New Information Technologies in Public Participation:
A Challenge to Old Decision-Making Institutional Frameworks

by

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ABSTRACT

Given the progress in information technology (IT) in the past 30 years, I hypothesized that radically new conditions exist for a qualitative improvement in public participation in decision-making. Two examples of key challenges are: 1) to bring more interaction early-on to the dialogue between citizens and decision-makers, rather than a "tunnel" two-step process (compile opinions-consider them at the very end); 2) to enable common, lay citizens to give meaningful contributions to decisions that require expert knowledge to understand the alternatives available. In order to test my hypothesis, I developed a prototype of an Intelligent Multimedia System to support public and technical consultation and, together with Internet-based collaborative tools, introduced it in the environmental impact assessment review process, for the solid urban waste incinerator of S. João da Talha, Portugal.

Supported by the evidence gathered from this experiment and by my analysis of the qualitative jump these IT developments represent, I argue that it is possible to use this new IT to capture and represent meaningful planning knowledge and with it enable multiple improvements in the public consultation, both qualitatively and quantitatively. On the other hand, observing the institutional responses and constraints during the process, my findings strongly suggest that the current institutional and regulatory context, inherited from old frameworks, is an impediment to fully set in place the improvements enabled by these IT developments. In other words, the decision-making institutional framework has not evolved at a pace fast enough to provide adequate responses to the challenges brought by the new IT. My findings also illustrate how different actors in a decision-making process are constrained by these old frameworks to follow different planning paradigms, further emphasizing the need to adjust to the new technology reality.

In this thesis, I present my hypothesis and research questions; the methodology I followed; the scientific traditions and bodies of literature that support this research; the case study and thesis experiment used to collect direct evidence; the analytical reasoning concerning the IT qualitative jump; the suggested research agenda for this domain; and the conclusions derived from this research, suggesting possible avenues to institutionalize some of the demonstrated IT-based improvements in public participation.

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SECTION 1 - Thesis Introduction

This section contains the Thesis introduction.

1. Introduction

Section I - Thesis Introduction

Introduction

1. Introduction

In general terms, my thesis is that information technologies (IT) developed in the last 30 years, and consolidated only recently, constitute a qualitative jump from past IT and have the potential to enable a vastly improved public participation in decision making, but requires a specific, new institutional and regulatory framework to fully materialize such potential.

Two inter-dependent classes of questions arise from this general thesis: questions on technology and questions on process. I argue that this duality process-technology is inescapable if we want to understand the fast moving new trends in decision making and their institutional implications. I call this duality the "Plato's Principle": for it was Plato that wrote[1] that *democracy cannot extend beyond the reach of a man's voice*, and it is part of my argument that technology is extending the reach of human voice in such mode and degree that new forms of democracy are being enabled today, forms that were no more than an utopian dream not so long ago.

Based on past research, I chose to focus on the combination of artificial intelligence with multimedia computer and network technology, applied in the context of citizen consultation by both national and local government agencies, within the domain of impact assessment. The rationale for this choice will become apparent through the thesis.

My main research case is the public consultation process on the Environmental Impact Assessment (EIA) for a solid urban waste incinerator in Portugal, in 1996. The context is the planning process centered on the realization of the World Expo 1998 in the oriental part of Lisbon, Portugal, with planned large developments of transportation infrastructure, drastic land use changes, and environmental clean-up.

[1] According to Walter Wriston (Wriston 1992)

New mandatory EEC - European Union (EU) directives regarding public participation in environmental impact assessment, and new national laws regulating city master plans, gave this and related cases a high profile as a test for all entities involved: Portuguese national government, local governments of Lisbon and Loures, the EU, private developers, and citizen's NGOs. Given the sensitivity of such kind of decisions, and also the strong reactions from citizens on the occasion of a previous process of siting a hazardous waste incinerator, both government agencies and environmental NGO's were strongly motivated to shift the focus of the debate from political and short-term considerations to a more technical and long-term reasoning. This created both a favorable condition for the introduction of new IT into the process, and the challenge of well defined expectations for the effect of these new IT.

