E-voting and media effects, an exploratory study

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Abstract

Internet voting has become a hot topic in recent years and most governments in Europe and elsewhere are planning to experiment with it, and to implement it. Many technology development projects have been undertaken in recent years, and the technological standards are being established. At the same time, a lot of legal and philosophical issues are at stake, as the system, form and technologies for voting do have normative implications. This makes the politico-technical arena in which the development and implementation of e-democracy systems in general and e-voting systems in particular so difficult and complex. In this paper we focus on the social and social-psychological aspects of voting media, in particularly Internet voting. Put it in a more general way, Internet technology may change the social setting in which people decide whether and what to vote, and as a consequence, the voting itself. We describe the design of longitudinal and comparative experimental field studies, in order to study these effects. After that we will present some of the initial empirical results. The study is theoretically relevant, as it validates results of experimental studies in a more 'real life' environment. That is, we will try to answer the question to what extent social-psychological mechanisms have an influence in real environments. Apart from that, the study may inform technological development and decision-making about the design and use of Internet technologies for political processes.

1. Introduction

Introducing new technology is always a complex undertaking, and has many different aspects. These aspects are partly technical, partly social, political, organisational and legal, and partly behavioural. This is also the case for information and communication technologies, and we see the study of these dimensions in various disciplines. In most cases, the research then aims at bringing forward practical knowledge about design, development and implementation of ICT's, and at the same time at contributing to the theoretical knowledge of the discipline involved. As a consequence, multidisciplinary research is the characterisation of the social research related to technological change, and this paper is not different.

One of the aims our study has is to inform practical development and use of ICT's for politics, but also to learn fundamental things within the disciplines involved. Here we focus on one of the important dimensions, that is the role of social and socio-psychological factors. Experiments with Internet technology in real life situations may inform us about various things, all studied by different disciplines. However, taking the design, the development, the implementation and the use of new technologies as point of departure, all these disciplinary approaches in studying Internet voting should inform the designer and politicians. This is what we call 'design oriented research', in which we try to produce results that inform the scholarly debates as well as the practical discourse. In the research project on which this paper is based, these many things are in fact done: first of all designing and building a prototype. Secondly, testing the technology in real situations; experimenting with the

prototype in order to find out political, organizational, administrative, legal constraints and possibilities. And finally, experimenting with the prototype in order to learn about the acceptance, use, usability, evaluation, trust by the individual voter, and the implications for the vote and the turnout. The working of the system can be tested. But also the scale and scope of possible application fields becomes clearer, influencing the thinking of the possible markets the system is suited for.

The research question

The introduction of electronic media in government and public services results into changing relations between citizens, politicians and government. In this project we address the question to which extent electronic media (e-voting) influence the articulation of political preferences and opinions by citizens, and how this effect is mediated by sociological and social psychological variables. We also want to investigate whether e-voting has an influence on the turnout and political representation. As cultural differences and differences in political systems may have a separate effect, we adopt an international comparative design.

The research project

The TruE-Vote project is an EU project designed to realise an Internet based voting service that will provide users with a tool for expressing their opinion. The full title of the EU project TRUE-VOTE is "a secure and trustable Internet voting system based on PKI". Within this project a large number of field studies will be carried out in order to investigate the use and effects of Internet voting. The project aims to contribute to the technological development and the increase of the community users' trust in information society technology tools to offer services, such as voting, by experimenting the potential of secure electronic voting integrated in the framework of a public key infrastructure. The objective of the project is to design and implement a secure Internet based voting system integrated with existing Public Key Infrastructures (PKI), and to demonstrate the advantages and the possibilities in terms of direct democracy and free expression of opinions offered by secure electronic voting. Polling and voting sessions are organised for Internet enabled users (community networks) and traditional users. The sociological analysis of the polling and voting session results will allow to understand the level of confidence and trust of the users in information society technology tools, the degree of acceptance of such tools in different socio-cultural areas and with respect to different users' technological skills. The proposed system will be useful within a range of voting options from public and private elections, referendums, opinion polls to different surveys.
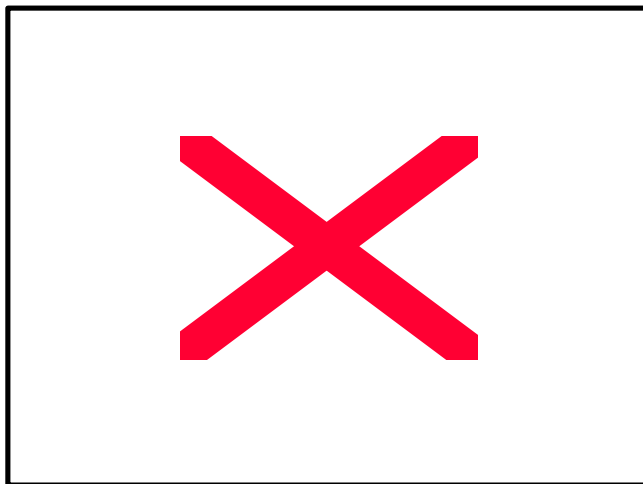
Besides studying privacy and surveillance concerns, trust issues, learning effects and usability and organizational aspects, we analyse media effects of the voting technology. We offer

