2	0.164	0.037	0.146	0.158	0.212	0.168	0.200	*0.841*	0.131	0.105
MEAN3	0.126	0.037	0.143	0.136	0.207	0.134	0.183	*0.827*	0.112	0.151
IMP1	0.111	0.025	0.129	0.034	0.102	0.163	0.085	0.119	*0.888*	0.126
IMP2	0.128	0.047	0.103	0.022	0.083	0.142	0.082	0.094	*0.918*	0.120
IMP3	0.045	0.072	0.174	−0.024	0.016	0.131	0.073	0.070	*0.805*	0.099
SDET1	0.142	0.207	0.011	0.139	0.120	0.159	0.233	0.105	0.168	*0.846*
SDET2	0.131	0.116	0.010	0.168	0.179	0.169	0.202	0.149	0.167	*0.790*
SDET3	0.034	0.206	−0.013	0.165	0.195	0.186	0.190	0.107	0.112	*0.789*

Note: Factor analysis with varimax rotation

Table AII.
Exploratory factor
analysis results

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