

Structuring e-Participation Perspectives – Mapping and Aligning Models to Core Facets

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ABSTRACT

A proliferation of e-participation research in recent years has produced fragmented contributions in the area of e-participation models. Without a mechanism for analyzing, relating and consolidating these models, further development of the domain is in danger of repeating itself. This paper presents such a mechanism – an Integrative Framework which organizes e-participation models based on the nature and specific aspects of e-participation supported. The Integrative Framework enables mapping of models to 12 different facets constructed from a combination of three related perspectives and four canonical aspects of e-participation. While our genealogical analysis of the models showed in general weak relationships among models, our Framework enabled logical groupings of these models as a basis for consolidation, alignment or complementarity analyses. Mappings also clearly revealed aspects of e-participation that are yet to be (sufficiently) addressed. We conclude with recommendations for fostering rigorous and incremental model development in the e-participation domain.

Categories and Subject Descriptors

H.4.2 [Types of Systems]: e-Participation System

General Terms

Management, Measurement, Design, Standardization, Theory

Keywords

e-Participation Perspectives, e-Participation Models, e-Participation Facet Framework, Pepper's World Hypotheses

1. INTRODUCTION

Over recent years, we have witnessed a proliferation of e-participation initiatives [32] aiming to leverage information and communication technologies (ICT) to widen civil or socio-political participation. E-participation typically involves technology-mediated interactions between the civil society sphere and the formal politics sphere and between the civil society sphere and the administration sphere [28]. However, like its parent field of electronic government, there is some perception that many e-participation initiatives have been less than successful [29].

A few studies have argued that the techno-centric focus of e-participation initiatives in which socio-organizational realities are ignored significantly contributes to these failures [19]. Some have also indicated the need to fill the e-participation research gap. For instance, [15] identified six research challenges to be addressed including: fragmented research efforts (research breadth) and technological determinism (technology design) and the weak theoretical underpinning (theory) of e-participation research.

Other works such as [14], [28] and [4] have attempted to conceptualize e-participation by identifying its different aspects. In particular [28] concluded that actors, context, effect and evaluation are core aspects of e-participation that theory and research methods must target.

Along with the above foundational efforts and perhaps confirming the fragmented nature of contributions in the e-participation domain as indicated in [15], several models and frameworks for e-participation have also emerged. These models address one or more aspects of e-participation. However, the degree of complementarity of these models and the extent to which they collectively cover the different aspects of e-participation is not known. *In our view, organizing and integrating these models to exploit their complementarity will directly address the challenge related to the breadth of e-participation research described in [15].*

This work fills this gap by developing an *Integrative Framework* for mapping and aligning existing e-participation models. The mapping and alignment operations are based on a set of *facets* derived by structuring well-established e-participation *ontological* perspectives using a canonical set of so-called “World Views” as described in the Pepper's World Hypothesis [17], [8]. Our mapping exercise shows the degree of coverage of models with respect to salient aspects of e-participation, while the alignment analysis carried out reveals the level of complementarity among models associated with the same facets. From results, we show that our framework enables de-fragmentation of the e-participation model space by relating and aligning hitherto unrelated models.

The rest of the paper is organized as follows: Section 2 presents the overall approach for the work. This is followed by a description of e-participation models in Section 3. Our integrative framework is presented and applied for mapping and aligning models in Section 4. Results are presented and validated in Section 5. We discuss our results in the context of similar works and also highlight other applications of the Framework in Section 6. We close and offer some recommendations in Section 7.

2. APPROACH

This section presents the approach we adopt for integrating existing e-participation models. The conceptual underpinning is presented in Section 2.1 followed by a description of the methodology in Section 2.2.

2.1 Conceptual Framework

This section describes works that have attempted to conceptualize, evaluate, shape, structure or provide a better understanding of e-participation as a concept. A common element to these studies is their implicit attempt to answer two basic ontological questions [27] related to e-participation – (i) What is the form and nature of e-participation? (ii) What can we know about e-participation? We

describe different perspectives on the nature of e-participation in Section 2.1.1 and highlight some of its aspects in Section 2.1.2. In Section 2.1.3 we briefly discuss a generic conceptual tool for inquiring about the aspects of any phenomenon and show how this can be applied to define an ontological space for e-participation in Section 2.1.4.

2.1.1 Nature of e-Participation

Two recent studies have attempted to inquire about the nature of e-participation. The first study presented in [4] is unique in its efforts at conceptualizing e-participation. This work examines the nature of e-participation in terms of whether it is simply an extension of existing forms, differing only in mode or whether it offers a fundamentally different form of political participation. The study offered a typology of e-participation, based on a representational category (i.e. the use of formal and institutional channels or informal peer-to-peer networks) and on the active or passive forms of voice-based participation. Based on an empirical analysis of UK voters in their 2010 general election, the study concludes on the nature of e-participation as an internet-mediated political activity with four sub-types, namely e-communication, e-expressive, e-formal and e-targeted.

The second study [16] proposed a more holistic operationalization of the concept of e-participation by presenting an evaluation framework consisting of three overlapping perspectives of e-participation, including democratic, project and socio-technical perspectives. According to Macintosh, these evaluation perspectives are embedded in one another with the democratic criteria providing a context for the project criteria and the project criteria defining a context for sociotechnical criteria.

We interpret these embedded evaluation perspectives as also defining three related natures of e-participation. Our elaboration implies ontological and sustainability dependencies among these three perspectives, with e-participation as a political participation activity creating an e-participation project and with the project leading to the creation of an e-participation socio-technical system. A feedback relationship from the socio-technical system to the democratic activity is also shown later on in Figure 3.

2.1.2 Aspects of e-Participation

Five recent studies on e-participation evaluation have presented different aspects of e-participation based on different project experiences. The first major effort presented in [14] characterized their e-participation project using 10 dimensions: level of participation, stage in policy making, actors, technologies used, rules of engagement, duration and sustainability, accessibility, resources and promotions, evaluation and outcomes, and critical success factors. The next effort by [30] proposed an evaluation framework that examined three aspects of e-participation projects – participation areas, categories of tools, and technologies. The third study described in [16] identified a set of criteria for evaluating each of the three perspectives of e-participation – socio-technical, project and democratic, based on a set of local e-participation projects. The fourth study in [1] further elaborated on the criteria described [16] based on e-participation cases across Europe. The fifth work in [29] identified project stakeholders and supported communication types (or genres) as important aspects of e-participation projects.