My thesis research builds upon the course work done and elements of past research. Among others, my MSc. thesis (Ferraz de Abreu 1989), in what concerns the use of artificial intelligence (AI) to facilitate public access to computer technology; my study on the effect of market forces in recycling programs (Ferraz de Abreu 1992), in what concerns the dynamics of grass-root participation in development processes; my research on infrastructure shortfalls, in what concerns the use of AI techniques to model impact assessment as an inference net of primary and secondary consequences; my research on the Bertaud model (Ferraz de Abreu 1993), in what concerns the relationship between information technology, planning processes requiring multiple domain expertise, and community participation; my research on natural resources management, in what concerns the use and modeling of case-based reasoning; my research on the cultural-dependent impact of GIS in privacy issues (Ferraz de Abreu 1994), in what concerns the individual dimension of the consequences of applications of the new IT; and several case studies of information systems user need assessments for city governments, in what concerns the role of computer Browser tools in local decision-making.

In this thesis , I present my hypothesis or point of depart; the questions that are at the center of my research; the typical scenarios in which they occur; the methodology I followed; the scientific traditions and bodies of literature that support this research; the case study and thesis experiment used to collect direct evidence; the analytical reasoning concerning the IT qualitative jump; the

suggested research agenda for this domain; and finally the conclusions. The main bibliographic references are identified, and research records are included in the appendix.

SECTION 2 - Hypothesis and Method

This section concerns the Thesis basics and includes the chapters:

1. Hypothesis
2. Research Questions
3. Thesis Methodology
4. Thesis Roadmap

2.1. Hypothesis

Point of Depart; Argued assumptions; Thesis experiment expected evidence

2.1.1. Point of Depart

In general terms, my early working hypothesis was that "current state-of-the-art information technologies (IT) have the potential to enable significant changes in the current decision making processes in public institutions, in what concerns the direct participation of the citizens and the intercommunication among technical staff with different backgrounds" [Thesis Proposal, 1995]; and that some of these changes are already taking place.

I use the expression "*current state-of-the-art information technologies*", or "new IT", as referring to a specific set of recent technology developments, described in this thesis, that I argue to represent a specific qualitative jump. While it is reasonable to expect new qualitative jumps to occur in the future, as they did in the past, my thesis addresses this specific "new IT".

I define here "*public participation"* as a loose combination of direct participation by individual citizens and/or their NGOs, and experts, even if provided by other government agencies, in a decision making process. I will argue that this more inclusive definition is important, because it is an open question whether "public vs. expert" participation is a false dichotomy.

• The *process* facet of public participation concerns a) the choice of timing and opportunities to involve citizens before, during and after the decision making; b) the choice of techniques of participation; c) the degree of influence citizens may have in the final decision and in aftermath monitoring mechanisms.

• The *technology* facet of public participation concerns the choice of ITs used or made available in each step of the process, and the attributes of the used IT, relevant to the process.

Naturally, the formulation of the hypothesis evolved during thesis research. The major evolution resulted from observing the heavy weight of the current

institutional and regulatory framework in the process of introduction of new IT. Consequently, my hypothesis became that modern IT have the potential to enable a vastly improved public participation in decision making, but requires a specific, new institutional and regulatory framework to fully materialize such potential.

I considered this working hypothesis as encompassing several aspects, some of which I intended to test with a research experiment within a case study, prove others by documented research and analytical reasoning, while transforming the remaining into reasonably well-founded assumptions, within defined boundaries, through observation and discussion of published research. Specifically,

2.1.2. Argued assumptions:

A.1) - That better public participation is in general consequential to better decision making (necessary, but not sufficient).

A.2) - That there is such a thing as "commonly used" decision-making procedures within democracies in developments requiring environmental impact assessment (EIA), general enough to constitute a meaningful working basis for this thesis.

A-3) That the use of information systems is a useful component of decision-making.

2.1.3. Thesis experiment expected evidence:

T.1) That new IT can help lay, common citizens play a more knowledgeable and effective role, in public consultation concerning decisions involving technical arguments.

T.2) - That new IT can impact decision-making procedures: including and up to the point where many of the current procedures become inadequate and require a new regulatory framework.

