

Towards a Decision Support Guide for User Participation in Public e-Service Development

Completed Research

Anthony Simonofski

KU Leuven-University of Namur, Belgium
anthony.simonofski@unamur.be

Ulf Melin

Linköping University, Sweden
ulf.melin@liu.se

Ida Lindgren

Linköping University, Sweden
ida.lindgren@liu.se

Benoît Vanderose

University of Namur, Belgium
benoit.vanderose@unamur.be

Monique Snoeck

KU Leuven, Belgium
monique.snoeck@kuleuven.be

Abstract

User participation is often reported as a success factor for public e-service development. However, in practice, project managers face challenges to involve users due to lack of methodology, time, or context awareness. In order to tackle this lack of context awareness, we describe a conceptual model summarizing the impact of four influencing factors on user participation decisions. From this model, we then derive a decision support guide that helps project managers from public organizations understand when and how to include users in the development process. Following the design science research approach, the conceptual model is built in an iterative manner based on several literature sources and validated through in-depth interviews and group discussions with project managers and researchers. This paper contributes to research as it helps to frame the conditions impacting participation and opens the discussion for the addition of other factors. Then, it also contributes to practice as project managers developing public e-services will be able to reach a better situated participation.

Keywords: User participation, Public e-service Development, Decision support guide

Introduction

User participation is a crucial element for information systems development as it has been reported to increase the quality of the system (Hartwick and Barki, 1994). Such insights from the information systems research (ISR) in the private sector partially apply to systems developed for the public sector as well. Indeed, developments in Information and Communication Technologies (ICT) for public sector organizations has led to the emergence of the field of e-government in research and in practice, referring to the use of ICT by governmental entities to deliver information and services to their users (citizens, businesses or other governmental bodies) (Andersen and Henriksen, 2006; Fath-allah et al., 2014). More recently, this phenomenon is also discussed under labels e.g., digital government, digital services and public e-services (Lindgren and Jansson, 2013). In this paper, we consider public e-services as interactions between a government organization and its users, through the use of ICT, in order to deliver information and service. Preferably, public e-services create value for both user and supplying organization, as well as for the greater society (Jansen and Ølnes, 2016; Lindgren and Jansson, 2013). In this paper, we take the practical viewpoint of a public project manager that has to make decisions about user participation in the development of public e-services as a point of departure for exploring a decision support guide. Users can have a more active role in e-government in general and public e-service development in particular (Axelsson et al., 2010; Karlsson et al., 2012). Indeed, a wide range of user participation approaches and methods have been described in detail in the literature. However, project managers within public organizations are sometimes reluctant to involve the users in the development process and need more support when making decisions on this matter (Simonofski et al., 2019). Several reasons have been identified, e.g., lack of knowledge of potential methodological approaches; lack of time and other resources; additional complex requirements to integrate and so forth.

Another key challenge, aligned with the lack of knowledge of potential methodologies, is the wide variety of existing participation methods. Indeed, some methods are more relevant than others, depending on the specific context, users’ characteristics, their motivation, the organizational culture, or the project stage (Simonofski et al., 2019). This is aligned with studies that question the preconception that more participation is always for the better and reflect on the tension between the positive findings from the general ISR and the opinions of project managers (Heeks, 1999; Holgersson et al., 2018) and is relevant both for research and for practice. For instance, Heeks (1999) challenges the consideration of user participation as a “magic bullet” that can solve everything without taking into account the context or the target users. Without an appropriate ex-ante analysis, user participation could reveal itself to be useless or even negative for the project manager in the public organization.

In that regard, the research question that this paper tackles is: “How can the project managers’ decisions related to user participation in public e-service development be supported, taking several influencing factors into account?” The end-goal of this research is to provide practitioners with a decision support guide to help them decide: (1) whether they need to organize for user participation in the development of the public e-service and (2) on the modalities of user participation, with regard to the context specificities. In order to reach that goal of situated user participation, presents a conceptual model that constitutes an essential theoretical basis for the decision guide. We also present how we derive the decision guide from this model. Lastly, we present a tentative empirical validation of the decision support guide, that provide insights and feedback about its use. The paper is structured as follows. In the *Research Methodology* Section, we detail how we used design research to build the conceptual model and the decision support guide. In the *Conceptual Model* Section, we explain the different parts of the model and formulate hypotheses about the relationships between influencing factors and user participation. In the *Decision Support Guide* Section, we focus on the functioning of the guide giving recommendations to practitioners after an ex-ante analysis. In the *Discussion, Limitations and Further Research* Section, we raise open questions about this paper based on its limitations and further research leads. In the *Conclusion* Section, we summarize the contributions of this paper as well as their implication for research and practice.