different voting/polling media, in order to be able to investigate the effect of media on participation and voting outcomes. In the three 'real communities' the population will be divided into three groups using a different voting medium: traditional paper-based voting; electronic voting in special voting kiosks; and online voting from home. This variety of used media enables us to examine whether the medium influences participation and the opinion of the voter, as theories of social identity suggest.

The field studies, which were held in December, January, February and March, are designed to enable comparison. We *combine several methods* and tools: 1) Questionnaires before and after the voting measuring personal characteristics, opinions about e-voting, exit polls. The same will be done with respect to the registration process. 2) Direct observation and use of log files, 3) Voter interviews. 4) Analyses of ballots (turnout and outcomes per voting medium/technology). 5) Interviews with the ballot organisers about problems that occurred during the ballots.

Scientific relevance

Without data from large-scale Internet voting experiments it is difficult to clarify the influence this new voting method may have on the turnout of voters and on the way different contexts could affect voting. With our research we hope to be able to gain some more insight in these issues. Futhermore, the field studies should provide us with knowledge about the political implications of new voting technologies for overall political participation and the quality of representation. We will also gain an improved insight in social and technical design issues of e-government systems. This paper will present the first results of the field studies as carried out by the True-Vote project.

2. Theoretical background

Electronic voting (and polling) is already discussed for quite some years, but recently also the development of electronic voting systems is becoming a major activity. Within the EU funded IST program, some 15 systems are currently under development and being prototyped. Official government policies in many countries aim at introducing e-voting in a fast pace. In the UK, the first experiments have been done with elections on the local level (May 2002).

The development and introduction of new voting technologies generally is lacking serious evaluation. From a social and from a scientific point of view, there is a need for testing the functioning of voting technologies and the effects on participation and outcomes of the democratic process.

In our review of the state of e-voting (Oostveen & Van den Besselaar, 2002) we found a lot of projects aiming at the development of e-voting systems. The differences between the various systems are not very large, and technological trajectories with respect to most of the essential technical components are already emerging. Most of these projects include some testing, but from a technical perspective only. Social and behavioural issues are generally neglected, or

studied rather superficially. Traditional computer experts tend to have a deterministic view of technology itself. Technological determinism is the theory that a developing technology will have social consequences (good or bad impacts) for us to foresee and then live with (Dahlbom & Mathiassen, 1993: 196). Technical experts develop their artefacts as if their use were determined by their functional properties. In this view, the users of these new systems feature mainly as passive victims and society is shaped by technology.

This is not how we approached the development of electronic voting systems. Our point of departure is that technology is a social phenomenon shaped by the society producing it. We avoid a deterministic view, where the technology produces good or bad impacts. The role of a certain technology will be determined by the social context into which it is introduced. In other words, technology is socially shaped or constructed by its users. Therefore, as social constructionists we are interested in engaging the immediate users, as well as others who will be affected by our system, in the development and design process. The design of the technology should be a democratic process. Social constructionists see the complexity of the interplay between society and technology. The ways in which the boundary between 'social' and 'technical' processes or artefacts is negotiated should be examined, rather than accepting it as 'given' or taken for granted (Green, Owen and Pain, 1993).

