



E-Voting as the Magic Ballot?

The impact of the internet on electoral participation and civic engagement

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Synopsis: In many societies the use of the Internet for multiple functions in commerce and government has generated debate about whether the introduction of e-voting could reduce the costs of casting a ballot and therefore promote electoral participation. The argument developed in this study makes three claims: first, the evidence from the distribution of Internet access worldwide and within Western Europe suggests that, at least in the short-term, the impact of introducing e-voting into elections could probably deepen and worsen the existing socioeconomic 'voting gap'. Second, even if we assume that use of the Internet gradually 'normalizes' across the population in many affluent countries, there are still good reasons to be skeptical about any potential revolutionary benefits from e-voting on electoral participation. E-voting at home or work can be understood as analogous to the use of voting facilities exemplified by postal ballots, and the evidence suggests that the use of such facilities has had little impact on turnout. Instead, it is argued, the most important role of information technology in democracy lies, in its potential capacity to strengthen the public sphere. As such the debate about e-voting may well prove largely irrelevant to the primary impact of the Internet on democracy.

As access to the Internet has diffused throughout many post-industrial societies the idea of e-voting – or casting a secure and secret official ballot to electoral officials via the Internet at the poll site, kiosk, or remote home and workplace – has been widely debated. E-voting has been regarded as a logical extension of developments in commerce and government. Proponents claim that the introduction of this facility into the electoral process will serve numerous functions: adding convenience to the voting process, allowing the electorate to become more knowledgeable and informed, greatly increasing the efficiency and security of elections, making access to the electoral process more widely available, and facilitating new forms of direct democracy¹. Among these arguments, one of the most important and influential concerns the potential impact of e-voting on boosting electoral turnout and civic engagement, especially for the younger wired generation². By increasing the convenience of casting a ballot, e-voting can be regarded as analogous to the use of postal, absentee, overseas, or advance ballots, facilities already widely available in many countries³.

The argument developed in this paper makes three claims: first, the evidence from the distribution of Internet access worldwide and within Western Europe confirms that, at least in the short-term, the impact of introducing e-voting would probably deepen and worsen existing socioeconomic 'voting gaps'. Second, even if we assume that use of the Internet gradually 'normalizes' and becomes widespread throughout affluent societies, there are still good reasons to be skeptical about any potential revolutionary benefits from e-voting on turnout. E-voting can be understood as analogous to postal or advance voting. Evidence based on comparing turnout during the 1990s in established democracies suggests that many of these facilities have little impact on electoral participation. More fundamental structural reforms that could both maximize electoral choices and electoral decisiveness are required to have a major impact on strengthening turnout. Tinkering with e-voting is insufficient unless elections are seen as relevant and important to people's lives. Lastly, it is argued that the most important role of information technology in democracy lies, instead, in its potential capacity to strengthen the public sphere by expanding information resources, channels of communication, and networking capacity for many organized interest groups, social movements, NGOs, transnational policy networks, and political parties⁴. The Internet is already creating major challenges to the decision-making processes in global governance, exemplified by networks of activists protesting at Gothenberg, Genoa and Rome. As such the debate about e-voting may well prove largely irrelevant to the primary impact of the Internet on democracy.

To support these claims, *Part I* outlines what we know about the digital divide in access and use of the Internet both globally and within Western Europe, and examines whether there is any evidence that the online population has gradually 'normalized' from 1996-2001 as Internet access has spread. *Part II* considers evidence for the impact on electoral turnout of analogous voting facilities, exemplified by postal ballots, as the closest existing experience that is equivalent to e-voting. The conclusion considers the broader implications of the analysis and what we know about the functions of the Internet for civic engagement and democracy.