Unfortunately, given the different project contexts and conceptual underpinnings informing the identified aspects in the above studies, organizing and integrating findings is challenging.

2.1.3 Structuring e-Participation Aspects

An approach to address the above challenge is to adopt a fundamental and more generic set of e-participation aspects. Generic aspects such as the traditional journalistic questions of What, When, Who, Why, Where and How (5W1H) [33] or Aristotle's Four Causes could provide a template for generating domain-specific aspects in e-participation.

Here, we propose the use of Pepper's World Hypotheses or Views [21] as a generic set of aspects for the area of e-participation. The premise for our choice of Pepper's Views is based on the following: 1) Pepper's Views are metaphorically richer when compared to the journalistic questions or Four Causes [13]; 2) it is possible to map Pepper's Views to the journalistic questions and Four Causes; and 3) there is evidence of the suitability of applying Pepper's Views to structure and analyze socio-technical systems [17].

Pepper identified four different adequate views of the world: Mechanism, Formism, Organicism and Contextualism [8]. He described each of the four views as follows [8], [17]:

- *Mechanism* - the root metaphor for this view is that the machine is composed of discrete parts related to one another in a systematic way. The relations among parts do not change the nature of these parts. Some form of inputs are supplied to and transformed or transmitted through the machine to produce predictable outcomes. For example, we can consider the e-participation system to be made up of a client component enabling citizens to use the platform, a participation platform providing the different user services, and analytic components for analyzing contributions. Models supporting the mechanistic view will enable the functional specification and decomposition of an e-participation socio-technical system.
- *Formism* – the root metaphor for this view is similarity. It can be understood as an entity- or forms-based view. In this view, the perception of any event involves two aspects – the character and the particularity. Character refers to the qualities and relations that are tied to a given object. For example, a citizen may have a quality like being rational and have a relation of having a certain political ideology. A given character may have an infinite number of particulars. Here, we take the notion of character to be synonymous to “classes” and that of a particular to the notion of “objects”. In our framework, this view represents entities associated with e-participation.
- *Organicism* – the root metaphor for the third view is the process of organic development. Organic development is described by staged-growth, maturity or level-based models. The assumption underpinning the process of organic development is that the final stage represents the ideal aimed at by the progressive steps. In addition, changes from one stage to another are guided by sets of rules. In the context of e-participation, participation levels (information, consultation and active participation) described in [14] present a staged-growth perspective of e-participation.
- *Contextualism* – the root metaphor for this view is an ongoing act. Two basic concepts are central to contextualism. The first concept “quality” represents the experienced nature of the act. The second concept “texture” refers to the details and relations that make up the quality of the act. This view

contends that our knowledge about the world is not final and thus is subject to changes at future points in time. Overall, this view presents a relativistic view of reality, implying that two different observers may have potentially different interpretations of the same act. For example, an evaluation of an e-participation experience by two different citizens could be completely different due to their different contexts, for instance, due to the time and subjective interpretation of an experience.

In the context of e-participation, Pepper's Views enable the specification of: e-participation goals to be realized through some staged models (Organicism); the description of different entities involved in realizing a specified e-participation goal (Formism); the different functions, processes and systems required to produce desired e-participation outputs or outcomes (Mechanism); an indication and evaluation of the experience of actors and observers of the e-participation system (Contextualism).

2.1.4 Defining an e-Participation Ontological Space

We define here an ontological space that captures the three perspectives of e-participation identified in Section 2.1 and the four canonical aspects presented in Section 2.1.3. This space provides 12 aspects or "Facets" for organizing models and knowledge on e-participation. In this work, we adopt this space for mapping and aligning existing e-participation models.

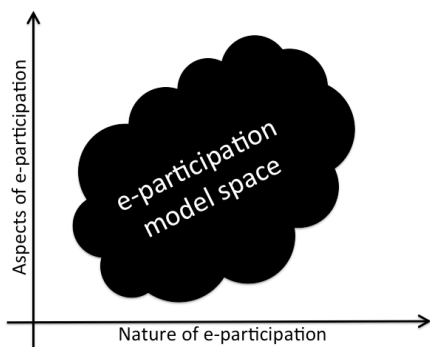


Figure 1: e-Participation Space

We elaborate in Section 2.2 how the e-participation ontological space depicted in Figure 1 can be used as an analytical tool and at the same time a knowledge integration tool.

2.2 Methodology

A major goal of this work is to map available e-participation models based on the thematic areas described in Section 2.1, as a basis for determining and harnessing the complementarity of related models, and at the same time establishing aspects of e-participation with modeling shortfalls as candidate areas for future research. Specific questions for our inquiry include:

- R1. What e-participations models exist and how mature are these models in terms of usage history in projects or in the development of other models?
- R2. Do existing e-participation models build on one another?
- R3. How can existing models be aligned to generate new knowledge and what challenges are there in achieving this?
- R4. How well do existing models cover the identified e-participation thematic areas?
- R5. Which aspects of e-participation are relatively under-studied in terms of availability of models?

Answering these questions is contingent on mapping and organizing existing e-participation models and frameworks into the twelve themes. We briefly describe below how models were selected, mapped and aligned.

- *Selecting Model*: Two major sources of information on scholarly e-participation publications were searched on using "e-participation model" or "online participation model". The first is Elsevier's Scopus database, the world's largest abstract and citation database of peer-reviewed literature, and the second was Google Scholar, enabling search across many disciplines and sources: articles, theses, books, abstracts, from academic publishers, professional societies, etc. A snowballing technique was used to identify other e-participation work from a seed model. Using the first identified model as the seed model, the process resulted in the 12 e-participation models described in Section 3.
- *Mapping Models*: Mapping each of the 12 models to specific e-participation types entails determining which of the three perspectives of e-participation and which of the four generic aspects of e-participation are supported by the models. In general, a model may be mapped to one or more thematic areas. The outcome of the model exercise is presented Section 4.2.
- *Aligning or Integrating Models* – After mapping models, models mapped to the same thematic areas can be analyzed for alignment and integration opportunities. To align a set of models, we first determine a *pivot* model; the most established and mature model in the set. Next, we consider how other models (peer models) can extend or refine the pivot model based on their constructs. For example, constructs available in peer models but missing in the pivot model could be considered for inclusion in the pivot model. Four alignment cases are described in Section 4.3.