If we do not correct the tendency to neglect social and behavioural issues, the result may be an uncritical introduction of new voting technologies, without any fundamental reflection about the technical, but more importantly, about the political, social, and organisational modalities of the systems introduced. The aim of our research is to provide fundamental and applied knowledge about the effects media on voting behaviour and opinion articulation, to improve social choice in designing and implementing electronic voting technologies.

The context of technology can have an impact on issues such as social identity, trust and digital divide. We will look at how these three mechanisms influence voting preference and voting turnout in more detail.

Social identity
The main difference between e-voting compared to standard voting is that it can be done in the privacy and security of one's own home rather than in the polling station in the community. The social psychological implications of this have been paid little attention hitherto. One important implication of e-voting is that when one votes at home, isolated behind the computer terminal, a more individual level of identity (and more individual self-interests) are likely to become salient compared to when one votes in the community hall, surrounded by other people from different groups and backgrounds. In the latter case collectivist and even multicultural concerns may be more salient.

Different voting contexts not only influence which identities and interests are made salient, they can influence behaviour relating to these identities and interests for *strategic* reasons. For example, being confronted with different groups of people at the polling station (or on the way to it) may make one feel more accountable to these audiences (e.g. ethnic minorities, the

poor) than when at home on one's own, or surrounded by one's family. This is particularly likely to affect voting behaviour when this is identifiable (and thus accountable) to audience that might disapprove. For example many polls underestimate self-interested or right-wing preferences (as demonstrated recently in France), because they failed to take into account that people might not want to admit to such preferences in public. Contexts in which people perceive there to be scrutiny of their choice may therefore affect voting for strategic or self-presentational reasons. An example of a high accountability context are votes that are conducted in public (e.g. in mass meetings with a show of hands), rather than by private ballot. Although e-voting may seem private, one of the concerns associated with this technology is whether it is indeed secure, or open to "surveillance" by those administering the system. The perception of surveillance may moderate voting preferences perceived to be critical of such authorities.

Another factor that may well cause features of e-voting to influence voting preference is the degree of social interaction and discussion around political topics prior to voting. Voting from the home increases the likelihood that choices will be discussed within a limited and homogeneous group context, whereas voting in the community may open the voter up to disparate social influence from others, especially those relating to more pro-social or collectivist concerns. This process of validating views through discussion has been called group consensualisation (Haslam, 1997). Because discussion is likely to polarise in line with group norms and identities (Spears, Lea, & Lee, 1990) the parties to discussion can be highly influential.

Of course we are not claiming that political preferences will be entirely determined by the voting context. However these contextual effects may be especially important in the case of "floating" voters who often decide elections.

Trust
In general, the following requirements can be formulated for electronic voting media.

- secure (accurate; only legitimate voters participate - and only once; protected against fraud and mistakes)
- protect privacy (the voter should remain anonymously),
- enable accountability (it should be possible to proof that the outcomes are correct; process is transparent; results have to be repeatable – 'recounting'), and
- economic (cheaper voting and polling than currently with paper based media, including postal voting)

In traditional voting procedures (paper based) these above mentioned requirements are implemented, and citizens are used to those media, and trust the procedures – at least in democratic countries. With the introduction of new media in voting, this changes. Public confidence in the manner in which ballots are counted is fundamental to the legitimacy of the electoral process. Internet voting is likely to lead to changes in how the public maintains confidence in the integrity of elections. Internet systems pose a problem in that the tallying process is not transparent.

With electronic voting systems, public confidence in the election relies on trust in technical experts instead of a transparent process (IPI, 2001). Media stories about various security threats to the Internet have an immediate impact on public confidence. Online voting may as a result not achieve the goal of increasing turnout of voters do not trust it. Therefore, it is important to make the voting and counting processes as transparent as possible. Because of this transparency there will be a greater confidence in the process and the result. Trust in an online voting system means having confidence in the machinery and infrastructure, rather than simply in the physical and administrative processes. However, all non-free software is secret by nature and there is virtually no way to be sure that the software does not include a trick to change the results of the vote. Only Free Software can ensure transparency (open source code).

There are many ways to make Internet voting more secure. Mechanisms that form the structure of security are: Personal Identification Number (PIN) or password, encryption, digital signature, smart cards, biometric identifiers (like fingerprints), or casting more than one vote where only the last one counts. Baseline integrity checks are for instance registration, authentication, privacy, and verifiable results.