Research Methodology

This section details how we build the two artifacts of this research: the conceptual model about participation in public e-services and the decision support guide derived from it. In order to develop the conceptual model and derived guide, we rely on the design science research methodology as described by (Hevner et al., 2004). Figure 1 details the overall methodology.

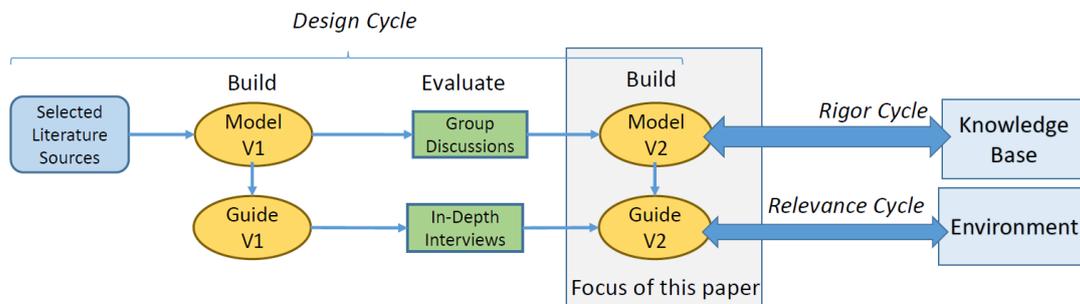


Figure 1. Design Science Research Methodology

In the *design cycle*, we first build the theoretical model artifact and suggest relationships between potential influencing factors and user participation, based on previous literature sources detailed in Table 1. The publications in Table 1 represent different and complementary aspects of user participation practices. In these papers, hypotheses and/or insights about user participation, as well as recommendations for practice, are presented. The purpose of using these particular sources in this paper is to combine the output of these papers into a model for understanding various facets of user participation, aiming to capture the entire process on a higher abstraction level. Second, we derived the decision support guide artifact from the model and derived hypotheses for the relationships. The concepts of the model and the guide were then considered as artifacts to be refined iteratively. Thus, in order to collect practical insights and validation about the model and the guide, we performed three in-depth interviews and three group discussions. In the group discussions, the focus was set on the completeness of the model, by letting practitioners assess the relevance of each element of the model and give their opinion about the relevant influencing factors. In the interviews, the focus was set on the relations between the elements and the participation decisions, and the usability of the guide. Thanks to

this validation, the artifacts were improved to be more aligned with the experience of project managers. An overview of the empirical validation activities conducted can be found in Table 2. Based on these validation cycles, we developed a second version of the guide and the model. In the *relevance cycle*, we ensured that the decision guide contributes to its environment and answers business needs by providing a relevant decision aid to practitioners. In the *rigor cycle*, we ensured that the model contributes to the existing knowledge base by positioning its contributions and limitations in the Discussion Section.

Table 1. Literature Sources

Conceptual Model Element	Main reference	Description
Participation Methods	(Simonofski et al., 2019)	Studies participation methods based on Systematic Literature Review and interviews with practitioners
Degree of Participation	(Karlsson et al., 2012)	Studies three user participation approaches and validation through document analysis
Organization	(Simonofski, Ayed, et al., 2018)	Explores which organizational factors impede agile methods implementation through focus groups
Project Stage	(Simonofski, Vanderose, et al., 2018)	Explores the impact of project stages on participation methods through action research
Users' Characteristics	(Wijnhoven et al., 2015)	Studies the motivations of citizens to participate based, among others, on demographics characteristics
Public Values	(Jaspers and Steen, 2018)	Studies the link between public values and co-production

Table 2. Empirical Validation activities

Type	Profile	Description/Role(s)
Interviews	Linkoping City (Sweden)	Head of Digitalization
	La Louvière City (Belgium)	e-Government Manager
	Digital Transformation Office (Belgium)	User Experience Manager
Group Discussions	Information Systems Division (Linkoping University)	5 e-government and IS researchers
	Federal Level (Belgium)	6 public servants working on digitalization
	Federal Level (Belgium)	6 public servants working on digitalization

Conceptual Model – Situated User Participation

From the literature and the empirical activities, we have chosen to study the influence of four factors (Organizational context, Project Stage, Users' Characteristics and Public Values) on user participation decisions (method and degree) from the viewpoint of a project manager in charge of public e-service development. By factor, we mean “any element, that the project manager may or may not influence, that impacts user participation decisions”. The Conceptual Model is summarized in Figure 2.