I: The Digital Divide in Internet Access

Critics argue that both technological and social problems create substantial barriers to the practical implementation of e-voting. The first claim is that the technology required to authenticate voters and to assure the accuracy and integrity of the election system either does not exist, or is not widespread enough in society, to be equitable and effective. Task forces reviewing the evidence in many countries have proved skeptical about the idea of e-voting as an automatic 'magic ballot' that could entice more people to vote, prevent electoral fraud, improve vote-counting, and make elections more representative, suggesting that further exploratory pilot studies are required before wider adoption⁵. Democratic electoral systems must meet certain stringent standards of security, secrecy, reliability, accuracy, efficiency, integrity, and equality, making the administrative challenges of e-voting more difficult than the implementation of many

common forms of electronic commerce or government. When tried in small-scale pilot studies, so far the security and technological problems involved in casting hundreds of votes electronically have often proved problematic. In October 2001, for example, the residents of the Dutch towns of Leidschendam and Voorburg were given the chance to vote via the net on the choices for the merged towns' new name. The vote was abandoned when it became obvious that more votes had been cast than there were electors⁶. The Arizona Democratic primary election, which also experienced many technical glitches, has been widely quoted, although it remains difficult to assess how far we can generalize from the particular circumstances surrounding this unique contest⁷. Pilot schemes using e-voting have been explored in local areas, including in Geneva⁸. They have recently been tested among selected wards and boroughs in the local elections held in Britain on 2nd May 2002, exploring innovative ways in which people can vote electronically using mobile phone text message services, touch telephone, local digital television and on-line voting methods using home computers, local libraries and council-run information kiosks⁹. Internet voting has also been employed as an option for shareholder elections by companies such as Chevron, Lucent Technologies and Xerox, as well as in student elections such as at Stanford and the University of Arizona, and many states are considering introducing Internet voting in elections¹⁰.

It remains unclear whether the purely *administrative* problems revolving around the practical issues of security, secrecy and integrity might eventually be resolved by suitable technological innovations, for example how far potential problems of voter fraud might be overcome by advances in biometric voice, retina scanning and fingerprint recognition, or the widespread use of 'smart cards' as identifiers with a computer chip and unique digital certificates. Putting these important technical matters aside for the moment, the key issue addressed by this study concerns assessing the potential *social* problems if e-voting serves to exacerbate inequalities in electoral participation. The second major claim advanced by critics is that even if e-voting becomes administratively practical, there are serious political barriers to overcome. The electoral process has to be equally available to every citizen, a principle widely recognized as important in locating traditional polling stations throughout local communities. Critics charge that access to e-voting from home or work would fail to be equitable, since the existence of the familiar 'digital divide' in Internet access could further skew electoral participation, and therefore political power, towards more affluent and wired socioeconomic groups. While not actively harming poorer neighborhoods, e-voting would still prove unfair by potentially advantaging some social groups over others. This argument holds less force when it comes to Internet voting through special dedicated public terminals located in the community, such as any facilities established in libraries, schools, or even supermarkets, where similar principles would apply to those determining the location of traditional polling stations. But the argument becomes relevant if e-voting is available from any home or work-place terminal, which is the most radical application of this principle.

Many agencies have expressed concern about the substantial differences in Internet access between the information haves and have-nots, including the familiar problem of the 'digital divide' between rich and poor, between graduates and those with minimal educational qualifications, between the younger and older generations, as well as among countries in Northern and Southern Europe. What remains unclear at this stage of diffusion is whether these social gaps are in the process of shrinking as access becomes more common in many affluent societies. We can consider the evidence for social trends by comparing patterns of use of information and communication technologies since the mid-1990s worldwide and then within the European Union.

The Internet has been around in at least rudimentary form since computers were first networked by ARPANET in 1971. The Internet as we know it today developed from a series of technological leaps: the invention of the World Wide Web by Tim Berners-Lee in 1989, the release of the first client browser software for accessing Internet materials in 1991, the

distribution of the first graphical browser (Mosaic) in 1993, and then the availability of the first popular Internet point-and-click browsers with Netscape Navigator in October 1994 and Microsoft's Internet Explorer in August 1995. The graphical browser removed the need for any technical expertise in accessing the Web beyond the ability to point and click, making it instantly accessible to a five-year old. In postindustrial societies, the expansion in Internet access during the last decade has been, as everyone observes, remarkable. The earliest estimates suggest that in 1994 there were about 3 million Internet users worldwide, mostly living in the United States¹¹. The following year this number had risen to 26 million. Although we can only provide a rough estimate of numbers, the available evidence suggests that the online population has probably roughly doubled every year since then, reaching an estimated 544 million people by early-2002¹². The bursting of the dot com bubble appears to have slowed, but far from halted, this process.