To mention the most prominent problem as an example, technical experts agree that there is a trade off between the requirement of voting anonymously, and the requirement of accountability of the voting system. If a system is 100% privacy protecting, the accountability becomes low, as the transparent reconstruction of the vote becomes impossible, and the other way around.

Digital divide

How Internet voting would affect the turnout of different demographic groups, defined by race, education, gender, age, party affiliation, or geographic location, in each district is an important concern to policymakers. Demographic groups with less familiarity with computers might find some types of electronic voting to be more difficult and intimidating. Critics of Internet voting say that government may be making it easier for some people to vote, but not for others (Alvarez and Nagler, 2000). After all, voting from home or work is only possible if one has a computer and an Internet connection. Besides having access to a computer and Internet, one also needs to know how to work this technology. Studies have shown that Internet connections do not occur proportionally across racial, gender and socio-economic lines.

According to Neu et al (1999), the digital divide is defined as disparities in computer ownership and Internet access based on income and has important implications for democratic citizenship (Tolbert & McNeal, 2001). One could argue that Internet access will only be available to the "haves" leaving the "have-nots" on the other side of the "Digital Divide". Opponents of Internet voting claim that access to computers and the Internet is already stratified by race, age and class, so Internet voting will be similarly stratified. Demographic

differences in those with Internet access and those without may make electronic elections less representative than traditional in person balloting or voting by mail.

While Internet access has been increasing for all groups, there are still significant gaps based on income, education, race, ethnicity and age. Statistics on Internet use and all sorts of research raise the concerns that Internet voting will only increase access for a limited population group (<35, white, male, high level of education). There is a growing concern about the disparity of access for certain population groups. Experienced Internet users are the most likely to favour online voting; senior citizens will be the most reluctant (research ActivMedia, surveying Internet users).

Within Europe and other western countries the digital divide can be found on many different levels. We will discuss here briefly the following digital divisions: digital division between towns and rural areas, between rich and poor, between young and old, between professional workers and unskilled/semi skilled workers, and finally the racial divide.

A joint British study by IBM and Local Features, which researches the geography of social change, has found that, far from uniting Britain, new technologies are serving to deepen divisions. The Internet, laptop computers, mobile phone networks and broadband links were supposed to help overcome the division between rich and poor and town and country. Research into the social effects of technology has found that some sectors of society are in danger of being entirely cut off from the benefits of technologies that keep people in touch. Making information easy to get at everywhere is not helping those in rural areas, reports the research. Instead the study found that the biggest users of for instance teleworking and mobile technologies are companies and individuals found in towns, cities and suburbs. While many companies are reaping the benefits of new technologies, other sectors of society are getting left out. Most at risk are those in rural areas were public transport is intermittent and access to information is hardest. Without concrete action, rural areas face the prospect of falling ever further behind, and perhaps even being cut off completely from the benefits new technologies can bring (BBC News, 4 March 2002).

Research found that socio-economic factors, particularly income, influence decisions on whether or not to vote. The Internet might skew the overall representation of the electorate, by mobilizing only those with higher socio-economic status, who not only are likely to have access to the Internet but also are also already predisposed to vote (Alvarez & Nagler, 2000). A British survey for the Department for Education reveals that the digital divide appears to be alive and well in Britain. Higher earners use a wider range of technology more often than those on lower wages. The study found that the high cost of going online lay at the root of the divide, with the poorest sections of society saying they simply could not afford the technology needed, nor the phone bills that going on the web could generate. Of those interviewed, 68% of the people in the highest socio-economic groups said they had used the Internet, compared to 23% of those in the lowest socio-economic groups. Those in higher income groups tended to use technology for longer too. The highest earners tended to be grappling with the web or a PC for just over six hours per week. Lower earners logged far fewer hours online, but many were eager to make more use of the net. Those living on council estates in areas of great

hardship, who accessed the net via local schemes, said they used it for around seven hours per week, mainly to send e-mails or to research job offers.

The survey found that a smaller percentage of single parents, disabled people or those with learning difficulties regularly used the Internet. All three groups were well below the national average of 44% of people who claimed to be regular net users. All of the respondents said that cost was stopping them making greater use of these technologies (BBC News, 30/01/01).