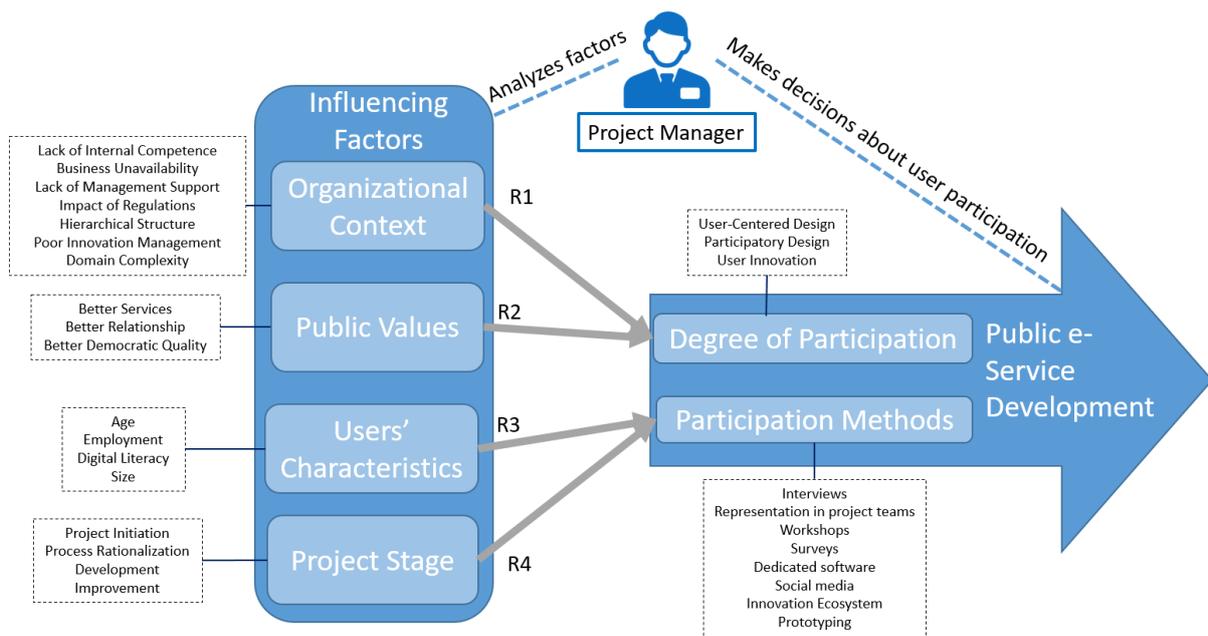


Figure 2. Conceptual Model Representation

In the remainder of this section, we will further expand on the two main participation decisions: the different participation methods, and the desired degree of participation. We then explain the different influencing factors, and we explain how these factors may determine the best choice of participation method and degrees (relationships R1-4 in Figure 2).

Table 3. Number of influencing factors from the Group Discussions

Influencing Factors	Group 1 (Researchers)	Group 2 (Public Servants)	Group 3 (Public Servants)	Total
Users' Characteristic	3	5	7	15
Organizational context	8	4	0	12
Project Stage	1	4	1	6
Type of Project (Public Values)	2	1	0	3
Other	3	1	1	5

Participation Methods

Different methods exist to collect the input of users in the development of information systems; For the specific case of e-government, Simonofski et al., (2019) reported eight different methods that are summarized here:

- **Interviews:** Software developers often rely on this direct and simple method to gather input from users in the requirements engineering phase of the development.
- **User workshops:** This method allows interaction with a group of representative users with the aid of innovative techniques such as improvisation principles.
- **Representation in the project team:** Salient users can be considered as partners and intermediaries in different stages.
- **Dedicated Software:** Dedicated software can also be used to support development such as Crowd-centric Requirements Engineering platforms for requirements elicitation, prioritization and negotiation.
- **Innovation Ecosystem:** Insights from potential users can also be collected thanks to new user-driven open innovation ecosystems such as living labs or hackathons.
- **Usability tests on prototypes:** This method allows to present a non-finished software to its potential users to collect feedback and improve it.
- **Social Media:** Social media is often considered as an enabler of political but can be a lead to improve software development practices
- **Answer to surveys:** Surveys can be used to collect insights from a large number of users through online surveys, phone or in person surveys.

We use these methods as a point of departure for the model as they constitute an abstraction that can be further refined and instantiated according to the specificities of the project.

Degree of Participation

The degree to which the users are actively involved in the development process and the actual public e-service design (as a result of the various methods above) is also an important element to take into consideration for the project manager. In order to explain this degree, we rely on the taxonomy from (Karlsson et al., 2012) that describes user participation around a spectrum of three approaches:

- **User-Centered Design** emerged in the human-computer interaction field and underlines the important impact of users' needs on the design of the interface (Abrams et al., 2004). In this approach, users remain passive as they only provide information to developers that hold the decision power.
- **Participatory Design** is an approach where developers and users are more equal partners in the process (Schuler and Namioka, 1993). Within this approach, there are several considerations for the users possible: users can be advisors, representatives or even constitute the full user population.
- **User Innovation** is an approach where the solutions reside within the user groups, and more specifically within the "lead users" group. This sub-group refers to users that have strong needs and that are willing to develop solutions themselves to answer those needs (von Hippel, 1986).