[Table 1 and Figure 1 about here]

The best available evidence on the distribution of users, hosts and hardware around the globe indicate that in the emerging Internet Age the information revolution has transformed communications in post-industrial states like Sweden, Australia, and the United States at the cutting edge of technological change, reinforcing their lead in the new economy. But in the early twenty-first century so far the benefits of the Internet have failed to reach most of the poorer nations in Sub-Saharan Africa, South Asia and the Middle East. The 29 OECD member states, representing post-industrial economies and developed democracies, contain 97% of all Internet hosts, 92% of the market in production and consumption of computer hardware, software and services, and 86% of all Internet users. In contrast the whole of Sub-Saharan Africa contains only 2.5 million Internet users, or less than 1% of the world's online community. Indeed there are more users within affluent Sweden than in the entire continent of Africa. Growing inequalities are evident even within post-industrial economies. Today almost two-thirds of the world's online community is located in just five countries: the United States, Japan, the UK, Canada, and Germany (see Figure 1).

The gap between the information-rich and poor countries has sharply increased in the emergent years of this new technology. The United Nations Development Report warned that the gains in productivity produced by the new technology may widen differences in economic growth between the most affluent nations and those that lack the skills, resources and infrastructure to invest in the information society: "The network society is creating parallel communications systems: one for those with income, education and literally connections, giving plentiful information at low cost and high speed; the other for those without connections, blocked by high barriers of time, cost and uncertainty and dependent upon outdated information."¹³ Echoing these concerns, UNESCO emphasizes that the North-South divide may be exacerbated in a situation where most of the world's population lacks basic access to a telephone, let alone a computer. As a result, poorer societies can become increasingly marginalized at the periphery of communication networks. Although the Internet is a new technology, there is nothing particularly novel about this pattern. Research on global information flows from north to south have long emphasized the center-periphery distinction, a problem which aroused heated debate in the 1980s centering on UNESCO's New World Information Order. But the growing importance of the information economy can be expected to exacerbate these divisions.

The rapid diffusion of the Internet within the EU, and also the disparities between Nordic and Mediterranean Europe, drawn from Eurobarometer surveys from 1996 to 2001, are illustrated in Table 2. As the data shows, use of the Internet has been remarkable during these years, rising from about 5% with access in 1996 to almost one third of all Europeans in spring 2001. The surge in Internet access has increased at a faster pace than access to computers, although this also rose rapidly during the same period, from 31% to 45% of all Europeans. Access to the Internet still remains far behind the distribution of some other common household technologies, such as the availability of VCRs (76%) and Teletext (67%), but nevertheless by the turn of the

century more Europeans already had access to the Internet than to either satellite TV, pay-TV, or a fax machine. The rise in most television-related technologies has been steady but relatively slow during these years, compared with the rise in all the computer-related technologies. Nevertheless the diffusion of the Internet during these years was also extremely uneven among European Union member states, with Scandinavian nations far ahead of Southern Mediterranean Europe (see Table 3 and Figure 2). Indeed with about two-thirds of the population online in spring 2001, Sweden (63%) and Denmark (62%) lead the world in Internet access, just ahead of the Netherlands (59%) and even the United States (58%). With one third or more of the population online, Internet access is also fairly widespread in Finland, Britain and Luxembourg. In contrast, Germany and France lag further behind, and while Mediterranean Europe has experienced considerable growth in use, nevertheless Internet access remains relatively restricted in Spain (22%), Greece (16%) and Portugal (15%).