T.3) - That you need specific IT to best support a specific kind of public participation; and that IT solely promoted by the so-called "free market forces"

does not satisfy this need, neither fulfills all the potential that new IT has in this domain.

T.4) - That the presence alone (or even introduction) of new IT does not necessarily promote better public participation nor improve decision-making procedures favoring public participation and is actually unlikely to do so, unless a) there is a good understanding of the underlying planning paradigms in presence, and b) an effort is made to shape both new IT and a new institutional framework in order to build bridges between these planning paradigms.

2.1.4. Thesis by analytical reasoning:

T.5) - That the current stage of development of information technologies corresponds to a qualitative jump in the technology substructure of society, as compared with the time when "modern" decision-making consolidated into current commonly used procedures within democracies.

2.2. - Research Questions

There is an underlying duality in this general hypothesis: *process* and *technology*. Besides the characterization of what I argue to represent an IT qualitative jump, I researched therefore two inter-dependent classes of questions arising from it:

On one hand, which major modifications (if any) are occurring in processes of public consultation due to the new IT? Is there evidence that current processes are becoming inadequate given the new IT developments? Which improvements are enabled by this new IT? Do we need new planning and/or political frameworks? If so, what must change?

On the other hand, what is (if it is) qualitatively different in new IT from past IT, in regard to public participation? In what form can the new IT best serve public participation ? What must be modified, or extended, in available IT to best responds to the requirements of such institutional processes?

In order to narrow down the scope of these questions, it was fundamental to specify both targeted IT and processes. My focus was the combination of artificial intelligence (mainly knowledge representation), multimedia computer technology and Internet, applied in the context of public participation in decision making by government agencies, within the domain of impact assessment review for large development projects (infrastructure shortfalls and environment).

SECTION 8 - Thesis Conclusions

This section presents the Thesis conclusions..

8. Conclusions

Introduction; Technology and process; Institutional impediments; Levels of conclusions; Hypothesis revisited; Final summary

8.1. Introduction

The research done for this thesis was vast, challenging and rewarding.

It was vast, because its nature involved tackling two large bodies of knowledge, public participation in planning and information technologies in planning. I reviewed the major scientific traditions and schools of thought in public participation, particularly concerning decision-making in planning. I reviewed the major IT recent developments and programmed a prototype with a focus on hypermedia, multimedia and artificial intelligence related technologies.

It was challenging, because it involved an in-depth immersion on a complex case study, used for the thesis experiment, with many facets that went well beyond simple analysis of the performance of the new IT introduced in a EIA review process with public consultation.

Finally, it was rewarding, because it provided a very rich body of evidence, not as much in the form of quantitative, deterministic conclusions, but giving good insight on the institutional responses raised by introducing this new IT, in a decision-making process with many layers of factors and many different actors.

These findings can be briefly summarized, in a introductory form, as follows:

On IT performance:

• The FAQ model proved to be an adequate form for representing planning knowledge relevant to the EIA review;

• The most successful user interface and prototype design element was the "Virtual office";

• The IMS demonstrated the potential to facilitate the understanding of technical data and the nature of the options in question;

• Internet-based components, such as the use of email, the Web publication of FAQ "trails", or sequence of questions had less visible impact at the surface of the public consultation, but still had more in-depth effects than those visible at first sight.

On Institutional context:

• The combination FAQ + "Virtual Office" was the one with more far-reaching institutional responses, positive and negative, therefore the one more revealing of the delicate and complex factors involved in the process;

• Also the combination FAQ + Web publication had a mobilizing effect, for different reasons and with different dynamics, in the key actors of the process, including the facility promoter, Valorsul;

• Several impediments of regulatory nature, like the legal status of email, and other obstacles derived from the institutional framework, were a good illustration of the inadequacy of some aspects of this framework to make the best of the new IT.

8.2. Technology and process

Throughout the thesis there is a permanent attention to the duality of *technology* and *process*. The research findings provide evidence of the relevance of looking at this duality, as the key for any real improvements in the public participation in the review of environmental impact assessment studies.

