P2P e-services that enhance participation in decision making and budget allocation

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Abstract. The aim of this research is to create an administration model that will introduce shareholders' participation on decision making and strategic planning. This model takes full advantage of the communication and information capabilities offered by the new technologies, creating advanced channels of information and communication between authorities and shareholders. E-administration has been conceived as a pioneering mean against bureaucracy and opacity of the administration procedure, mainly due to the direct availability of management data to the majority of the shareholders. However, in most administration models the operational base is "chained down" by its passive position, due to the limited channels of participation to the overall architecture, resulting to its remotion from the administration procedure and decision making. The model created, during this doctorate, uses the taxation paradigm, where it adapts basic principles of Participation Budgeting, migrating from the current administration model to a P2P one. Its operation involves a network based participation scheme, supported by the use of a complete set of participation tools, where knowledge's life cycle and budget allocation is transparent and available to all stakeholders. This takes place with the migration from the current administration model to a Peered (P2P) scheme which introduces new communication and information channels, from and to the shareholders. This Participative architecture is supported by a set of participation tools and principles which define and guide the operational cycle. This report summarizes the findings of the analysis performed in the research area, as well as their use and embedment to the Participatory model created. The model is analyzed thoroughly, introducing its architecture, philosophy and methodology, as well as the support tools used, giving a holistic picture of the migrating procedure towards a participatory scheme.

1 Introduction

We are moving towards a globally formed information society, where easy access to knowledge is a one-way road towards social evolution. This cultural change has been acknowledged and supported by most governments in the E.U., who have initiated an effort towards providing all the necessary electronic means required for this

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transition. Citizens and customers can now conduct transactions electronically (completely or partially, depending on the service sophistication level), without the need of physical presence. Although this effort does in fact results to more efficient and convenient services, its potentials on the other hand are limited due to the "mossy" architectural "status quo" of client–server networks which is still used.
The current social and organizational model of government can be thought of as a pyramid of authority. In this pyramid each layer is controlled by its upper level having a relationship which can only be described as a one-way unequal relationship, using principles similar to the Client-Server model for socio-technical systems. The limitations of such a system are many, in terms of performance and stability, and at the same time its philosophy does not facilitate participation and equitability, two fundamental principles of our next generation societies.
This dissertation describes a peered administration architecture, the development of which aims to transform the current client-server administration scheme into a participative one, by adopting the P2P theory, were simple shareholders no longer assume a passive position, but become active peers, sensibly involved on the decision making process. This transformation takes place by introducing additional communication channels and entities, between shareholders and authorities. Although it is not a fully e-based approach, it does take advantage of the offerings of the online technology in terms of information and knowledge exchange.
The philosophy hidden behind the administration model is presented, to be followed by the model's architecture. The attributes and roles of the different participants are introduced, as well as their interaction with the new entities. In addition to that, the design of the e-platform that will host the peered architecture is presented, with the electronic facilities that will come to complete this participation scheme. Lastly, the effects, positive and negative, of such a radical approach are examined, offering solutions and

2 Main Analysis

The term "P2P "has become a buzzword in most modern societies, referring to an effective architecture for file sharing. It has being adopted by various file sharing networks as a decentralized sharing scheme, offering efficient load management and enhanced client participation. However behind the core design of this architecture a promising philosophy is revealed with applicability to various social, political and financial networks. Peer-to-Peer networks, contrary to the client–server ones, follow a de-centralized approach towards ad hoc network management, using end-to-end communication with shared ownership, offering stability and scalability. From a socio-technical standpoint, the P2P architecture can be described as the extension of the Marxian ideology on today's human networks, technology-based or not. Concisely speaking the term "P2P network" refers to networks where its participants can be described as equivalent. In such a network every participant can operate both as a client and a server, in order to serve the common goals, forming bidirectional relationships. However from our point of view, the most important attribute of the P2P model is participation. It transforms simple peers (clients) into active members of the system, involved both in system's operation and system's strategy planning. It uses altruistic principles, compatible to the spirit and philosophy of ideal societies:

“Everyone is equal and has the same abilities and liabilities” – “A world where every citizen is an active member of a social network”. Lastly, its socio-technical architecture creates enriched social capital between the peer nodes due to mesh-like bidirectional relationships.