Many factors have contributed towards the digital divide within Europe. If the pattern reflects basic differences in levels of economic development, as many assume, then we would expect to find clear divisions between richer and poorer nations. One of the most comprehensive studies seeking to explain the distribution of Internet hosts within post-industrial (OECD) societies, by Hargittai, concluded that the economic wealth of a country, measured by per capita GNP, was one of the most important predictors¹⁴. The International Telecommunications Union also found that the number of Internet hosts per country was significantly related to general levels of socio-economic development, using the UN Human Development Index measuring the rate of adult literacy, education, life expectancy, and per capita GDP¹⁵. My earlier comparison of 179 nations worldwide confirmed that economic development certainly helps to predict levels of access to the Internet and the distribution of Internet hosts, as it does to other traditional forms of information and communication like television and radios, but there are a number of significant outliers to this pattern, so that economic development per se is conducive not necessarily essential to greater online use¹⁶. By most basic economic indicators, major G-8 rivals like France, Germany and Japan should outrank the UK in terms of Internet penetration, yet in fact they continue to lag behind. The spread of digital technologies is also related to many other factors, notably government technology policies, particularly investment in scientific research and development within each country; the structure of the telecommunications market and the pricing of services; the location of major information technology companies in the telecommunication, computer hardware and software sectors; the spread of computer skills and capacities through education, training and lifetime learning; and the distribution of language skills, particularly familiarity with English. It is striking that many societies at the leading edge of the digital revolution are either Anglo-American countries like Canada and Australia, or states like Norway, Sweden and the Netherlands where English has become widely available.

[Table 2 and Figure 2 about here]

What of the digital divide within societies, and is there evidence that social inequalities have gradually closed during the first few years as Internet use has spread more widely? Diffusion theory by Everett Rogers suggests that those who adopt any new technology in the initial phase are often fairly exceptional, being more affluent and educated than the general population. As a technology becomes more widespread, however, so the social inequalities in access narrow – and thus the social distribution of its consequences change¹⁷. Table 3 shows the profile of the online community in Europe in spring of 1996 and 2000. The distribution of Internet access in the mid-1990s is familiar, with the Internet population in Europe concentrated among the younger generations, more affluent households, university graduates, managers and white collar workers (as well as students), and, to a lesser extent, among men. More importantly, the pattern of Internet access in spring 2000 shows the extent of the growth but also a fairly similar social profile of the online community in Europe: the strongest percentage point growth has been among the most affluent households, the well-educated, and among managerial professionals, although there is perhaps some evidence that use has spread rapidly among the early-middle

aged as well as the youngest age group. For multivariate analysis Table 4 shows the strength and significance of all these factors when entered into logistic regression models predicting use of the Internet. A comparison of the strength of the unstandardized coefficients in 1996 and in 2000 shows a similar pattern. Nevertheless the models suggest slight evidence of a very modest weakening over time in the role of age, education, and income in predicting Internet access in Europe, with a sharper weakening the gender gap in Internet access, although at the same time the influence of social class actually appears to increase during these years. Moreover the differences among EU member states like Sweden and Greece remain strong and significant despite even after introducing the prior social controls into the model, suggesting that societal-level factors like government educational and training policy, levels of industrial development, the pricing structure of telecommunications, and the location of high tech companies are important factors influencing access above and beyond particular differences in the social and demographic composition of these countries.

Overall the results of the analysis suggest that if e-voting via computer terminals in the home or workplace were to be introduced into European elections within the next few years¹⁸, thereby increasing the convenience for those with Internet access, and reducing the barriers to participation, then the unequal patterns of Internet access could be expected to widen many of the familiar socioeconomic disparities in electoral participation that already exist, including those of social class, education, gender, and income¹⁹. Yet there is one important qualification to this conclusion because it does seem likely that, if this facility were available, then the typical generational profile of the online community might make voting marginally more attractive for younger citizens who were interested in participating. Of course none of this evidence is relevant to other functions of the Internet for elections, such as the introduction of Internet voting via public kiosks at traditional polling stations, or in public locations such as libraries, town halls, schools and community centers. On the other hand, the real advantages of using the Internet via these forms of transmission are reduced for citizens, because people still have to find the time from work or family responsibilities to travel to the public location, while the disadvantages of the Internet over paper-methods for administrative security remain.

[Tables 3 and 4 about here]

II: e-Voting and Electoral Turnout

But for the purposes of exploring the arguments further let us assume that the social inequalities revealed so far represent the first stage of technological diffusion when, like the spread of popular mass media such as telephones, radios and television in earlier decades, eventually use and access become 'normalized' in the population at large. If, say, all EU nations eventually came to approach the current levels of access evident in leading-edge countries such as Sweden and the United States, with about two-thirds or more of the population having access, and if e-voting were to be introduced at this stage, would it be likely to increase electoral participation? There still remain many reasons to be skeptical of these claims. The theory that we can use to understand electoral participation in European elections, which is developed more fully elsewhere (Norris 1993), suggests that the incentives motivating electors to cast a ballot represent a product of electoral costs (in registering to vote, sorting out information and deciding how to vote, and then actually casting a ballot), electoral *choices* (determined largely by the range of parties and candidates listed on the ballot paper), and electoral *decisiveness* (influenced by how far votes cast for each party determine the outcome for the European parliament and for EU governance)²⁰.