The main argument for using taxonomy is that it relies on well-established approaches that constitute a spectrum in the participation from low degrees of involvement of users to high degrees of involvement.

Influencing Factor 1: Organizational context

A growing body of research focuses on the impact of the organizational context and associated challenges on software development practices. Among other studies, Ayed et al. (2012) studies how agile methods should be customized according to the specificities of two organization in order to tackle the context-specific challenges. Recent research studies the organizational context of public organizations and details seven barriers that can impede the implementation of agile methods (Simonofski, Ayed, et al., 2018);

- **Lack of Internal Competences:** Unavailability of specific profiles in public e-service development teams (IT, Business Analysts, Agile specialist, etc.).
- **Business Unavailability:** Siloed structure impeding the internal alignment between business experts and IT stakeholders.
- **Lack of Management Support:** Lack of support from high-level, mid-level and operational employees as well as from political representatives to support the change in development practices.
- **Impact of Regulations:** Impact of regulatory compliance and political agendas on development practices.
- **Hierarchical Structure:** Presence of a hierarchical decision-making process.
- **Poor Innovation Management:** Lack of innovation due to budget constraints.
- **Domain Complexity:** Complexity of the project in terms of interoperability, security, quality, size, partners, etc.

As user participation is an essential principle of agile methods, we rely on these challenges to understand the organizational context as the more present these challenges, the most difficult to increase collaboration and participation in existing processes. The organizational context impacts the decision to make use of user participation methods or not (**R1**). Indeed, if the organizational context is very hostile to user participation (with, for instance, a very high hierarchical structure and low management support), then user participation can be useless (if it is not considered afterwards), inapplicable (the project manager is not allowed to take time to perform participation) or even detrimental (waste of resources). On the other hand, if these challenges are not saliently present in the organization of interest, the organization is likely to be more inclined towards welcoming users' input. Acknowledging the specificities of the organizational context is important based on the study above, and in line with the situated perspective in this paper, we include this in the framework so that the project manager is aware of the challenges of his/her organizational context.

Influencing Factor 2: Project Stage

Another influencing factor on which user participation method to implement is the project stage. Hartson and Pyla (2012) argue that developing a system with a high-quality user experience is an iterative process composed of four steps. These steps are "Analysis", where data on end-users' needs and wishes are gathered and analyzed, "Design", where design alternatives for the to-be participatory system are built and reflected upon, "Prototype", where prototypes of the system are built with various fidelity levels, and "Evaluate", where the prototypes are evaluated by User Experience (UX) experts and/or end-users. In a recent study that examines the e-government process of a local community, the links between UX process and e-government stages were reflected upon (Simonofski, Vanderose, et al., 2018):

- **Project Initiation:** The e-government strategy is formulated by the stakeholders in terms of scope, objectives and resources.
- **Process Rationalization:** The as-is processes of government were rationalized before engaging in any IT investments to evaluate if they needed to be adapted, transformed or even deleted.
- **Development:** The different software development stages of the new service take place in this step to simplify the internal processes as well as the services offered to users.
- **Improvement:** Feedback mechanisms allow the different stakeholders to give their opinion and ideas on the whole strategy to facilitate continuous improvement.

The Project Stage has an impact on the choice of participation methods by the manager. Indeed, some methods are more relevant than others depending on the project stage (**R2**). The full range of hypotheses has been formulated in a previous work and (Simonofski, Vanderose, et al., 2018) constitutes the basis for the recommendations in this paper. For instance, prototyping is helpful in the development of the solution but not necessarily applicable in the strategy formulation stage. Including the project stage is important for the project managers to understand the relevance of each method. These four stages are

also broad enough to be further refined if necessary (e.g. the different software development stages under the “Development” stage).

Influencing Factor 3: Users’ Characteristics

Wijnhoven et al. (2015) studied the motivations of citizens to engage in Open Government projects. Among the different analysis themes, he focused on socio-economic characteristics such as Age and Employment. We rely on these two characteristics to understand which user base the practitioners will target with their public e-service and their participation activities. On top of these characteristics, we can also add two other potentially interesting factors as the digital literacy (Distel and Becker, 2017; Hargittai and Hsieh, 2012) and the size of the user group (Oostveen and Besselaar, 2004). The included characteristics are thus:

- **Age:** The user base can either be Young (under 20), Adults (between 21 and 59) or Seniors (above 60)
- **Employment:** The target users can be students, employed or unemployed. In the case they are employed, they can work in governmental bodies or not.
- **Digital Literacy:** The targeted users can have a high-level, medium-level or low-level understanding of digital artifacts.
- **Size:** The potential user population may differ in size whether the service is aimed for use by a small town, a city, a region or at the national level.