The survey for the Department for Education showed that youngsters between 25 and 34 were the most voracious consumers of net technologies, spending around 16 hours per week online. Findings of Tolbert and McNeal show that the young are significantly more likely to use the Internet that the elderly. The Internet thus may represent an important venue for mobilizing younger voters, who have historically been underrepresented in the electorate (Tolbert & McNeal, 2001). However, the study 'Youth and Voting Behaviour in Britain' by Henn and Weinstein shows that to the question "would you be more likely to vote in the future if you could use Internet voting", young people are more responsive to issues of political substance than they are to the procedural mechanisms of voting. In other words, Internet voting is not considered by young people to be a substantial reform within the political system and therefore will only marginally modify their behaviour. According to Henn and Weinstein's research young people would be more likely to vote if they had more information about parties, if there was a party that they considered to represent their views, if was evidence that their views would be seriously listened to by politicians and decision makers, or if there was a greater choice of political parties available (Henn & Weinstein, 2001)

A study by the Fabian Society suggested that while 55% of British adults used the Internet, only 23% of people in unskilled occupations were users – dropping to 19% in areas with high unemployment (BBC News, 15/10/2001). At the end of 2000 the National Statistical Office also revealed the extend of Britain's digital divide, with barely 20% of unskilled and 26% of semi-skilled workers found to be using the net regularly. By contrast, 66% of professional workers are keen net users. Many of those who do not use the Internet regularly say the cost of buying a computer and paying high phone charges are the deterring factors. However, access to the technology alone is not the answer either. Sociologist Steve Woolgar points out that: "Access does not generate use" (BBC News, 23/05/2000). According to him kiosks and public net access points only attract a broader range of people when novices are given help and training during their first few times online. Without this extra effort, those who are already connected at home tend to monopolise the terminals.

Scholars and policymakers alike have long recognised differential turnout rates by socio-economic status in American elections; individuals with higher income, education and occupational status are significantly more likely to vote, as are whites. As we described earlier, because of unequal access to technology, Internet voting may expand turnout rates among those who are already predisposed to vote in elections, whites with higher socio-economic status, magnifying existing demographic disparities in the composition of the

electorate relative to the general population (Tolbert & McNeal, 2001).

In America, Hispanic households are less likely to own a computer and less likely to use the Internet (US Department of Commerce). The latest figures from Nua Internet Surveys (Feb 20 2002) show that half of Hispanics have Internet access at home, at work, or in an Internet café. On average, Hispanic Internet users go online six times a week, and spend 58 minutes online each time. Interesting is that the Roslow Hispanic Internet study found that online Hispanics spend 55 percent of their time on websites in Spanish. Although these studies show that digital exclusion is still a problem, recent figures seem to indicate that the racial digital gap in America is growing smaller. In our own study we will be able to compare the results from the highly multi-cultural Carpenters Estate in East London with results from a mainly 'white' rural area like North Karelia in Finland or from a 'white' city like Milan.

3. Methodology

The general research question 'What are the effects of different media on voting behaviour and opinion articulation?" can be subdivided into a number of more specific questions. First of all there are more *general issues* concerning the new system: Did the pilots prove a smooth operation of the system? Did the various system components interact properly? Did any breakdowns occur, and what implications? What are the (possible) political, legal, organisational, social and technical problems that arose during the course of the demonstrations? Secondly, we are interested in the *usability* of the system: Is the system easy to use, quick enough, understandable and transparent in the various dimensions: use in general, access, vote, correct mistakes, send the vote, verify the vote, and so on. Do we see differences between groups, and situations (organisational, issue of the polls etc.)? What are the users' opinions about e-voting, depending on topic of ballot, context of ballot and personal characteristics? Thirdly, we will pose questions about the *use and adoption* of the system: Which characteristics of the voting technology are decisive for its adoption? Does the information provided to the voters about the voting process make a difference for adopting? Does ability to verify and audit the voting (by the voter) make a difference for adopting? And does the medium used in the voting (traditional, kiosk, online) influence participation (level, demography)? Fourthly, we investigate *trust* issues. What is the initial level of trust in e-voting? Is trust in the e-voting system related to the technical and organisational characteristics of the system (e.g., possibility to verify and audit the vote and the procedure)? Is trust in the e-voting system related to the topic of the ballot? Does the level of trust influence the participation and outcome of the electronic ballot? Finally, besides the possibility that the medium can have an influence on participation, it can also have an *effect on preference articulation*: Does the medium used (traditional, kiosk, online) influences the outcome of the ballot? And is this related to the topic of the ballot or poll? Since we will have three voting sessions at all five participating locations, we will also be able to say something about *learning* issues: Does repeated use of the system have an effect on the use and the usability of the e-voting system? Will repeated use have an impact on other factors like trust, fear for privacy, or surveillance? In order to answer all these questions we chose to have a large number of field studies where the use and effects of Internet voting and e-polling are investigated.