Electoral Costs & Voting Facilities

The theory suggests that rational citizens will be less likely to vote if they face major electoral costs in registering as electors, in finding suitable information about the issues, parties and candidates that is useful in making voting decisions, or in casting a ballot to express their

voting choice. 'Electoral costs' concern the time, energies and informational demands required to register and cast a ballot. In this regard, the use of e-voting can be seen as essentially similar in principle to other voting facilities commonly used in many countries, such as the widespread availability of special arrangements for mobile populations, the use of mail, proxy, absentee, or overseas votes, as well as polling facilities for the elderly and disabled in nursing homes and hospitals, and elections held on a weekend or holiday rather than a workday. Registration procedures are often believed to be an important hurdle. In many countries like Britain, Sweden and Canada, registration is the responsibility of the government, conducted via a door-to-door canvas or annual census so most eligible citizens are automatically enrolled to vote. In others like the United States, France and Brazil citizens have to apply to register, often well ahead of the election, and complicated, time-consuming or restrictive practices can depress participation levels²¹. Standard rational choice theories suggest that, all other things being equal, the deterrent of higher costs reduces electoral participation.

Electoral Choices

The question is whether any reductions in the costs of casting a ballot from voting facilities are sufficient to overcome the many other important hurdles to electoral participation. Electoral choices are determined by broader systemic characteristics of the political system. The most important concerns the options available on the ballot, notably the range of parties and candidates contesting elected offices, and the policy alternatives listed for referenda issues. In turn, these options can be related to the type of electoral system, the party system, and other basic political institutions like parliamentary or presidential executives. The most important factor influencing electoral choices is whether there is a two party, two-and-a-half parties, moderate multiparty systems, or polarized multiparty system. Rational choice theories suggest that in general, all other things being equal, the greater the range of choices available on the ballot, the more the public will find a party, candidate or referenda issue option that reflects their viewpoint and interests, the stronger the incentive to vote.

Electoral Decisiveness

There may also be a trade-off between electoral choices and electoral *decisiveness*, or the political benefits anticipated from casting a ballot in determining the composition of parliament and government, the legislative and public policy agenda, and the outcome of referenda issues. In elections that are anticipated to be close, on the basis of past results, opinion polls or media commentary, voters are likely to feel a far greater incentive to get to the polls than in those where the outcome appears to be a foregone conclusion. Of course the actual benefits of casting a single vote may, on purely rational grounds, be illusory, because one vote is unlikely to decide the outcome of an election, but this is not to deny the psychological belief that in close elections, each vote counts for more than in safe contests. Hence for example British studies have found that the closer the difference in the national share of the vote between the major parties, the higher the level of electoral participation in the postwar era²². The marginality of British constituencies has also commonly been found to be one of the best predictors of turnout in each seat²³. Widening the range of choices on the ballot paper may allow citizens to find a closer match to their interests, but if the party system becomes too fragmented with multiple choices then the outcome of casting a vote in the election for smaller parties will be unlikely to influence the outcome for government and the policy agenda. Moreover a wider range of choices also simultaneously increased the costs of becoming informed about alternative candidates and parties.

Given this understanding, this study theorizes that the most probable effect of introducing e-voting from the home or workplace would be to marginally reduce the costs of casting a ballot. But e-voting would be unlikely to affect other important costs, such as the cognitive demands required to sort out the relevant information to decide how to vote, nor would it influence electoral

choices and electoral decisiveness. As such the Internet cannot be regarded as a magic panacea for all the ills of electoral participation, which are the result of more deep-seated problems in how far voters feel that they can determine the outcome of democratic politics through casting a ballot.