Users’ Characteristics also have an impact on the choice of methods (**R3**). Indeed, depending on the targeted users, different methods should be used. At this stage, different hypotheses were formulated in a citizens’ survey by (Chantillon et al., 2018). Acknowledging user characteristics in the public e-service development is important to understand the specificities of the target users and how it impacts their participation. Additional characteristics can be added to the model to refine the understanding of the user base.

Influencing Factor 4: Public Values

Public values are extensively discussed within the public administration literature as they have an impact on the processes and strategies of governments. Rose et al., (2018) formulate several “ideals” to understand the underlying public values that can influence ICT development in an e-government context. In line with the service, engagement and efficiency ideals previously formulated, (Jaspers and Steen, 2018) provide three main categories of public values:

- **Better services:** This category refers to a better service delivery through values such as efficiency, effectiveness, quality, satisfaction or sustainability.
- **Better relationship:** This category refers to a better relationship between public servants and users through value such as trust, mutual learning, consideration for users’ needs and capacities, reciprocity, transparency or individual freedom.
- **Better democratic quality:** This category refers to the democratic quality of the service delivery through values such as participation, empowerment, inclusion, diversity or social capital.

The inclusion of Public Value as an influencing factor on user participation practices, rests on the idea of ‘public value’ being a proxy for the ‘type’ (or underlying purpose) of the project. Project managers often experience tensions between the values presented above and need to balance them in terms of their development project (de Graaf et al., 2016; Melin and Wihlborg, 2018). Therefore, they have an impact on the user participation decisions when it comes to developing public e-services. Public Values also impact the extent to which the organization would go towards participation or not (**R4**). If the most dominant value steering the development is to create “Better Services”, taking time for participation is not always considered and the input from the citizens must be quickly processed as the allocation of resources for non-priority objectives must be optimized. A user-centered design approach where the user has a less active role is therefore recommended. Furthermore, fast participation should be used in order not to lose time on other key activities for the organization. If the dominant value is to achieve a “Better Relationship”, a more active role from the users can be processed thanks to more traditional individual participation methods. If the project aims at achieving “Democratic Quality”, then a participatory design (with high degree of involvement of the users) or user innovation approaches can be more appropriate through large scale innovative methods to ensure representativeness.

Decision Support Guide Development

The conceptual model helped us build a decision support guide for project managers. This guide was created and improved in close collaboration with project managers through in-depth interviews in order to increase its usability. These interviews helped us understand the requirements of practitioners regarding the guide. These requirements related to the process of the guide, the way to formulate questions and the presentation of the output of the guide. The process for using the decision support guide contains two parts as presented in Figure 3; (1) the influencing factors analysis, and (2) the participation methods matrix. The logic of the guide is as follows; first, each of the influencing factors will be presented to the project managers from the relevant governmental bodies in order to perform an **influencing factors analysis**. This analysis can take the form of a questionnaire where the project manager has to input the necessary information for each of the influencing factors. The output of these questions are labels matching the situation of the project managers, as well as scores assigned to each method, ranking them from most recommended to least recommended. Then, the decision support guide issues recommendations in the shape of a **participation methods matrix** showing which user participation method(s) to use and to which extent the users should be actively involved in this process. These recommendations are for now based on hypotheses resulting from prior research, but can be adjusted as the guide gets used and more insight in the relationships are obtained.

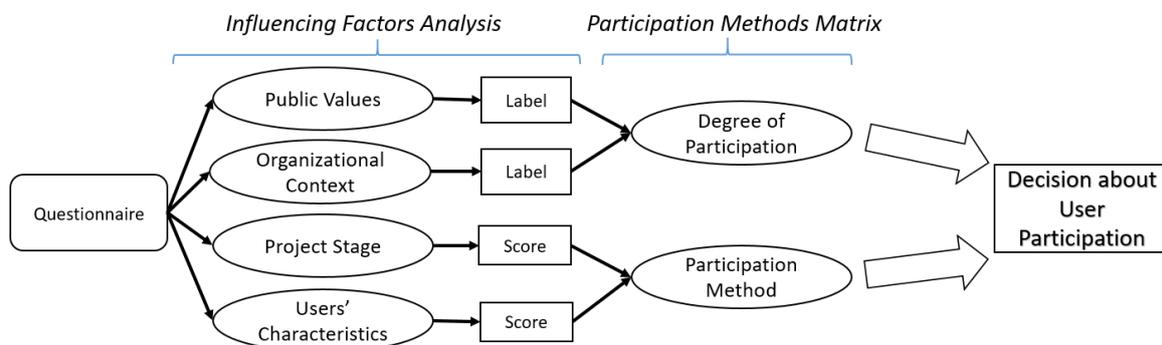


Figure 3. Decision Support Guide Process

Influencing Factors Analysis

The questions about the **Public Values** are formulated on a three-point scale question ranging from “Not important” to “Important” with the following template: “To which extent is the value of “X” important to your organization?”. These questions will deliver an aggregate score about the three main values categories previously described. An alternative to this formulation would be to ask the respondent to rank the values from most important to least important to avoid a high score for all categories.

