International Teledemocracy Centre

A generic re-engineering methodology for the organized redesign of the electoral process to an e-electoral process

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Research aim

- This paper is based on a completed doctoral research founded on evidence deriving from the case of the 2002 and 2003 UK e-voting pilot schemes.

- The research addressed the following overarching research question: *"What are the non-technical constraints in re-designing the electoral process in relation to ICTs?"*

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The use of process re-engineering in government provided services

☐ The analysis of the e-electoral process conducted, is based on the hypothesis that the electoral process has been through a "silent" re-engineering phase.

☐ E-elections, similar to traditional elections, are government owned and initiated processes, and as such, many of the activities involved in their undertaking are closely related to public administration, in this case electoral administration.

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Research methodology

☐ BPR concepts are used to assess the redesign of the electoral process to an e-electoral process and analyse the resulting effects on the validity of the process, the effectiveness of its administration and the social acceptance of its results.

☐ To that effect a review of existing BPR methodologies was conducted in order to identify the key BPR concepts which can support the analysis of the e-electoral process.

☐ The following theoretical BPR concepts form the basis of the process stage approach to the e-electoral process adopted in this paper

Defining agent roles and their procedural responsibilities

- The description of e-voting agent roles can serve the detailed allocation of tasks attributed to each agent.

- This aspect mainly aims at the allocation of procedural responsibilities but also enables a better understanding of the overall process.

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Defining agent accountability and agent obligations

☐ In the e-voting context, business rules are substituted by the existing legal framework defining an election, as legislation varies according to different elections.

☐ We should therefore consider the relevant legal issues as a dynamic factor to which e-voting deployment should adjust accordingly.

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Defining dependencies

- Once agent responsibilities have been identified they can subsequently be allocated along the e-voting process.

- Defining dependency relationships between the different collaborating parties in the e-voting procedures can be achieved by clearly demonstrating each agent's role and internal responsibilities.

- The focus should be on the identification of dependencies that are critical for the election success.

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Enabling multiple agent communication, co-ordination and control

☐ The co-ordination of the agents involved in the delivery of electronic voting is of central importance due to their multiplicity and the complex nature of the multiple channel e-voting process

☐ The following slides provide a five stage outline of the suggested generic re-engineering methodology for the organized redesign of the electoral process to an e-electoral process

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Stage 1: Understanding the context of the existing electoral arrangements

- ☐ The primary aim is to gather internal data, in any form (previous e-voting evaluation reports, statistics, cost calculations etc.)
- ☐ That should be followed by interviewing representatives of the main agents involved. Interviews should be focused on identifying:
  - **Each related department's tasks, responsibilities and activities in relation to the electoral process**
  - **Expected inputs and resulting outputs related to the above activities**
  - **Input suppliers and output customers for these activities, whether internal or external**
  - **Formal and informal communication lines**

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Stage 1:Understanding the aspirations of the main government organisation concerned

☐ After concluding the above practices a decision has to be taken by the main government organization concerned as to whether re-engineering will be aiming at process improvement (an e-enabled paper ballot based election) or process innovation (an e-voting process possibly including an e-enabled element as well).

☐ This would derive from the combination of the opportunities identified in the earlier steps and the aspirations of the government organisation, meaning the amount of risk they are willing to take.

Stage 2: Modelling (who, what, where and how)

Three basic model constructs are suggested:

☐ Process stage modelling (what needs to be done and when)

By modelling each stage of the electoral process, one can monitor the parallel activities taking place concurrently. Such models can be used to describe the activities taking place (what needs to be done) in the different stages of the e-electoral process (and when).

☐ Contractual relationships modelling (who should deliver what and who expects what)

The contractual relationships perspective could be modelled so as to identify the obligations of each agent towards others (who should deliver what) and accordingly the deriving dependencies of deliverables between agents (who expects what)

☐ Agent role modelling (how should agents act)

The question here is to define how the agents identified should respond to their responsibilities (how should agents act) within their combined activities which produce the overall electoral process.

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Stage 3: Analysis (why)

☐ The purpose of the analysis of gathered data, existing and proposed models, is to understand why process stages, contractual relationships and agent roles are executed in the way identified.

☐ Analysis tools and methods can either be developed or alternatively adapted as appropriate from those having already been used in the re-engineering of business processes.

☐ At the end of this stage one should have a full understanding of the current electoral arrangements, the proposed changes to the electoral process and the resulting effects that these changes would incur.

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Stage 4: Re-design

□ In this stage the conclusions reached in the analysis undertaken in stage three, together with the proposed would-be models, and the models of existing electoral arrangements produced in stage two should be presented to the main government agent holding the election.

□ A second round of interviews, this time including more junior employees could identify further opportunities for improvement and validate those already identified.

□ The outcome of this stage should be a re-designed e-electoral process, the re-design solutions being based on the organised introduction of ICT in the traditional electoral process

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Stage 5: Continuity of e-electoral redesign

The necessity for adaptation to e-voting technology advances, as well as to changing voter trends, fosters the necessity for repetitive process improvement. This doctoral research produced three separate analytical methods for the evaluation of e-electoral processes which could serve the continuous assessment of e-voting schemes:

☐ Procedural security analysis, in which given security constraints are used as evaluation criteria to measure the existing or prospective security level of e-electoral procedural practices

☐ Trust flow analysis, a method which provides an abstract representation of how stakeholders interact in terms of trust within the scope of a re-designed electoral process

☐ Level of difficulty analysis, which evaluates the expected level of difficulty of a suggested e-voting scheme prior to each implementation based on specific criteria.

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☐ The comparative analysis of agent roles between the traditional and the new e-electoral process could be used to specify how agent responsibilities and obligations are altered and re-distributed due to the introduction of ICTs in the electoral process. This in turn supports trust analysis and social acceptance for the e-process.

☐ The identification of procedural security gaps which could foster fraud opportunities and their allocation to specific process stages could function as a preventive mechanism against the possibility of fraud in all its different forms.

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Conclusions II

- Better management could be provided by identifying the opportunities for effective administration of the introduced e-voting technologies.
- This is in line with the requirement for customisation of e-voting technology to fit local needs and the need for common evaluation criteria on the effectiveness of e-voting technology.
- The stage analysis of the e-voting process could also prove beneficial in the effective allocation of resources by indicating the optimal combinations of resources in parallel process stages of the multiple channel e-voting process.
- Finally, the re-engineering of the process could lead to process simplification, which is also a necessity in the deployment of e-voting

Future work: Investigating cost efficiencies for e-voting

- ☐ Although detailed evaluation reports have been produced with regard to technical, security, legal and accessibility issues, to this date no detailed study has been published with regard to e-voting costs.

- ☐ The authors suggest that future research is oriented towards producing a cost accounting methodology aiming at estimating and controlling multiple channel electronic voting costs.

- ☐ Such research would answer e-voting costs criticism which is fostered by the absence of specific cost metrics.

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E-voting cost vs. e-voting value

☐ E-voting costs nevertheless should be measured against the expected added value that their deployment will incur in the wider democratic process.

☐ Eventually, if no apparent relationship between e-voting and increased voter turnout is achieved, then the future of e-voting will lay solely upon the cost factor as far as the state is concerned and the trust factor from the voters' point of view.

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