We argue for the reliability of our mapping based on the results of "inter-observer" and "test-retest" reliability tests [3]. By establishing the "content validity" [3] of our Integration Framework, we show that its 12 facets adequately structure e-participation. Details of these arguments are presented in Section 5.

3. E-PARTICIPATION MODELS

This section describes the 12 e-participation models found in literature. A general overview and genealogy of the models is presented in Section 3.1, with descriptions of the models presented in Section 3.2 and a summary is given in Section 3.3.

3.1 Models Overview

We present a broad overview of the evolution of e-participation models here. This evolution is described in terms of explicit dependencies of models on earlier ones. Explicit dependencies are indicated through references to specific earlier models as a base or contributing model. Implicit dependencies among models are depicted by references to earlier models without an explicit statement of their influence on the model being described or developed.

As shown in Figure 2, the first listed participation model is the 'Ladder of Participation' described in [2] which implicitly shaped most of the participation and later e-participation studies. The evolution of models appeared to progress from initial attempts at scoping and eliciting the important dimensions of e-participation (e.g. [14]), to models aiming to capture desired progression in levels of e-participation (e.g. [6], [12]), to models for e-

participation processes (e.g. [30], [11]), and finally evaluation models for e-participation (e.g. [16], [22], [1]).

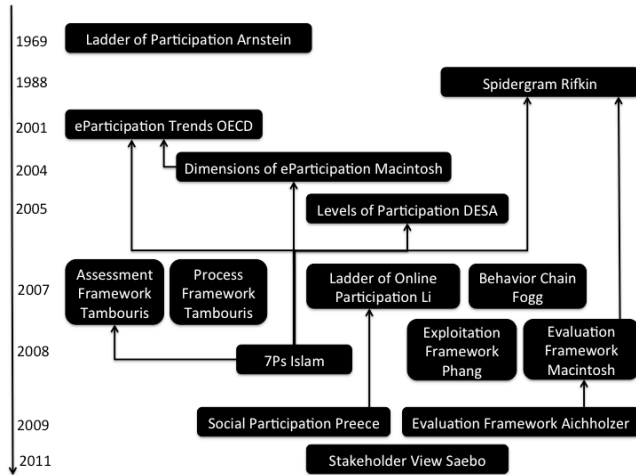


Figure 2 e-Participation Models Genealogy

Dependencies among models are organized around these development phases. The model genealogy also shows a number of conceptually-independent models such as [29] and [24] as these works are underpinned by models from outside the domain of e-participation. We describe each of these models next.

3.2 Models Description

We provide short descriptions of the 12 e-participation models highlighting their purpose and some of their key features.

3.2.1 Dimensions of e-Participation Macintosh 2004

Motivated by the need for consolidating ICT-supported participation research, Macintosh in 2004 developed a framework describing the key dimensions of e-participation [14]. The identified dimensions include: i) levels of participation (e-enabling, e-engaging, e-empowering), ii) stage in policy-making process, iii) actors, iv) technology used, v) rules of engagement, vi) duration and sustainability, vii) accessibility, viii) resources and promotion, ix) evaluation and outcomes and x) critical success factors. The dimensions are employed as a description and analytical framework for an e-participation project.

3.2.2 Levels of Participation DESA 2005

The Department of Economic and Social Affairs (DESA) of the United Nations presented in 2005 a three-stage model to describe levels of participation [6]. The model describes three levels of participation: e-information, where government websites offer information to the public through various Web 2.0 tools; e-consultation, where the consultation process is explained, and the government website offers archived access to public meetings; and e-decision-making, where there is an acknowledgement by the government of citizens' inputs into policy-making. Though lacking explicit references, DESA's participation levels are similar to the trends identified by OECD in [18] and the three levels of participation described in [14].

3.2.3 Ladder of Online Participation Li 2007

In 2007, Li et al. presented as a part of their Social Technographics framework the Ladder for Online Participation model [12]. The ladder refers to user engagement in participation activities on web portals. The original version consists of six levels of user activity: i) Inactives – users showing no activity; ii)

Spectators – passive users, who read/watch and observe; iii) Joiners – registered users; iv) Collectors – users collecting and describing web content, using RSS feeds and tags; v) Critics – those providing comments and ratings to the online content, vi) Creators – those who publish and create content, maintain blogs, moderators. The authors presented an updated version of the ladder in 2011 [5], adding an additional step: vii) Conversationalists – maintaining a level of activity between creators and critics. This level also refers to those who post status updates on social media.

3.2.4 Behavior Chain Fogg 2007

Fogg in 2007 presented a fifty-case based “User behavior chain for online participation” framework [7]. The model relates to the persuasion patterns of users to take specific actions and so could be considered a model for controlled user engagement. The model distinguishes between three basic levels of target behaviour: i) Discovery, involving learning about and visiting a service; ii) Superficial involvement, involving a decision to use and initial use of the tool, iii) True commitment, where the user creates content, involves others to participate, forms sustainable participation.

3.2.5 Process Framework Tambouris 2007

In 2007 Tambouris proposed an e-participation process framework which distinguishes between five levels and two possible directions of the sequence [31]. The levels are: Democratic processes, Participation areas, Participatory techniques, Categories of tools, Technologies. Based on the model, an e-participation initiative's direction can progress from the democratic processes top-down to the technologies or could be technology-driven bottom-up towards democratic processes [31].

3.2.6 Assessment Framework Tambouris 2007

Building on his earlier process model, Tambouris et al. proposed an e-participation assessment framework, which distinguishes participation areas and accordingly ICT support. The model includes the assessment recommendations along with the assessment templates [30].

3.2.7 Evaluation Framework Macintosh 2008

Macintosh et al. in 2008 presented an e-participation evaluation framework characterized by three key dimensions: i) Evaluation criteria spanning the democratic, project and socio-technical perspectives; ii) Analysis methods comprising of field observations of relevant actors using the tool in the real world, interviews and group discussions with relevant actors, analyses of online questions and discussions, analyses of project documentation, usage statistics from the tools and server logs; iii) Actors involved including decision-makers managing the e-participation mechanism, experienced users of e-participation platforms, people who do not use e-participation platforms, officials considering e-participation results, other officials, project managers and technologists [16].