Methods and tools

The field studies comprise a series of case studies and observational studies of Internet voting and e-polling in practice, in which we study which factors influence the way voters use (or do not use) e-voting systems, with the emphasis on naturalistic conditions and generalisability. The field studies take place in five different places: in three local situations (Newham, a neighbourhood in East London; Orsay, a small town in France; CGIL, the Milanese department of an Italian trade union) and in two virtual communities (Rete Civica de Milano, RCM and Glocal, a rural community network in Finland)[1].

Table 1: Size of the Ballots					
	A: Capacity for e-voting	B: Expected participation per mode per ballot	C: Ballots per site (sessions)	D: Modes of voting (media)	B * C * D = total voters
CGIL	**500**	**200**	3	3	**1800**
Newham	**500**	**200**	3	2	**1800**
Orsay	**1000**	**600**	2	2	**2400**
Glocal	**500**	**200**	3	2	**1200**
RCM	**500**	**200**	3	2	**1200**
TOTAL					**8400**

Due to legal constraints, the system cannot be tested in national elections. Nevertheless, in all test sites, two or three *real* voting/polling events were organised by e.g., the local authorities, or the trade union board, about serious ('official') issues. For example, the users of RCM had to answer a question about the public transport in Milan (focusing on extra city bus lines), while the residents of North Karelia (Finland) answered to the question whether they thought that Finnish welfare services (social, health, and educational services) and the amount of the taxes paid are balanced. During the second vote in North Karelia, the citizens were asked whether Finland should join the NATO. The residents of the Carpenters Estate in East London were asked whether they would be willing to help set up and run a Neighbourhood Watch Scheme, to improve the safety of their estate. The second voting session asked how much the residents would be prepared to pay, to secure a parking space and improve the security in the Estate Car Parks. Finally, the Italian trade union employees were posed a question about the citizenship rights of immigrants. They had to vote 'yes' or 'no' (or abstain) to the question: 'Are you in favour of granting administrative voting rights to immigrants who have lived for the last 5 years in our country?' The last voting session will have a ballot on the same topic in all five different sites. After some discussion on the phrasing the project decided to ask the respondents the following question: "What measures should Europe take to reduce its dependency on oil?" The voters had four possible answers: reduce oil consumption

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[1] For a description of the demonstrators see Oostveen & Van den Besselaar (2002), *The implications of Internet voting on elections and civic participation.* Euricom Colloquium 2002.

by raising the price of oil, invest more in nuclear power, invest in research on renewable sources of energy such as wind and solar energy, or do nothing.