The experiment shows that new technology brings powerful tools to better structure and represent the relevant knowledge (IMS). It shows that without this new IT, in the form of collaborative tools, it will be very difficult, if not impossible, to meaningfully integrate the work of experts in different domains and from different institutions (Internet, IMS collaborative tools). It shows that new IT, such as Internet and web publishing, have an enormous potential in facilitating access to the relevant information, in more flexible formats than the traditional printed media (FAQ trails, hyperlinks). Maybe more relevant is that it shows the promise the new IT brings in helping to reduce the gap between experts

and common, “lay” citizens, in making use of technical data to form educated opinions (IMS knowledge test).

The experiment shows also many limitations of the technology. It shows how difficult it is to reach a standard knowledge structure, adequate to the purpose in view (the need for a dual taxonomy). It shows how much tool development and fine tuning is still needed to do on the spot, by knowledgeable people, to handle unexpected difficulties arising from the complexity of the data, during the implementation phases (IMS HTML scripting tools). It shows how fragile technology can be to human error or deficiencies in data insertion mechanisms (FAQ web publishing problems). It shows how a ever changing IT environment can inadvertently sabotage entire sections of a product (ISP change of URL, deactivating “page “hit” counters).

But more importantly, the experiment shows the inescapable interdependency between IT and the institutional and regulatory context of its application. It shows that a simple regulation, or institutional convenience in interpreting regulations, can drastically limit the reach and use of the new IT (refusal to allow access to EIA prior to public consultation period). It shows how institutional logic tends naturally to a conservative, defensive posture, concerning innovation, effectively neutralizing the more progressive policy (emails not accepted as legal input). It shows how without new regulation specifying the need to satisfy modern IT requirements in public processes, private interests will fear opening precedents and will not volunteer modernization unless where and when it is profitable (consultants reluctance in giving access to source documents in digital form, maps with color-dependent information delivered in black and white Xerox copies). It shows that without internalizing, through EIA review regulation reform, the costs of IT innovation, it just won’t happen (impossibility to obtain balanced FAQ except with IMS funded consultants; in 6 years, only one single project replication in Portugal, and limited to the facet of publishing an entire EIA on the web).

My findings are naturally limited by the fact they derive from a from a single case analysis, and no extensive quantitative data. It is not possible to generalize to all countries and all conditions.

What makes these case settings particularly interesting, is that at an institutional framework level, all seemed set for support. There was genuine political will, there was genuine interest from practically all actors, even if by different reasons and agendas. The IT to introduce was welcome, and was there, ready to use. But even with all this favorable factors, still the decision-making institutional framework was such that it compelled the machinery to throw sand into the wheels.

8.3. Institutional impediments

We have two levels of institutional impediments.

One, the simplest to overcome, is to improve some regulatory framework. In this case is the improvement of regulation concerning digital delivery (more specificity, including on data organization minimum standards, such as some simple standard metadata, etc.).

Others are obviously much more complex, and involve building bridges between planning paradigms in presence, and reforming public administration away from old traditions (like at least in some cases the military model and napoleoninc traditions of centralism).

In between can fall elements that further research may find that they are either feasible within the major current institutional superstructure or that require major reforms.

This is the case, for instance, of institutionalizing the FAQ. Will this FAQ always collide with the big picture of the decision-model, by putting in question the role of the actor? Or is that only put in question by the virtual office "equalizer" effect? Maybe with a careful safeguard against exaggerated bias in FAQ either question list or answers provided (for instance, building a library of professionally reviewed FAQ, by a board with representatives of all major typical actors in EIA review), it will be possible to avoid that part of the institutional reactions, and incorporate it into the process, with a lower level framework reform.

8.4. Levels of conclusions

We have also two levels of conclusions. The first, is more closely derived from the experimental observation and its analysis:

The experiment provided some evidence, even if only as an indicator, that:

• It is possible to capture and represent planning knowledge for EIA review. In this case, it validated the adequacy of the FAQ model, anchored to a dual taxonomy of domains and issues, supported by an Intelligent Multimedia System.

• IT can contribute to reduce the gap between experts and less qualified people, in decision-making concerning technical data.

• Internet (email and web) is a media with potential wide reach and long memory.