3.2.8 Exploitation Framework Phang 2008

In 2008, Phang presented a framework of ICT exploitation for e-participation initiatives [23]. The framework is based on four general e-participation objectives with detailed requirements: i) Information exchange - bringing together decision-makers and citizens for the open sharing of problems and ideas; ii) Education and Support-building - informing citizens on policy making and propaganda; iii) Decision-making supplements - extracting specific information from citizens, which can be used as supplementary input for policy making; iv) Input Probing - obtaining citizens' views on underexplored policy issues. The

model also defines participatory techniques, ICT tools and e-participation initiatives that could support particular objectives.

3.2.9 7Ps Islam 2008

Islam proposed in 2008 the 7Ps process model for sustainable e-participation [11]. The model builds upon and combines multiple earlier models from [18], [14], [6] and [26]. The model distinguishes seven general phases: i) *Policy & capacity building* - the phase involving education, ii) *Skill building, hardware and software infrastructure preparation* - followed by the participation areas formulation; iii) *Planning & goal setting* - emerging e-participation from the overall e-governance initiative; iv) *Programs & contents development* - preparation of relevant programs and content that can be easily accessed via available tools, v) *Process & tools* - definition of the e-participation process, followed by vi) *Careful tools selection* and vii) *Tool-to-task matching*, taking into consideration participation barriers.

3.2.10 Evaluation Framework Aichholzer 2009

In 2009 Aichholzer et al. presented a framework for evaluation of e-participation projects [1]. Their model is based on Macintosh's earlier e-participation evaluation model [16]. It distinguishes between three basic perspectives for an e-participation project with a set of related dimensions: i) Democratic - representation, support of engagement, transparency and accountability, conflict and consensus, political equality, community control; ii) Project - management, engaging with a wider audience, community development, obtaining better-informed opinions, process quality, scope of deliberation, effectiveness, feedback behavior, sustainability; iii) Socio-technical including social acceptability, usefulness and usability dimensions.

3.2.11 Social Participation Preece 2009

Preece in 2009 proposed a framework for technology-mediated social participation, focusing on the user perspective [24]. The model was designed for social participation and drew from communications theory, including key aspects important for e-participation. The model distinguishes between four key levels of user engagement: i) Reader - the user is passive, with actions limited to reading, browsing and searching; ii) Contributor - the user actively contributes to the content, rating, tagging, posting and uploading content; iii) Collaborator - the user creates content collaboratively and shares the knowledge; iv) Leader - the user takes on the governance of social interactions by promoting participation, mentoring novices, setting and upholding policies. Moreover the model identifies the usability and sociability factors influencing each of the defined engagement levels.

3.2.12 Stakeholder View Saebo 2011

In 2011, Saebo et al. proposed a view of e-participation based on stakeholder and genre theories [29]. The model identified specific classes of stakeholders related to e-participation initiatives and the forms of communication types. The consolidated factors enabled them to identify key actors and the roles important for the effective development of e-participation initiatives. The proposed lens showed how to identify key stakeholders and the dynamics of salience (how prominent elements emerged).

3.3 Summary

The above 12 models are summarized in Table 1 indicating their purpose, major constructs, the approach adopted in developing the

model, the disciplinary origin of the model, maturity of the model and the technology view adopted in the model. We adopt Orlikowski et al.'s technology views approach described in [20] by association with one or more of the views assumed in the models.

From the table, we note that most of the models focus largely on describing levels of participation or engagement and evaluating e-participation. The table shows that most of the models are descriptive in nature with no conceptual or theoretical underpinnings. This potentially poses a challenge when considering comparative analyses of models. At the same time, we observe an increasing use of case studies and a better methodological grounding in more recent models.

Concerning the maturity of models, most of the models have only been employed as either descriptive schemas or analytical frameworks for e-participation initiatives. From the research perspective, Preece's Social Participation Model; Macintosh's Evaluation Framework, Tambouris' E-Participation Assessment Framework and Phang's Exploitation Framework are relatively more mature based on their citation records. We show in the next section how these models relate to each other and could be integrated.

4. THE INTEGRATIVE FRAMEWORK

4.1 Description

This section describes and relates the two major dimensions of our framework – e-participation perspectives and e-participation aspects. As described in Section 2.1, the framework is characterized by three e-participation perspectives – the democratic, project and socio-technical perspectives, with the ontological relationship among these perspectives depicted in Figure 3. We briefly elaborate on these three perspectives below:

- *Democratic Perspective* – this refers to all the aspects of e-participation concerned with the democratic context. The construct is oriented on putting e-participation into a wider democratic context. Therefore the construct is dependent on political factors such as political utility, political impact, representation, transparency, political equality and goals. It is a democratic activity that creates and sustains an e-participation initiative project. Before any e-participation project starts there has to occur a particular democratic activity that would form a relevant policy, secure sufficient funds and identify participation areas.
- *Project Perspective* – this represents e-participation from the initiative perspective. This perspective characterizes e-participation as common to governmental and business projects. Therefore this construct is highly dependent on criteria from the project management domain such as mission, stakeholders, change management, deliverables, outcomes, results, impact and evaluation. The project creates and sustains a socio-technical system in an iterative way. The project officers, administrators and developers collect feedback (while running a socio-technical system), maintain and apply necessary improvements to the system.