Voting and registration facilities

For evidence we can compare the impact on turnout of voting and registration facilities, as the closest equivalents to e-voting. Voting facilities that can reduce the costs of voting include the use of absentee, overseas, postal, advance ballots, proxy voting, facilities for registration, and how far polling stations are distributed widely throughout the community for groups who might otherwise have difficulty in getting to the polls, such as the population in residential homes for the elderly, in hospitals, and military personnel posted overseas²⁴. Timing is also believed to be important: most countries hold their elections on a single day, usually at the weekend that makes it easier for employed people to visit a polling station. In a few countries, however, elections are spread over more than one day; in India, for example, where there are more than 600 million voters and some 800 thousand polling stations, balloting takes place on a staggered basis during a month across the whole country. In a comparative study, Franklin compared average turnout 1960-95 in parliamentary elections in 29 countries and found that compulsory voting, Sunday voting, and postal voting facilities all proved important predictors, along with the proportionality of the electoral system, although not the number of days that polls were open²⁵.

The evidence that the registration process matters is most persuasive in comparisons of regulations within the United States. Rosenstone and Wolfinger examined the difference in turnout between those states with the easiest registration requirements, for example those like North Dakota that allow registration at polling places on election day, and those with the strictest requirements. Their estimates suggest that if all American states had same-day registration, this would provide a one-time boost of turnout by about 5 to 9 percent²⁶. Since their study in the 1970s, many states have experimented with easing the requirements, through initiatives like the 'motor voter' registration (where citizens can register to vote at the same time as they complete the form used for motor vehicle registration), but the results appear to have had only limited effects on voter participation²⁷. Some states have also introduced easier postal voting, while Oregon has moved to all mail ballots²⁸. The 1993 National Voter Registration Act requires all states to make voter registration available in motor vehicle bureaus, as well as by mail, and at various social service agencies, and it also forbids removing citizens from the rolls simply for not voting. Nevertheless as the Florida case vividly illustrated in the 2000 presidential contest, the efficiency of the registration and voting procedure at state level can leave much to be desired. Studies suggest that easing voter registration processes has slightly improved American voter turnout, with a one-time bump when new processes are introduced, but that the impact is not uniform across the whole electorate, as it has had the most impact increasing participation among middle-class citizens²⁹.

Comparative evidence on the impact of registration processes on turnout is less well established. Studies have long assumed that voluntary registration procedures, where citizens need to apply to be eligible to vote, are an important reason why American turnout lags well behind many comparable democracies³⁰. In countries with application processes, including the United States, France, and Australia, prospective voters must usually identify themselves before an election, sometimes many weeks in advance, by registering with a government agency. In other countries, the state takes the initiative in registering eligible citizens, through an annual census or similar mechanism. But what is the impact of this process? Katz compared the electoral regulations in thirty-one nations and found that nineteen states used an automatic registration process, while in contrast twelve registered citizens by application³¹. The analysis of electoral participation based on this classification of countries suggests that the registration hurdles may be less important than is often assumed, since average vote/VAP proved to be identical in both types of system³².

To examine some of the available evidence on these issues, drawn from a broader forthcoming study examining patterns of activism worldwide³³, Table 5 compares levels of turnout (measured as the number of valid votes cast as a proportion of the voting age population)³⁴ in seventy national parliamentary or presidential elections held during the 1990s in twenty-five established democracies³⁵. Model A examines the impact of *voting facilities*, including the use of automatic or voluntary registration processes, the number of polling days, the use of rest days or workdays for polling, postal voting, proxy voting, special polling booths, transfer voting and advance voting. In contrast, Model B examines the role of *political institutions* for elections, which have commonly been found to influence patterns of turnout³⁶, including the basic type of electoral system, the mean district magnitude, the frequency of elections, whether a parliamentary or presidential contest, and the level of fragmentation in the party system³⁷. Model B also examines the impact of the *legal rules* including the use of compulsory voting, the age of voting eligibility, and the length of women's enfranchisement. Model C presents the combined impact of all the factors under consideration. All the regression models control for levels of socioeconomic and democratization, which are important in worldwide comparisons, although these factors prove largely insignificant predictors of voter participation among affluent post-industrial societies sharing similar levels of economic development and an established tradition of political rights and civil liberties.