As stated above, we aimed at three ballots in each site, resulting in 15 field studies. Unfortunately, the city of Orsay was due to its late involvement in the project only able to organise two ballots. Therefore, the results are based on 14 field studies instead. The system used is based on identification and authentication of the voter by means of smart cards. The number of cards, and of card readers restricted the number of users per e-vote to about 200. A problem, which had to be solved was the distribution of the readers and cards to the voters. In some cases the Certfication Authority directly sent them to the final users. In other cases the local organisers of the ballots distributed the cards and readers. There were a lot of smart card readers available within the project which made the number of potential participants very large. However, the local organisers of the voting sessions had to do quite some propaganda to get enough participants interested. As an incentive the voters could win a prize for each separate ballot. Nonetheless, some organisers found it very hard to attract enough voters. In total we expected to have 5 test sites * 3 votes each * 200 users = 3.000 users. We planned to include in the research similar amounts of users of the other voting media, which would make the total number of participants at least 8.400 (because of the 2 ballots in Orsay), enough for the numbers of variables included.
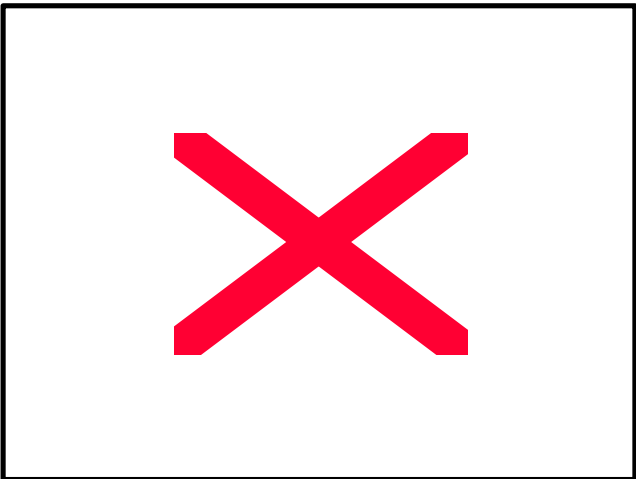
Table 2: The TRUE-VOTE test sites					
	'real communities'			'virtual communities'	
Voting media:	CGIL	Newham	Orsay	Glocal	RCM
Traditional	X	X	X		
Kiosk	X	X	X	X	
Online	X			X	X
CAWI				X	X

As usual in field studies, we will *combine several methods* and tools. First of all, we used questionnaires before and after the voting to get information on the participants' personal characteristics, and on their opinions about e-voting, the way they voted, and what they voted. The same was done with respect to the registration process (issue 3 below). Second, we

observed the voting process partly using log files, and partly in real life. Third, interviews will be held with voters. Fourth, the outcomes of the ballots (turn out and outcomes per voting medium/technology will be analysed. Finally, the organisers of the ballots will be interviewed about organisation and problems that occurred during the ballots.

Elaboration of the research questions

The field studies are designed in a way, which enables us comparison. This means that they are not different studies aiming to investigate different issues, but the rich data emerging from the field studies will be combined into one data set, in order to study the five issues mentioned below.

1. Media effects of the voting technology

We will offer different voting/polling media, in order to be able to investigate the effect of media on participation and articulation of opinion. In the three 'real communities', the voting will be done by dividing the population into three groups all using a different medium: traditional paper based voting; electronic voting in various special voting kiosks and online voting from home. In the two virtual communities, the online voting from home or work is one of the two modalities; the second is on-line voting from the. This variety of used media enables us to investigate whether the medium influences participation and the opinion of the voter, as theories of social identity suggest.

2. Trusting the system?

We want to investigate whether people trust e-voting systems, and how this relates to the nature of the system, and the topic the voting is about. In contrary to the traditional paper based vote, the process and procedures in e-voting are less transparent for the user, and the various steps in the processing of the information are less observable for the voter. By selecting a wide set of topics for the ballots, we will be able to analyse the relation between the willingness to use the e-voting system and the sensitivity of the topic of the ballot. Apart from this, we will offer the user possibilities for controlling the voting procedure. We will study whether these possibilities are used, and whether the availability of these possibilities does influence the use of the system.

3. Privacy and use of the system

In traditional voting media, the anonymity of the voter is guaranteed to a high degree. As e-voting in principle is place independent, the identification is much more sensitive than in the traditional vote, where one goes to the local voting station with the invitation for the ballot. Therefore, the use of e-voting systems requires a sophisticated identification and authentication of the voter, generally based on smart card technology with some form of biometrics or pin code. However, the institutions issuing the cards will require quite some information from the voter to be sure that the card is given to the right person. This request for information is much higher than in the current voting procedures. The personalised card enables in principle the coupling of the person with his/her vote. We will test the willingness of people to provide all this information to enable electronic voting by drawing a sample of people who gave and who refused to give the information required.

4. Learning effects

The fact that someone is confronted with e-voting technology for the first time may influence the willingness to use it, the attitude (trust, fear for monitoring behaviour), and the effect on social identity. As we have three ballots over a period of 4 months in the various test sites, and of course some change in group of people participating, we are able to investigate the effects of learning and experience on the use and effects of the e-voting system.