Table 1 e-Participation Models

Name of the model	Purpose	Major Constructs	Approach	Disciplinary Orientation	Maturity	Technology perspective (View)
Dimensions of e-Participation Macintosh 2004	Level of Participation	e-enabling e-engaging e-empowering	Descriptive	E-democracy eParticipation	12 Citations	Tool: <i>Productivity, Information Processing and Social Relations</i>
Levels of Participation DESA 2005	Level of Participation	e-information e-consultation e-decision making	Descriptive	Public Administration Development Management E-gov, E-inclusion	Official report	Proxy: <i>Perception, Diffusion</i>
Ladder of Online Participation Li 2007	Level of engagement	inactives, spectators, joiners, collectors, critics, conversationalists, creators	Descriptive	Online Participation Social Media Business	16 Citations as a paper 464 as a book	Nominal
Behavior Chain Fogg 2007	Level of engagement and influence	discovery, superficial involvement, true commitment	Theoretical based on over 50 cases	Online Participation Social Behaviour	26 Citations	Nominal
Process Framework Tambouris 2007	e-Participation Process	democratic processes, participation areas, participatory techniques , categories of tools, technologies	Descriptive	Management Human Factors Theory	18 Citations	Nominal
Assessment Framework Tambouris 2007	e-Participation evaluation	Participation Areas, Tools Category, Technology Category, Levels of Participation, Actors, Stages in the Policy-Making, Rules of Usage, Outreach Special Concerns	Descriptive	Political Science ICT	57 Citations	Tool: <i>Productivity, Information Processing, Social Relations Tool</i> Ensamble: <i>Development, Embedded System, Structure</i>
Exploitation Framework Phang 2008	e-Participation exploitation (technologies)	information exchange education and support-building decision-making supplement input probing	Analytical based on case studies	eParticipation ICT Communications	41 Citations	<i>Views same as above (Assesement Framework)</i>
7Ps Islam 2008	e-Participation Process	Policy& capacity building, Planning & goal setting, Programs & contents development, Process & Tools, Promotion, Participation Post-implementation analysis	Analytical based on other models	ePractice Socio-economic settings eParticipation	14 Citations	Nominal
Evaluation Framework Macintosh 2008	e-Participation evaluation	evaluation criteria (perspective): <i>democratic, project, socio-technical</i> analysis methods: <i>field observation, interviewing, discussions, analysis of online questions and documentation, tools usage statistics</i> actors involved: <i>decision-maker, users, officials, project managers, technologists</i>	Analytical based on case studies	eParticipation Public Participation ICT	70 Citations	Tool: <i>Productivity, Information Processing, Social Relations Tool</i> Ensamble: <i>Development, Embedded System, Structure, Production Network</i>
Evaluation Framework Aichholzer 2009	e-Participation evaluation	evaluation perspectives: democratic, project, socio-technical	Analytical based on 30 case studies	eParticipation Public Participation ICT	21 Citations	Nominal
Social Participation Preece 2009	Level of engagement	Reader, Contributor, Collaborator Leader; (<i>Usability , Sociability</i>)	Descriptive	Social Participation Communications Social Networks	183 Citations	Proxy: <i>Perception, Diffusion</i>
Stakeholder View Saebo 2011	e-Participation Process	Politicians; Administrators; Consumers; Activists; Vendor; Power, Legitimacy, Urgency;	Theoretical	E-government Genre Theory Stakeholder Theory	8 Citations	Nominal

Dimensions of e-Participation Macintosh 2004	Level of Participation	e-Enabling, e-Engaging, e-Empowering	Descriptive	e-Democracy, e-Participation	12 Citations	Tool: <i>Productivity, Information Processing and Social Relations Tool</i>
Levels of Participation DESA 2005	Level of Participation	e-Information, e-Consultation, e-Decision Making	Descriptive	Public Administration, Development, Management, e-Gov, e-Inclusion	Official Report	Proxy: <i>Perception, Diffusion</i>
Ladder of Online Participation Li 2007	Level of Engagement	Inactives, Spectators, Joiners, Collectors, Critics, Conversationalists, Creators	Descriptive	Online Participation, Social Media, Business	16 Citations as a Paper 464 as a Book	Nominal
Behavior Chain Fogg 2007	Level of Engagement and Influence	Discovery, Superficial Involvement, True Commitment	Theoretical Based on Over 50 Cases	Online Participation, Social Behavior	26 Citations	Nominal
Process Framework Tambouris 2007	e-Participation Process	Democratic Processes, Participation Areas, Participatory Techniques, Categories of Tools, Technologies	Descriptive	Management, Human Factors Theory	18 Citations	Nominal
Assessment Framework Tambouris 2007	e-Participation Evaluation	Participation Areas, Tools Category, Technology Category, Levels of Participation, Actors, Stages in Policy Making, Rules of Usage, Outreach Special Concerns	Descriptive	Political Science, ICT	57 Citations	Tool: <i>Productivity, Information Processing, Social Relations Ensemble: Development, Embedded System, Structure</i>
Exploitation Framework Phang 2008	e-Participation Exploitation (Technologies)	Information Exchange, Education and Support-Building, Decision-Making Supplement, Input Probing	Analytical Based on Case Studies	e-Participation, ICT, Communications	41 Citations	<i>Views same as above (Assessment Framework)</i>
7Ps Islam 2008	e-Participation Process	Policy & Capacity Building, Planning & Goal Setting, Programs & Contents Development, Process & Tools, Promotion, Participation Post-Implementation Analysis	Analytical Based on Other Models	e-Practice, Socio-Economic Settings, e-Participation	14 Citations	Nominal
Evaluation Framework Macintosh 2008	e-Participation Evaluation	Evaluation Criteria (Perspective): <i>Democratic, Project, Socio-Technical</i> Analysis Methods: <i>Field Observation, Interviewing, Discussions, Analysis of Online Questions and Documentation, Tools Usage Statistics</i> Actors Involved: <i>Decision Maker, Users, Officials, Project Managers, Technologists</i>	Analytical Based on Case Studies	e-Participation, Public Participation, ICT	70 Citations	Tool: <i>Productivity, Information Processing, Social Relations Tool</i> Ensemble: <i>Development, Embedded System, Structure, Production Network</i>
Evaluation Framework Aichholzer 2009	e-Participation Evaluation	Evaluation Perspectives: Democratic, Project, Socio-Technical	Analytical Based on 30 Case Studies	e-Participation Public Participation, ICT	21 Citations	Nominal
Social Participation Preece 2009	Level of Engagement	Reader, Contributor, Collaborator Leader, (<i>Usability, Sociability</i>)	Descriptive	Social Participation, Communications, Social Networks	183 Citations	Proxy: <i>Perception, Diffusion</i>
Stakeholder View Saebo 2011	e-Participation Process	Politicians; Administrators; Consumers; Activists; Vendor; Power, Legitimacy, Urgency	Theoretical	e-Government, Genre Theory, Stakeholder Theory	8 Citations	Nominal

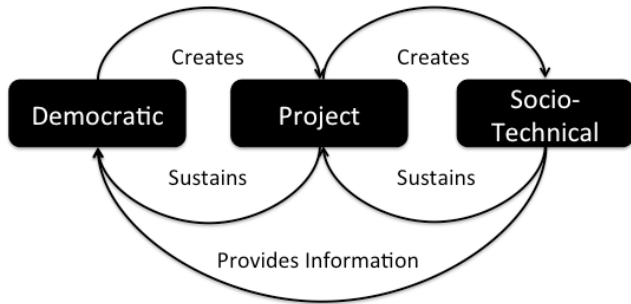


Figure 3 e-Participation perspective views

- *Socio-Technical Perspective* – we understand that there are a broad range of platforms for e-participation. The main function of the socio-technical perspective is to provide information to the democratic activity. This information can have the form of purely statistical data about the usage of a socio-technical system or perhaps about higher levels of participation, e.g. citizen questions and contributions to policy making.