Although this newly defined model is described as P2P, the focus of our work was not to create a pure P2P model, whose members are fully equivalent, but to adopt certain P2P principles on the current client-server model. We have used the same structure as the one used on the pre-existing administration scheme, but we have re-allocated the responsibilities and capabilities of the four participants.

The notion of a peered budgeting system is not new. It has been described as a “Participatory Budgeting” system, “a mechanism which brings communities closer to the decision-making process around the public budget”. Existing PB approaches can be thought of as “a flexible set of community engagement techniques, adaptable to local circumstances, sharing a common principle: power lies with those who decide how new money is to be spent”. Although some would characterize such an approach towards fund management as “unrealistic”, PB has been successfully practiced in a number of local communities (first used in 1989 in the municipality of Porto Alegre) as a means to help poorer citizens and neighborhoods receive greater levels of public spending. Today it has been adopted by 300 local authorities around the world, involving more than 12 million people. It manages to play a key role in engaging citizens and transforming them into active social participants (Bradford case). The success of PB initiatives on a local level was the main motive for initiating an effort to design a PB taxation scheme, operating on a national level.

The aim of this effort is not to “void” the existing administration model but to introduce shareholders’ participation on decision making. The number and categories of the participants, as defined in the current administration model, remain unchanged. However their responsibilities will be reallocated, aiming to “share” authority in a more democratic manner. All shareholders become active members of the management scheme, being able to use communication and information facilities, in order to produce knowledge and interact with each other and with the domains. The knowledge generated is transformed into formal feedback with the creation of a new entity, namely the “funding domains catalogue” (FDC), a term used to describe the list of available entities that can be chosen for funding by shareholders. This list is generated by the higher authority in coaction with each funding domain, based on the generated knowledge, to be then evaluated by shareholders, and returned to the central authority.

All the above are to be host by a communication portal with advanced facilities, which will provide easy access and use to shareholders, but also automated mechanisms for analyzing their input. C2C communication becomes a valuable tool that will operate not only as a means of knowledge sharing, but also as the basic facility for awareness and participation. It will be facilitated via traditional and electronic means. Intermediate authorities will operate as a communication/information hub allowing the creation of “virtual” communities. Forums will become the mean where shareholders and domain representatives could engage in discussions and debates. Simple members will have the opportunity to express their ideas and receive feedback from others members. The ideas receiving

positive feedback may be submitted to the proper domains introducing additional Shareholder to Shareholder communication path.

The e-services however, and electronic means in general, will be the main medium for information sharing and communication. The nature of this Shareholder-to-Shareholder communication would be that of an informed process for opinion-formation at the personal level, and potentially consensus-building at the level of groups. In the first case, shareholders may act on an individual basis to acquire information and express their views, while in the second one they may be organized into discussion groups, concerning strategic planning. Their ideas will be evaluated through an evaluation mechanism that includes evaluation tools, expert reviews and public discussions. Ideas that are positively accepted could be recycled back to the discussion board or forwarded to the proper domain. The operational platform will provide e-facilities, being the e-Portal's front end to the users. It will provide information and communication services to registered and unregistered users. Those services could be categorized into two main categories:

Structured Input Services: This category includes services where users provide structured input. Structured input will be received by the questionnaire and poll facilities and will be used to receive rapid and targeted responses to emerging issues and problems. The polls will operate as a quick "census" tool that captures users' views on certain issues. They will ask direct questions to receive direct answers, available to both authorities and shareholders. The results of polls can be publicized in order to inform users on others' views and at the same time provide clear direct answers on ideas, issues and suggestions to the administration.

The questionnaires also provide structured input. However, the depth and width of this input may be richer than the feedback obtained from simple polls. Questionnaires will give shareholders' views on certain issues, but at the same time they can help the rationale behind these views to be expressed and analyzed. The measureable results received can be employed as benchmark indicators, subject to target-setting for further analysis and change.

Unstructured Input Services: This category includes services where users provide unstructured input, like the one received from forums and blogs. As compared to structured input services, the unstructured input services allow shareholders to fully express their views without being limited to the topics and context defined by a given questionnaire. The input received, although unstructured and rather difficult to analyze, will be equally important on highlighting unexplored issues, as well as novel ideas and proposals.