- If the aggregated score is high for “Better Services”, the label “S” will then be assigned and suggests to focus on user-centered design.
- If it scores high for “Better Relationship”, the label “R” will be assigned that suggests to focus on participatory design.
- If it scores high for “Better Democratic Quality”, the label “D” will be assigned that suggests to focus on user innovation or high levels of participatory design.

The **Organizational context** is also assessed by means of three-point scale to understand the importance of challenges. Detailed thresholds are formulated to determine if an organization scores low, middle or high to these questions.

- If, on average, the different challenges score Low, this results in assigning the label “F” (Favorable) and recommends user innovation or high levels of participatory design due to an appropriate environment.
- If, on average, the different challenges score Middle, the label “M” (Medium Favorable) is assigned and the recommendation is to focus on participatory design on small scale.
- If, on average, the different challenges score High, this results in assigning the “U” (Unfavorable) label and suggests to focus on user-centered design or to not use participation methods at all.

Then, the project manager will be asked to report in which **Project Stage(s)** he/she wishes to invoke a user participation method. Based on the hypotheses from Simonofski et al., (2018b), Table 4 reports

the translation of the hypotheses into scores for each entry following this taxonomy: 0= Not Applicable / 1= Not suggested / 2=Applicable / 3=Recommended.

Table 4. Project Stage Matrix (Sample values based on hypotheses from (Simonofski et al., 2019))

	ITW	WS	REP	SOFT	INNOV	PROT	SOCIAL	SURV
Project initiation	3	3	3	1	1	0	2	2
Process Rationalization	3	3	3	0	0	0	0	2
Development	3	3	3	3	3	3	3	3
Improvement	1	1	1	3	3	0	3	3

The same taxonomy is then applied to the Users' Characteristics in Table 5. The hypothesis of this table are based on a citizens' survey performed by (Chantillon et al., 2018).

Table 5. Users' Characteristics Matrix (Sample values based on a survey from (Chantillon et al., 2018))

		ITW	WS	REP	SOFT	INNOV	PROT	SOCIAL	SURV
Age	Senior	3	3	1	1	1	3	1	1
	Middle	1	1	3	2	2	2	2	2
	Young	2	2	2	3	3	1	3	3
Employment	Employed Public	3	3	3	2	1	3	1	1
	Employed	1	1	1	1	2	2	2	2
	Students	2	2	2	3	3	1	3	3
Digital Literacy	High	1	1	1	3	1	1	3	1
	Middle	2	2	2	2	2	2	2	2
	Low	3	3	3	1	3	3	1	3
Size	Large	1	1	1	3	2	1	3	3
	Middle	2	2	2	2	3	3	2	2
	Small	3	3	3	1	1	2	1	1

Participation Methods Matrix

After the influencing factors analysis, the outcome is a participation method matrix, summarized in Table 6, that recommends which method (row) to use and to which degree (column). Within each box of the matrix, two pieces of information will be found; a combination of two labels and a score. The label refers to the public values and organizational context factors, whereas the score is derived from the project stage and users' characteristics factors of the model. The specific box will be recommended if the right label combination is reached. Then, within the recommended boxes, the higher the participation method scores, the higher the recommendation. For instance, if the influencing factors analysis combines a "Better Services" orientation and the unfavorable organizational context (equivalent to the SU Label), we recommend the use of User Centered Design. Then, if within the User Centered Design column, the "Interview" method scores the highest, this method will be recommended. The SU label could also lead to the use of no participation method or taking advantages of proxies (public servants taking up the role of regular citizens). Indeed, this is consistent with the previous argument from the literature that user participation is no silver bullet and may not be appropriate in some cases.