The properties of each of the perspectives can be divided by purpose aligned to the second dimension – “aspects”. The four canonical aspects of e-participation described in Section 2.3 include: Mechanism, Formism, Organicism and Contextualism.

The relations among the four views are as follows: The Mechanism view specifies operations and actions to achieve goals specified in the Organicism view. The Formism view specifies entities and forms that participate in operations and actions specified in Mechanism view. Similarly, entities and forms specified in the Formism view define different contexts in the Contextualism perspective which contribute to the Organicism view. These relations are shown in Figure 4.

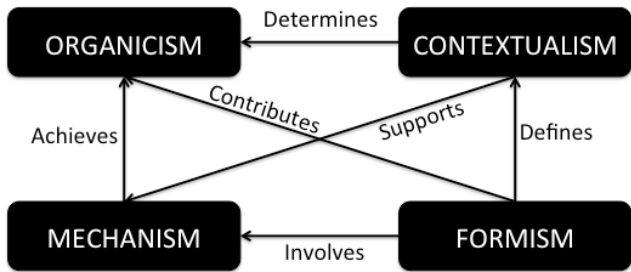


Figure 4 e-Participation Views of the World

Following Section 2.4, the 12 facets characterizing our e-participation ontological space are described below (See Table 2):

- 1) *Democratic Entities and Forms* – refers to all the concepts related to e-participation as a democratic activity. This includes actors, resources, participation areas and all the policies regarding e-participation.
- 2) *Democratic Activities* – this facet refers to all e-participation activities within the democratic process. This includes activities responsible for creating and sustaining e-participation (all related to policy making), and also initiatives within participation areas such as informing citizens and consulting with or probing citizens on particular policies.
- 3) *Democratic Impact* – refers to the desired e-participation impact on policy making such as citizen policy acceptance

supported by increased citizen awareness, as well as policy change, creation of new legislation or a release of a citizen-co-contributed policy.

- 4) *Evaluation of the Democratic Side of e-Participation* – refers to the performance of the e-participation initiative as a democratic tool. Evaluation provides a success rate for the overall impact of e-participation on policy making.

Table 2 e-Participation Views and Sub-views

Generic Views	e-Participation Perspectives		
	Democratic View	Project View	Socio-Technical View
Mechanism	Democratic Entities and Forms	Project Entities and Forms	System Entities and Forms
	Activities involved in e-participation as a democratic activity	Activities involved in e-participation as an initiative	Functions and operations of e-participation as a ST system
Formism	Democratic Activities	Project Activities	System Features and Services
	Entities in e-participation as a democratic activity	Entities in e-participation as an initiative	Entities in e-participation as a ST system
Organism	Democratic Impact	Project Goals	System Goals
	Desirable goals of e-participation as a democratic activity	Goals of e-participation as an initiative	Goals and properties of e-participation as a ST system
Contextualism	Evaluation of the Democratic Side of e-Participation	Project Evaluation	System Adoption and Use
	Evaluation of e-participation's impact on democracy	Evaluation of the e-participation project	Adoption and usability of an e-participation system

- 5) *Project Entities and Forms* – refers to all the concepts defining the e-participation project. This includes stakeholders, resources, techniques, tools and technologies related to e-participation project management at all levels, from setting up the project, maintenance, through to late project sustainability.
- 6) *Project Activities* – this facet refers to the actual project tasks that lead to a particular goal. Therefore related concepts would include promotion, information dissemination, consultation, feedback generation, information aggregation and sustainability efforts.
- 7) *Project Goals* – this facet refers to the purpose of the creation and mission definition of an e-participation initiative. The goals include the delivery and sustainability of a socio-technical platform.
- 8) *Project Evaluation* – refers to the classic project evaluation process. The evaluation investigates whether the goals set for

the project have been achieved and to what extent. Also proper measurements of project management performance are considered here.

- 9) *System Entities and Forms* – the facet is related to all the concepts, classes and properties that describe the system structure and the system environment. This can refer to actors, components, resources, techniques, tools, technologies and particular configurations leveraged by the system.
- 10) *System Features and Services* – refers to all the services offered and functions performed by the socio-technical system. This may refer to functions such as deliberation space features, consultation features, e-information or e-learning features, information sharing or information collection (survey).
- 11) *System Goals* – the facet refers to the expected socio-technical system goals like fast and effective information dissemination, user opinion mining or citizen driven policy-making support.
- 12) *System Adoption and Use* – this facet refers to the actual adoption of the particular socio-technical platform by users. The facet is a measure of success and can be subject to evaluation. The facet may refer both to user acceptance of the technology as well as the general activity of citizens on the socio-technical system (determined by factors like ease of use and availability).

The relations between the elements of the framework dimensions determine the relations between the 12 facets. As an example, the System Entities and Forms define the socio-technical system. In this, the e-participation deliberation platform can be identified by key components, users, deliberation tools (like chat or forum) or information technologies. Those Entities and Forms are the input, output and controller for all the System Features and Services. In other words every concept identified has to be aligned to some role in the system where the role is clearly identified by System Features and Services. For instance, users (which are one of the entities) leverage the chat feature to express their opinions and share ideas on new policies. The socio-technical system is created and runs for a particular purpose. This purpose is a set of goals fulfilled by particular System Features and Services running according to the identified System Entities and Forms. One of the goals of a hypothetical deliberation platform is to crowdsource opinions from citizens on certain new policy ideas. This goal is supported by chat and forum features where users share their ideas on new policies. The system runs in a particular context that is also defined by System Entities and Forms. The whole context of the system with all the entities, features, goals, results and the timeframe is a subject for the evaluation of the system.

4.2 Mapping Models

Here we show how the models presented in Section 3 map to the 12 facets of our framework. The mapping is done by determining the perspectives of e-participation adopted by the model, followed by the aspects of e-participation supported. We consider that a model supports one or more of the four views if it provides some prescriptive or descriptive information (process, staged model, discrete ordered values, etc.) on the views. In addition to the information presented in Section 3.1, we use the information in Table 1 as input for the mapping.