My findings also illustrate how different actors in a decision-making process are constrained by old decision-making institutional frameworks, inherited from other times and conditions when they were formed, to follow different planning paradigms, further emphasizing the need to adjust to the new technology reality:

• Actors are constrained by this context to stay in their different planning paradigms, in different wave lengths, which makes it difficult to communicate with each other towards a decision-making able to profit from meaningful input from all stakeholders.

• Old decision-making models like the ones dividing citizens between experts and “lay”, do not satisfy the current conditions and demands in public participation;

• It is not effective to throw "blindly" IT into the process, without understanding these planning paradigms and addressing them. IT must target specific planning steps and build bridges or channels of more effective communication between actors.

• New IT, such as the IMS and “Virtual Office” kind of system, supported by simple and solid knowledge structure like FAQ within a dual taxonomy of domains and issues, may contribute to facilitate this dialogue and build those bridges.

• Institutionalizing an actor with a moderator role, accepted by all actors or at least tolerated by them, such as the one I played together with my IMS Expert Panel, is important and may be a necessary combination, together with new IT, to enable the gains from this IT.

The second level derives more indirectly from experimental data, and is only supported by analytical reasoning. Nevertheless, it suggests that:

• New IT (in the past 30 years) represents a qualitative jump, in what concerns enabling a new stage of public participation;

• Current institutional and regulatory context is an impediment to full use of the new IT potential

• A good institutional reform should improve the real incorporation of the “rational” and ”pragmatic” paradigms and substitute hierarchy with more network-oriented paradigms.

• We need a strong research "push" in research on Planning and Information Systems to better understand the challenges and opportunities brought by the new IT.

8.5. Hypothesis revisited

T.1) That new IT can help lay, common citizens play a more knowledgeable and effective role, in public consultation concerning decisions involving technical arguments.

The findings suggests this is the case. However, further evidence is necessary concerning the real impact of new IT in the role played by citizens in public participation.

T.2) - That new IT can impact decision-making procedures: including and up to the point where many of the current procedures become inadequate and require a new regulatory framework.

The findings clearly show this is the case, at least for equivalent conditions to the ones studied. Since these conditions included an extraordinary supportive context, from all actors including those with political and administrative power of decision, it is reasonable to expect that the range of situations in which these conclusions apply are vaster than this case settings.

T.3) - That you need specific IT to best support a specific kind of public participation; and that IT solely promoted by the so-called "free market forces" does not satisfy this need, neither fulfills all the potential that new IT has in this domain.

The experiment did not gather sufficient negative evidence concerning “market failures”, although there are strong arguments in the case of Internet access and infrastructure development.

T.4) - That the presence alone (or even introduction) of new IT does not necessarily promote better public participation nor improve decision-making procedures favoring public participation and is actually unlikely to do so, unless a) there is a good understanding of the underlying planning paradigms in presence, and b) an effort is made to shape both new IT and a new institutional framework in order to build bridges between these planning paradigms.

The findings suggest this is the case.

T.5) - That the current stage of development of information technologies corresponds to a qualitative jump in the technology substructure of society, as compared with the time when "modern" decision-making consolidated into current commonly used procedures within democracies.

The analytical reasoning established the ground to support the claim that new IT in the past 30 years enable other forms of public participation that were not

possible at the time when only “broadcasting” IT was available, or even before that. Further claim needs to be supported by further research.

8.6. Final summary:

I hypothesized that new developments on IT offer the potential for considerable improvements in public participation in decision-making.

Supported by the evidence gathered from this experiment and by my analysis of the qualitative jump these IT developments represent, I conclude that it is possible to use this new IT to capture and represent meaningful planning knowledge and with it enable multiple improvements in the public consultation, both qualitatively and quantitatively.

On the other hand, observing the institutional responses and constraints during the process, my findings strongly suggest that the current institutional and regulatory context, inherited from old frameworks, is an impediment to fully set in place the improvements enabled by these IT developments. In other words, the decision-making institutional framework has not evolved at a pace fast enough to provide adequate responses to the challenges brought by the new IT.

This is not to say that rapid change of key institutional structures is without risk: in fact, it is likely to bring its own set of problems. But, the result does emphasize the importance of serious study of IT-induced changes in participatory democracy, as the important details are tried and evaluated, regarding which combinations of technology, process, and visibility contribute to effective social policy and governance.