Therefore an equally important aspect of the proposed architecture is the evaluation tools that will be used to analyze the feedback received by both structured and unstructured services. The evaluation mechanisms will come to help participants and administrators on analyzing the input received.

The input from structured services is by definition direct and measurable. Users are invited to express their views on specific topics using pre-defined questions and answers, and the results can be interpreted using simple statistical methods, applied to the raw data included on the facilities log, and transformed to suggestions and clear knowledge. Although structured input services expose great strength in terms of facilitating analysis, they have limitations in terms of the value added by the results that they contribute.

The input received from unstructured services, on the other hand, may be ambiguous and difficult to analyze. It will contain however various data that need to be identified and categorized. Roughly speaking, this input can be described as flat text and the analysis performed as a "text consolidation" procedure. Its goal is to successfully "squeeze out" key elements of users' knowledge and transform them into consolidated views.

The e-Portal can be viewed as a shareholder-centered knowledge management system. The communication facilities, which form a major part of the portal, are actually a means for knowledge and information generation. The information received by the structured and the unstructured services will be the most valuable asset of the portal, and will be forwarded to the proper authorities and at the same time "recycled" and used as the basis for new communication topics within the portal. The scheme's operation is based on a 3I's workflow process that connects all major building blocks of the system: **Inform** end-users, allow them to **Interact, Identify** new knowledge that will enrich on-going debate.

The methodology adapted is based on a five step algorithm:

- Train users to enable them to participate efficiently, including
  - usage training, to familiarize shareholders with the facilities available to them, encompassing both electronic and non-electronic interaction facilities
  - information provision, to enable the to make informed decisions.
- Have the users participate in physical presence and e-interaction-based events, including:
  - usage of structured services (questionnaires, polls),
  - usage of unstructured services (forums, debates, blogging)
  - participation in group meetings.
- Transform end-users feedback to structured input and consolidated information.
- Allow shareholders to formally express their views and choices with respect to the funding domains under debate, i.e. the domains included in the FDC list.
- Support the consultation of all relevant data and the arrival at a funding decision.

3 Conclusions

From a theoretical point of view, the P2P movement can be viewed as something more than network architecture, but in fact as a philosophy. It can be described as a self-giving attitude that allows every peer to equally participate, operating towards common good. Such an approach to social culture is the very essence of pure democracy and is a one-way road towards future societies. It encourages public learning, active shareholder/participation as well as an improved sense of social justice.

On the other hand, a number of limitations may affect the impact of this approach. First of all, the diversity and complexity of different management and budget decision

systems implies that porting of this approach to anyone of these settings, requires a prior study of political, legal as well as cultural factors that may affect its applicability. What is more, the large scale of application is always a factor introducing additional technical and operational complexities. Secondly, shareholders may “fail to make the leap from the lack of basic infrastructure to the broader socioeconomic forces that shape their lives”. They may not use it for long-term planning, being mainly interested in securing short to medium term works. In addition to that, a PB approach to social management may become subject to manipulation by certain individuals in order to advance their own agendas. Thirdly, the e-nature of this approach combined with a possibly limited number of shareholders with Internet access, gives to this approach more the character of a complementary channel for discussing budgeting, being mainly available to “e-shareholders”. This is why, at least at this point, the results from such an approach could not be considered as binding for the budget allocation process, but more as an additional feedback to be taken into account, together with a number of other factors, by the authority making the final budget decisions. As a result, the discussion and voting processes mentioned in the description of the model should not be interpreted as steps of a legally binding procedure, but rather as tools for arriving at a synthesis of views. What is more, the objective of an effective synthesis of views entails a number of additional issues, both at the process level (establishment of consensus-building processes) as well as at the level of technology (techniques for near duplicate identification, text summarization and the like that may need to be applied to the transcripts of e-dialogues), that are answered in this dissertation. Although the research has been completed, guided by the needs that are sure to arise, further adaptation steps may take place in order to create a viable architecture that will serve the specific needs of each management scheme. One such adaptation has to do with the granularity of the FDC, its content and form, as well as the level of its application: consultative or decisive

The effort reported in this dissertation is based on the common grounds of a number of interdisciplinary research themes. The first of these is e-administration, i.e. the deployment of e-administration services that can make the administration process simpler for authorities and more transparent to the public. A second research issue is that of participatory budgeting schemes, i.e. communication platforms and policies that facilitate shareholder participation in decisions on funding projects and bodies that contribute to the public good. A third agenda of work is that of group consensus-building, i.e. the formulation of consensus within a group engaged in some form of semi-structured discussion, consultation or other communicational interaction.