We assign all the models related to levels of participation and levels of engagement (Levels of Participation DESA 2005, Ladder of Online Participation Li 2007, Behavior Chain Fogg 2007 and Social Participation Preece 2009) directly to “*System Goals*” as the resulting or desired citizen engagement is one of the key goals

of a socio-technical system. We map the Exploitation Framework Phang 2008 to “*System Entities and Forms*” since in principle the model identifies the tools satisfying e-participation system features. The Process Framework Tambouris 2007 is mapped to “*Project Activities*” as well as “*Project Entities and Forms*” as the framework tackles the fact that an e-participation initiative activates at multiple levels of a process aligned to project concepts. The model 7Ps Islam 2008 is assigned to the “*Project Activities*” facet as in principle it identifies key e-participation initiative activities. We map the Stakeholder View Saebo 2011 to “*Project Entities and Forms*” as the model describes the stakeholder as a key component of an e-participation initiative.

Table 3 e-Participation Models Mapping

Generic Views	e-Participation Perspectives		
	Democratic View	Project View	Socio-Technical View
Formism	-	Dimensions of Participation Macintosh 2004 Process Framework Tambouris 2007 Stakeholder View Saebo 2011	Exploitation Framework Phang 2008
Organicism	-	-	Levels of Participation DESA 2005 Ladder of Online Participation Li 2007 Behavior Chain Fogg 2007 Social Participation Preece 2009
Mechanism	-	Process Framework Tambouris 2007 7Ps Islam 2008	
Contextualism	Evaluation Frameworks: Macintosh 2008 Aichholzer 2009	Evaluation Frameworks: Macintosh 2008 Aichholzer 2009 Assessment Framework Tambouris 2007	Evaluation Frameworks: Macintosh 2008 Aichholzer 2009

The Evaluation Framework Macintosh 2008 is assigned to the entire Contextualism level as it defines in detail concepts related to the evaluation of e-participation as whole, from e-participation as a democratic activity, through project to socio-technical platform. Assessment Framework Tambouris 2007 and Evaluation Framework Aichholzer 2009 are mapped to the “*Project Evaluation*” facet as the core of these models defines key measures for an initiative evaluation, addressing direct project

performance as well as management quality and effectiveness. Table 3 shows the resulting mapping.

We will show in Section 4.3 how the models assigned to the facets can be aligned.

4.3 Aligning Models

We show here possible relations between the models and how a relatively mature and grounded model (i.e. the pivot model) could be extended with peer models belonging to the same facet. From Table 3, there are four facets presenting opportunities for model alignment. These are considered in turn below.

Project Entities and Forms Facet - the pivot model is the Dimensions of e-Participation Macintosh 2004 which presents many of the project-related concepts. The Stakeholder View Saebo 2009 could be used to extend the pivot model with detailed conceptualization of project stakeholders. The “participation areas” construct in Process Framework Tambouris 2007 could generalize the “stage in the policy model” specified in the pivot model. We depict this alignment in Figure 5.

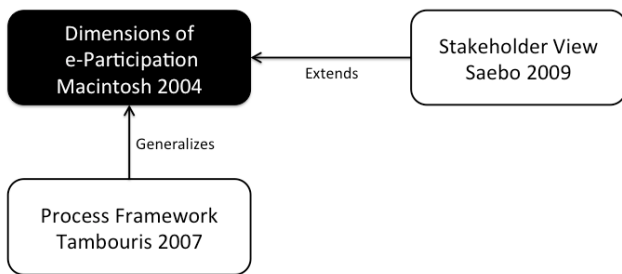


Figure 5 Project Entities and Forms Facet

Project Activities Facet - Figure 6 describes the alignment between the Process Framework Tambouris 2007 (pivot model) and 7Ps Islam 2008 (peer model). The latter could extend the pivot model by going beyond strictly e-participation processes to include sustainability-related activities including promotion and post-participation analysis.

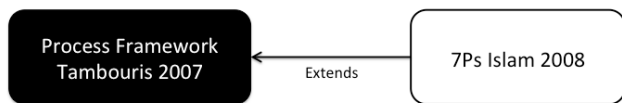


Figure 6 Project Activities Facet

System Goals Facet - The scenario in Figure 7 presents two major alignment steps. The first step involves relating alternative Participation Level models as sub-models of a more general Participation Level model. The second stage of the alignment involves linking of the “e-Participation Platform Maturity” model with the generic “Participation Level” model.

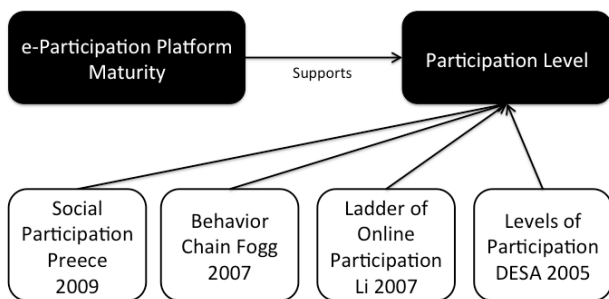


Figure 7 System Goals Facet

This linking involves the participation levels prescribing concrete requirements for the stages in the platform maturity model. This is reflected as the support relation in Figure 7.

Project Evaluation Facet - Figure 8 presents the relations between the Evaluation Framework Macintosh 2008 (pivot) and the Evaluation Framework Aichholzer 2009 (peer) and Tambouris’s Assessment Framework Tambouris 2007 (peer). Both peer models provide details on the specific aspects of the Macintosh’ Evaluation Model in the form of detailed evaluation criteria and additional detailed project-related process constructs.

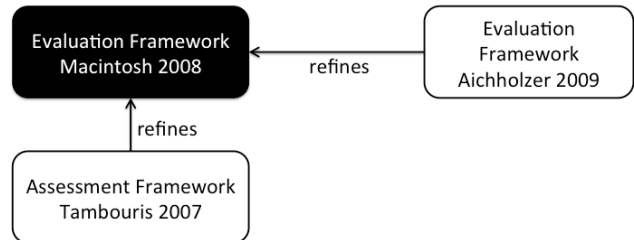


Figure 8 Project Evaluation Facet

We summarize results from the use of our framework for mapping and aligning models in the next section.