Table 6. Participation Methods Matrix

	User-Centered Design (or No Participation)	Participatory Design		User Innovation
	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score
Interview	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score
Workshops	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score
Representation in Project Team	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score
Dedicated Software	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score
Innovation Ecosystem	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score
Prototyping	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score
Social Media	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score
Survey	SU/RU/DU + Score	SM/SF/RM + Score	RF/DM + Score	DF + Score

Legend for Labels: S=Better Service, R=Better Relationship, D=Better Democratic Quality / U=Unfavorable organization, M=Medium favorable organization, F=Favorable organization

To test the usability and utility of the guide, we applied it for the case of La Louvière, Belgium. We were able to complete the factor analysis in collaboration with the e-government manager of the city. We asked her questions from the guide from the perspective of possible user participation in the development of an online portal. The answers revealed a medium (M) favorable organizational context

with public values aiming at better services (S), resulting in the SM combination that suggests a participatory design approach with low degree of citizen involvement. By entering the choices for users' characteristics (they were targeting a large middle age population with low digital literacy that are employed outside the public organization), the computation of the scores ranks the three participation methods as follows: Survey (13), Innovation Ecosystem (12) or Social Media (11). This is in line with the actual strategy conducted by La Louvière that used an online survey to get feedback on its portal and on its e-government strategy at the same time. They did not follow the Participatory Design methodology but still considered the feedback (and phoned the persons directly if necessary) into their strategy and to improve the portal. However, the users did not have an impact in the decision-making process. This first application is only a rudimentary result that will further be refined with additional uses of the guide.

Discussion, Limitations and Further Research

In this section, we reflect on the inherent limitations of the research and how we intend to tackle them. The first versions of the conceptual model and decision support guide are based on several literature sources. Even though we performed interviews and group discussions, it needs further empirical validation. We intend to rely on engaged scholarship principles as described by (Van De Ven, 2007) to follow an e-government project from the start and by documenting the use of the guide at different steps. As example of future developments of the decision support guide, weights could be added to the elements of the guide to balance their importance. Furthermore, additional insights on the choice of participation methods could be derived from the organization and public values elements of the model.

Another limitation resides in the completeness of the model. Even though we intended to provide a model that contains enough elements to match the messy reality of ICT development and user participation practices, not all influencing factors can be. This is in part due to the lack of hypotheses formulated in previous papers, and because we wanted to keep the model simple. For instance, we used public values as proxy of "type of project" conducted. A better assessment of the type of project in which user participation is to be organized would be an interesting addition, as different public e-services (ranging from the simple online form to the complex integrated information system) require different participation methods. However, this would require further work in the taxonomy of public e-services. Ultimately, other types of projects such as smart city solutions could be tested in the guide. Beyond this type of project, the addition of other additional influencing factors also opens up for further research. Another key element to include in the model would be the expected outcomes of user participation as well as their impact on the quality of the developed public e-service.

Finally, decision support might be too over-intellectualized methods and ultimately of low value for decision-makers. Therefore, as a next step, we intend to develop a tool based on the decision support guide. This would take the form of an easy-to-use online application that the interested project managers can use to analyze their current situation and get insights on their decisions related to user participation. In later implementation stages, this application could bring additional insights on the content of the participation methods matrix; instantiation of the participation methods to the specific context; reports on previous use cases; references to scientific literatures; or, contacts to relevant experts. This will be developed in close cooperation with potential interested project managers.

Conclusion

The aim of this paper was to support project managers in their decisions related to user participation in the development of public e-services by taking the context into account. To reach that goal, we have provided a conceptual model and decision support guide to practitioners and researchers. This constitutes a first step to perform an ex-ante analysis before engaging in user participation activities and to give recommendations for a better situated participation. In that regard, this paper contributes at several levels. Through the conceptual model, we provide an integrated view on user participation and its influencing factors grounded in several literature sources. The originality of this model resides in its modular nature and has a value for future research and practice. Therefore, it can constitute a basis for the interested researcher to further add influencing factors. The formulated relationships also constitute solid ground for the interested researchers to build on in further work. Regarding the contribution for practice, the decision support guide delivers useful guidelines to practitioners in the public sector to help them design a suitable strategy. This answers the need in practice for a concrete methodology on participation. This guide will be refined by means of iterative analysis and use by practitioners, aiming at creating a decision support guide that is aligned with ICT developments in the public sector context. We intend the future tool to constitute as solid decision aid for the project managers in the future.