[Table 5 about here]

The result of the analysis in Model A in Table 5 shows that, after controlling for levels of development, among voting facilities, only polling on a rest day proved to provide a significant boost to turnout in established democracies; in contrast the use of proxy voting and the number of days that the polling stations were open proved to be significant but *negatively* associated with turnout, perhaps because countries concerned about low turnout try to increase the opportunities to get to the polls. Other special voting facilities, such as the availability of postal or advance voting, as well as the use of automatic or voluntary registration procedures, proved to be unrelated to levels of electoral turnout. Overall the results suggest that the role of voting facilities (in Model A) proved to explain far less variance in electoral participation than the role of institutions and legal rules (in Model B). Among institutional variables, voting participation is most likely to be maximized in national elections using proportional representation, with small electoral districts, regular but relatively infrequent national contests, competitive party systems, and in presidential contests. The final equation in Model C, including all structural and developmental factors, successfully explaining almost three-quarters of the variance in turnout among established democracies. In the final model, the most important factors concern the type of electoral system (whether PR or not), the frequency of elections (where more frequent contests depress turnout through voter fatigue), the length of women's enfranchisement, the use of compulsory voting³⁸, and after introducing all the controls, among voting facilities only the provision of special polling booths proved significant at conventional levels.

This limited analysis only briefly examines a few of the structural factors that can be expected to influence the costs, choices and decisiveness of elections, and survey analysis is necessary for a fuller examination of the social psychology of voting participation³⁹. Nevertheless if we can draw a valid analogy between the provision of existing voting facilities like postal ballots and the proposed use of the Internet to register and vote from home or work, then this evidence suggests that e-voting would have only little or no effect on turnout. Elections need to matter, and there need to be an effective range of real choices on the ballot for citizens to believe that they can make at least a symbolic difference to the outcome through casting a vote. If elections are regarded as largely irrelevant to the policy outcome, or if people do not feel that they are presented with choices which represent their interests, then no matter if casting a vote becomes as easy as clicking a mouse, participation levels will, unfortunately, probably remain miserably low.

III: Conclusions and Discussion

Modern lifestyles mean that people have become increasingly comfortable with the security of online banking, shopping, and stock market trading, so advocates of e-voting hope that this process could generate similar levels of trust and confidence. The use of e-voting could be regarded as building upon other increasingly-common electoral and political uses of Internet for information and communications, such as the use of websites and email by parties, candidates, and interest groups, the publication of election results online, the provision of voter registration facilities, and the use of the Internet for the submission, collection, and disclosure of campaign finance. But the evidence presented in this study suggests that at present, even if the technical issues could be overcome, the digital divide in Internet access means that it would be premature to consider adopting e-voting at home or work on a wide-scale basis. If the digital divide eventually closes, then problems of unequal access become less important. Nevertheless the impact that can be expected from the introduction of e-voting at home or work could expect to be modest, at best, if judged by the available evidence on the impact of equivalent facilities like postal voting. E-voting is unlikely to prove a 'magic ballot'. Technological quick fixes, while superficially attractive, cannot solve long-term and deep-rooted civic ills.

This is not to argue that the Internet fails to serve many other important functions during election campaigns, including for civic engagement. Content analysis of party websites suggests that the Internet provides a more level playing field for party competition, providing information and communication functions that are particularly important for minor and fringe parties⁴⁰. American surveys show that online communities can serve both 'bridging' and 'bonding' functions strengthening social capital⁴¹. Experimental evidence demonstrates that party websites on the Internet do indeed promote civic learning, and in this regard information on the Internet is analogous to campaign information from newspapers or television news⁴². Nevertheless survey evidence from those Americans who use the Internet during campaigns in the United States strongly suggests that e-voting would be used most heavily primarily by people who are already most likely to participate, thereby still failing to reach the apathetic and disengaged⁴³.

Perhaps the primary impact of the Internet on democratic life concerns its ability to strengthen the public sphere by expanding the information resources, channels of electronic communication, and the networking capacity for many organized interest groups, social movements, NGOs, transnational policy networks, and political parties with the technical know-how and organizational flexibility to adapt to the new medium⁴⁴. The impact of the Internet on intermediary organizations is evident from the way that it facilitates networks of activists concerned to challenge the decision-making processes in global governance. As such the debate about e-voting may well prove largely irrelevant to the primary political impact of the Internet on democracy. How political leaders respond to these new demands, and thereby use the potential of new technologies to widen and deepen the democratic processes, represents one of the key challenges of governance for the 21st Century.