A participatory approach to budget allocation and administration like the one proposed is sure to have a positive effect on the performance level of different domains. Funding assumes a “merit-based” dimension and will only take place if past performance exceeds a certain threshold assessed by shareholders. Therefore fundees will constantly try to improve themselves in order to convince shareholders for the importance of their work, which can potentially lead to less corruption, better performance and funding efficiency. It should be noted, however, that this merit system may not be well-suited as the unique decision criterion in certain cases. Those cases involve services and domains whose deeds are not directly viewed by shareholders and in domains where maintenance funds are necessary (e.g. hospital maintenance on the health care domain). In such cases a basic level of funding could

be applied, covering all the indispensable expenses, while any additional funding could be based on the shareholders' evaluation.

Still much skepticism is expected regarding the applicability of the model on today's societies and networked architectures. Some might describe this approach as utopian, arguing that shareholders (e.g. citizens) are not ready to comprehend the consequences and tolerate the complexity of such budgeting decisions and that it is impracticable to migrate this process into a participatory model. This sort of reservations is also considered in our own approach, which must be complemented with further investigation of the political and socio-cultural factors that a participatory budgeting scheme must further take into account. Participatory Budgeting case studies have proven to be successful in the past, in terms of citizen participation and active citizenship in general. For example, statistical data on Porto Alegre have shown that the inhabitants have a high rate of associational activity, political awareness and communal trust when compared to the inhabitants of most Brazilian cities. 38.4% of the people in Porto Alegre belong to a civic association, actively participating to local decision making, as compared to an average bellow 20% in other Brazilian cities. In addition to that, 41% of the people in Porto Alegre believe civic associations of some type promote people's interests, encouraging active participation of various segments of civil society in a progress that earlier involved only the elected representatives. Although developed European cities that have recently adopted PB have different social and political parameters, as compared to the growing cities of Latin America, the need of citizens to participate in the commons is expected to result to a similar level of acceptances.

The migration to a participatory system quite complicated. Stepping away from the pure technical aspects of such a system, the very social infrastructure required can only be obtained through a selfless civic culture. A sense of responsible citizenship on behalf of the shareholders is also essential, alongside a minimum level of political consensus, are both essential factors for brushing aside personal interest for what is conceived as the public good.

Besides these issues, the diversity and complexity of different decision systems at the local, regional and national level implies that the adoption of this approach to one of these settings requires a prior study of the local institutional and legal factors that may also affect its applicability. The application at large is always in itself a factor of unanticipated technical and operational complexities.

To sum up, human and social evolution has shown a slow but continuous shift of power from the few to the many. Individuals tend to demand more control on the strategic planning and fund allocation of the network scheme that they belong. That trend has changed the very shape of societies and organizations, but at the same time has been limited by the lack of means to support the communication and information requirements. The rapidly advancing technologies have provided tools and facilities ready to support the needs of citizens, and individuals in general, to actively participate in decision making. However those technologies have been used solely, and not in the context of a complete participative approach, limiting their potential and effect. Although we leave in the era of pure democracy, still the very essence of societies and networks is based on a "horse-and-buggy" architecture of Servers and Clients, living little space for innovation and true knowledge generation.

This approach does not offer a new technology that accomplishes things faster or cheaper, but in fact tries to take full advantage of the current technological scheme into an architecture that connects different components, in order to serve the needs of individuals to communicate, be informed and participate in decision making. Although we too agree that, at this at least point, shareholders (e.g. citizens, students, etc) may not be fully ready to take advantage of such a promising architecture, due to lack of cultural infrastructure and also willing leadership, we are convinced that in the near future, as the individuals will to participate increases, a participatory approach towards social management will be a one way road to future societies and networked architectures.

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