References

- Abras, C., Maloney-Krichmar, D., and Preece, J. 2004. "User-centered design," *Bainbridge, W. Encyclopedia of*.
- Andersen, K. V., and Henriksen, H. Z. 2006. "E-government maturity models: Extension of the Layne and Lee model," *Government Information Quarterly* (23:2), pp. 236–248.
- Axelsson, K., Melin, U., and Lindgren, I. 2010. "Exploring the importance of citizen participation and involvement in e-government projects," *Transforming Government: People, Process and Policy* (4:4), pp. 299–321.
- Ayed, H., Vanderose, B., and Habra, N. 2012. "A metamodel-based approach for customizing and assessing agile methods," *Proceedings - 2012 8th International Conference on the Quality of Information and Communications Technology, QUATIC 2012*, pp. 66–74.
- Bloch, M., Lave, J., and Wenger, E. 1994. "Situated Learning: Legitimate Peripheral Participation.," *Man*.
- Chantillon, M., Simonofski, A., Tombal, T., Kruk, R., Crompvoets, J., de Terwangne, C., Habra, N., Snoeck, M., and Vanderose, B. 2018. "FLEXPUB Public e-Service Strategy - Report Work package 3 - Requirements Identification.," Leuven
- Distel, B., and Becker, J. 2017. "All citizens are the same, aren't they? – Developing an e-government user typology," in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* (Vol. 10428 LNCS), pp. 336–347.
- Fathallah, A., Cheikhi, L., Al-qutaish, R. E., and Idri, A. 2014. "E-Government Maturity Models: A Comparative Study," *International Journal of Software Engineering & Applications (IJSEA), May 2014* (5:3), pp. 71–91.
- de Graaf, G., Huberts, L., and Smulders, R. 2016. "Coping With Public Value Conflicts," *Administration and Society*.
- Hargittai, E., and Hsieh, Y. P. 2012. "Succinct Survey Measures of Web-Use Skills," *Social Science Computer Review* (30:1), pp. 95–107.
- Hartson, Rex, P. P. 2012. *The UX Book - Process and guidelines for ensuring a quality of user experience Elsevier* (Vol. 1), Elsevier.
- Hartwick, J., and Barki, H. 1994. "Explaining the role of user participation in information system use," *Management Science* (40:4), pp. 440–465.
- Heeks, R. 1999. "The Tyranny of Participation in Information Systems: Learning from Development Projects," *Development Informatics: Working Paper Series*.
- Hevner, a. R., March, S. T., and Park, J. 2004. "Design Science in Information Systems Research," *MIS Quarterly* (28:1), pp. 75–105.
- von Hippel, E. 1986. "Lead Users: A Source of Novel Product Concepts," *Management Science* (32:7), pp. 791–805.
- Holgersson, J., Melin, U., Lindgren, I., and Axelsson, K. 2018. "Exploring User Participation Practice in Public E-Service Development – Why , How and in Whose Interest ?," (16:1), pp. 72–86.
- Jansen, A., and Ølnes, S. 2016. "The nature of public e-services and their quality dimensions," *Government Information Quarterly*.
- Jaspers, S., and Steen, T. 2018. "Realizing public values: enhancement or obstruction? Exploring value tensions and coping strategies in the co-production of social care," *Public Management Review* (21:4), pp. 606–627.
- Karlsson, F., Holgersson, J., Söderström, E., and Hedström, K. 2012. "Exploring user participation approaches in public e-service development," *Government Information Quarterly* (29:2), Elsevier Inc., pp. 158–168.
- Lindgren, I., and Jansson, G. 2013. "Electronic services in the public sector: A conceptual framework," *Government Information Quarterly* (30:2), Sweden, pp. 163–172.
- Melin, U., and Wihlborg, E. 2018. "Balanced and integrated e-government implementation – exploring the crossroad of public policy-making and information systems project management processes," *Transforming Government: People, Process and Policy*.
- Oostveen, A.-M., and Besselaar, P. van den. 2004. "From small scale to large scale user participation: a case study of participatory design in e-government systems," in *eighth conference on Participatory design: Artful integration: interweaving media, materials and practices* (Vol. 1), Toronto, Ontario, Canada: ACM Press, pp. 173–182 (available at <http://doi.acm.org/10.1145/1011870.1011891>).
- Rose, J., Flak, L. S., and Sæbø, Ø. 2018. "Stakeholder theory for the E-government context: Framing a value-oriented normative core," *Government Information Quarterly*.
- Schuler, D., and Namioka, A. 1993. *Participatory design: Principles and practices*, CRC Press.
- Simonofski, A., Ayed, H., Vanderose, B., and Snoeck, M. 2018. "From Traditional to Agile E-Government Service Development: Starting from Practitioners' Challenges," in *24th Americas Conference on Information Systems*, New Orleans: Association for Information Systems.
- Simonofski, A., Snoeck, M., and Vanderose, B. 2019. "Co-Creating e-Government Services: An Empirical Analysis of Participation Methods in Belgium," in *Setting Foundations for the Creation of Public Value in Smart Cities*, Springer, pp. 225–245.
- Simonofski, A., Vanderose, B., Clarinval, A., and Snoeck, M. 2018. "The Impact of User Participation Methods on E-Government Projects : The Case of La Louvière , Belgium," *Media and Communication* (6:4), pp. 175–186.
- Van De Ven, A. H. 2007. "Engaged scholarship: a guide for organizational and social research," *Human Resource Development International*.
- Wijnhoven, F., Ehrenhard, M., and Kuhn, J. 2015. "Open government objectives and participation motivations," *Government Information Quarterly* (32:1), pp. 30–42.