5. Usability and organisational aspects

As e-voting is rather new, the outcomes of the tests may be influenced by all kinds of contingent problems that accompany the tests. Therefore we will study the implementation of the system and the organisation of the ballot in the various test sites. What social, organisational, political, legal problems occur and why? What about the interoperability of the various systems components? How is the technical support functioning? We will also do observations (in real life, and by using log files) of how users cope with the system. Do they find their way in the system, does the system work fast enough, does it give enough help? The information gathered in this way will provide us with the context of the analysis of the use, participation, and ballot results.
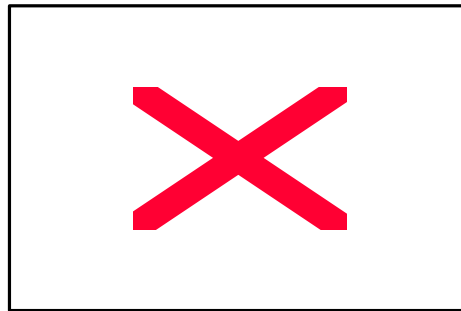
Variables

In the research questions various variables are implied and we summarise them in figure 1. The variables will be operationalised, and various instruments will be used to measure them.

Figure 1: Variables

Independent variables:
1. Characteristics of the voter:
Age, gender, income, nationality, education, attitude, experience with new technologies.
2. Voting technology/medium
Paper; kiosk; online.
3. Characteristics of the e-voting technology
Personal information needed for the smart card; availability of tools for audit and verification.
4. Organization of the ballot
Who 'owns' and organizes the ballot.
5. Experience with e-voting
Three subsequent ballots.
6. Topic of the ballot
Level of sensitivity of the topic.
Intermediate variables
7. Trust in system
Opinion about privacy, surveillance; behaviour (participation).

8. Social identity	
	Collective versus individual / social versus individual.
Dependent (effect) variables	
9. Participation in the ballot	
	Differences in participation between the various media – turnout and demography.
10. Result of the ballot	
	Different outcomes for the various media.
11. Opinion about e-voting	
	Acceptability, trustability etc.
12. Usability	
	Is it easy, quick, transparent, in the various dimensions: use in general, access, vote, correct mistakes, send the vote, verify the vote, and so on.

From a general point of view, the demonstrations consist of two main activities. First, to involve people (final voters) in using the TruE-Vote system, simulating a real situation of voting; in order to evaluate the effect of this particular voting system it is useful to compare it with more traditional media of voting: for this reason, the demonstrators will also organize some simulations of voting with more traditional media (especially paper based voting and CAWI). Secondly, to observe what is occurring in the field, collecting data and information, and analyze them in order to evaluate the results of the demonstration. As already stated, this will be done from different point of view, using appropriate methods and means. One of the main data sources will be the *results of the demonstration itself*, in terms of final voters' participation and outcomes of the ballots. Another important aspect to be analyzed is the relationship between the above mentioned items (participation and outcomes) and the background and opinions of the final voters; in order to collect this kind of data we will use some *questionnaires for the final voters*. They will be invited to complete before and after the ballots. The third aspect to take into account is related to different sets of problems and issues, which will arise from the pilots (logistic, technical, legal, etc.). In order to collect this data we will use a *checklist for the demonstrators*, which they are invited to fill in during the demonstration itself. Given the size of the samples, we used on-line questionnaires and self-completed paper questionnaires to get the information needed about characteristics and opinions of the voters. We distributed questionnaires before the first ballot, and after the other ballots (the second and the third). This way we can analyse the different and complex relationship between *characteristics* of people (age, gender, educational level, experience in use of ICT, etc.), the *opinions* of people (involved in TRUE-VOTE system or other traditional voting technology), before, (during) and after the demonstrations. And the *behaviour* of people involved in different demonstrations (TRUE-VOTE system and other traditional voting technology).

4. Preliminary results

[To be included in the April version]

5. Conclusion

The general question of our research project was to study the effects of the new media on voting: participation, articulation of opinions, and outcomes. We aimed at clarifying how media effects are mediated by social and social-psychological variables.

[To be included in the April version]

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