5. RESULTS AND VALIDATION

5.1 Results

We summarize results from Section 4 (and partially from Section 3) to answers the five questions posed in Section 2.

R1. What e-participations models exist and how mature are these models in terms of usage history in projects or in the development of other models?

We have identified and cataloged 12 relatively-established e-participation models. Analysis of these models shows that they generally lack conceptual and theoretical foundations. Few of the models were built from concrete case studies. In the area of usage, most of the models have been employed as either descriptive schemas or analytical frameworks for e-participation initiatives. From the research perspective, Preece’s Social Participation Model, Macintosh’s Evaluation Framework, Tambouris’ E-Participation Assessment Framework and Phang’s Exploitation framework are significantly more cited than others.

R2. Do existing e-participation models build on one-another?

Our genealogy analysis of the models as depicted in Figure 3 shows a quite disconnected model space, with the highest in-degree for models as 2. Thus, we offer concrete evidence to support the claim in [15] about the fragmented nature of research contributions in the area of model development.

R3. How can existing models be aligned to generate new knowledge and what challenges exist in achieving this?

We have provided a simple procedure inspired by the traditional alignment process in which possible contributions of domains to be aligned are sought. We have used the concept of pivot and peer models to indicate the required direction of support desired – from “peer to pivot model”. Four examples of how models in the same facet could be aligned were presented in Section 4.3. A major challenge in aligning models is the lack of information on conceptual underpinnings for these models.

R4. How well do existing models cover the identified e-participation thematic areas?

The socio-technical and project perspectives of e-participation are relatively well covered in terms of availability of models. Given the popularity of participation-level related models, the System Goals Facet is the most active facet (with four models).

R5. Which aspects of e-participation are relatively under-studied in terms of availability of models?

The democratic perspective is the least studied perspective in the e-participation domain in terms of model development. Beyond Macintosh's and Aichholzer's models described in [16] and [1], there are no models to describe entities and forms, processes and goals associated with the democratic perspective of e-participation.

5.2 Validity of Results

Here we argue for the validity of the above results by showing that our framework is expressive enough to capture all the important aspects of e-participation. We also argue that our mapping and alignment procedures are reliable.

Content Validity of the Framework – Our arguments for the content validity of the integrative framework are based on the established adequacy of Pepper's World Hypotheses or Views [21] for describing a world or system and the possibility of mapping Pepper's Views to other popular canonical enquiry tools such as Aristotle's Four Causes and journalistic questions (5W1H [33]) as shown in Figure 9. In addition, we have successfully mapped the 10 dimensions identified by Macintosh in [14] into the 12 facets.

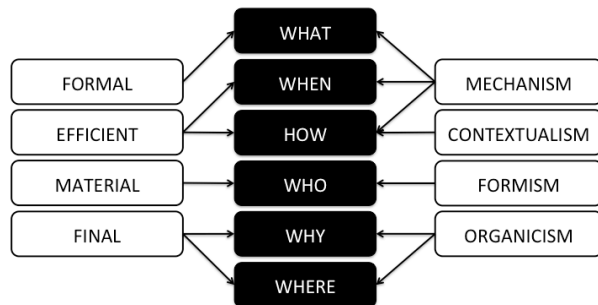


Figure 9: Mapping 5W1H, Aristotle Four Causes and Pepper's Views

Reliability of Mapping and Alignment Exercise – To guarantee the reliability of the mapping exercise, two reliability strategies were adopted. The first is the test-retest strategy in which each author repeatedly mapped the models a number of times and compared results across sessions. The second is the inter-observer test in which the authors independently mapped the models into the 12 facets noting reasons for their decision and later comparing results to reconcile differences in mapping.

6. DISCUSSION

Results from our work provide good evidence to support the claim of increased fragmentation of e-participation research as raised by [15] and also confirm a lack of rigor in e-participation research in the area of model development. For instance, only in rare cases (such as [29]) did models offer a clear conceptualization of e-participation or a theoretical underpinning for their model. These two observations may indicate a young and maturing field.

On the one hand, one could argue that given the less-than-a-decade history of e-participation research and practice (albeit with practice dating back to 1960's [2]), such a level of development in the e-participation models research domain is expected. On the other hand, lessons can be drawn from the parent discipline of e-government [9], [25] which suffered and continues to suffer from the same symptoms after well over a decade of research and practice, to address the problem. Given the less complex nature of e-participation initiatives compared with traditional e-government projects, and the large number of e-participation and social participation initiatives, there is a good opportunity for harnessing data (a challenge in the parent e-government discipline [9]) from such initiatives for carrying out more rigorous qualitative and quantitative research in e-participation. This may suggest that the more specialized e-participation domain may offer examples of how to move up the "knowledge ladder" from model-based research towards theory-based work.

In our opinion, developing a unifying framework such as the Integrative Framework presented in this work and providing a robust conceptualization of the e-participation phenomenon is a necessary condition for ascending the knowledge framework ladder. Apart from [4], we are not aware of any other attempts at explicitly conceptualizing e-participation. While there have been past efforts, aiming to scope e-participation [31] and elicit its core dimensions [14], the lack of information on the theoretical basis for these works makes them difficult to evaluate in terms of coverage. These two models have been mapped into specific facets of our framework.

Despite claims by Pepper and the wide application of his world hypothesis and views in different domains, we cannot claim "absolute completeness" of these views with respect to e-participation [10].

Apart from being an Integrative Framework, first, the framework could serve as structuring tool for an e-participation ontology along the identified facets. Second, the framework could also be used as standard analytical tool for analyzing cases to generate data. Third, the framework could serve as a basis for meta-modelling and multi-view modelling of e-participation.

7. CONCLUSIONS

Motivated by the need to provide the necessary steps towards knowledge consolidation in e-participation, we have presented an integrative framework for organizing, mapping and aligning existing e-participation models. Results from our work show immediate opportunities for consolidating work on existing models and at the same time the lack of models to support better understanding of the democratic context for e-participation. While we have demonstrated the usefulness of the framework, more detailed and formal processes for aligning models in the same domain have yet to be developed. There are two immediate next steps for our work in this area. First is the development of a formal ontology for e-participation capturing the identified facets, and the second is a series of applications of the framework as an analytical framework for analyzing selected e-participation initiatives in Europe.

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