Table 1: Trends in Access to Information Technologies, EU-15, 1996-2001

	% With Access					%Change
	1996	1997	1998	1999	2001	1996-2001
COMPUTER-RELATED						
Internet/WWW Connection	5	6	12	20	30	+25
CD Rom	13	16	25	26	31	+18
Modem	8	8	12	23	25	+17
Computer	31	30	35	40	45	+14
TELEVISION-RELATED						
Teletext on TV	50	52	59	60	67	+17
Video Recorder (VCR)	72	73	74	73	76	+4
Satellite TV	17	18	18	20	24	+7
Decoder for Pay TV eg Canal+	10	11	11	10	13	+3
TELEPHONE-RELATED						
Fax Machine	19	N/a	N/a	19	20	+1
Minitel or Videotext System	5	5	3	3	4	-1

Note: Eurobarometer Q. "Do you have access to, or do you use..."

Sources: Eurobarometers 44.2 spring 1996; 47.0 spring 1997; 50.1 fall 1998; 51.0 spring 1999; 54.1 fall 2000; 55.0 spring 2001.

Table 2: Proportion of Internet Users, EU and U.S. 1996-1999

	Spring 1996	Spring 1997	Fall 1998	Spring 1999	Spring 2000	Spring 2001	Increase 1996-01
Sweden	12	26	43	61	61	63	+51
Denmark	10	17	26	44	53	62	+52
Netherlands	9	16	19	32	50	59	+50
U.S. (a)	21	36	42	49	53	58	+37
Finland	11	16	18	39	48	47	+35
Britain	9	10	11	22	40	40	+31
Luxembourg	5	13	16	22	33	35	+30
Austria	4	10	7	11	27	30	+26
EU15	5	9	12	20	26	30	+25
Italy	3	5	7	14	22	29	+26
Ireland	4	5	9	14	25	28	+24
Belgium	3	6	8	11	23	26	+23
Germany West	5	8	8	8	20	26	+21
France	2	4	4	9	20	23	+21
Spain	2	2	5	8	16	22	+20
Germany East	2	4	5	8	20	20	+18
Greece	1	3	3	7	11	16	+15
Portugal	2	2	3	5	12	15	+13

Note: The Eurobarometer question asks, "Do you have access to, or do you use, the Internet or World Wide Web."⁴⁵ The Pew survey asks, "Do you ever go online to access the Internet or World Wide Web or to send and receive email?"

Sources: Eurobarometers 44.2 Spring 1996; 47.0 Spring 1997; 50.1 Fall 1998; 51.0 Spring 1999, 53.0 Spring 2000; 55.0 spring 2001. (a) US: successive surveys by *The Pew Research Center for the People and the Press*. See www.people-press.org.

Table 3: Social Profile of Online Community, EU-15 1996-2000

	% Online Spring 1996	% Online Spring 2000	Change 1996-2000
AGE			
15-25	9	28	+19
26-44	7	28	+21
45-64	5	21	+16
65+	1	6	+5
HH INCOME CATEGORY			
--	4	12	+8
-	3	15	+12
+	5	24	+19
++	10	44	+34
AGE FINISHED EDUC			
Up to 15	1	7	+6
16-19 years	4	19	+15
20+	9	38	+29
GENDER			
Men	6	25	+19
Women	4	21	+17
OCCUPATIONAL STATUS			
Managers	14	44	+30
Other White Collar	8	29	+21
Manual Worker	3	15	+12
Home worker	2	8	+6
Unemployed	3	10	+7
Student	13	44	+31
ALL EU-15			
<i>All</i>	5	22	+17

Sources: Eurobarometer 44.2 spring 1996; 53.0 spring 2000

Table 4: Models predicting use of the Internet, EU-15 1996 and 2000

	1996			2000		
	B	S.E.	Sig.	B	S.E.	Sig.
DEMOGRAPHICS						
Age	-.035	.002	.000	-.025	.002	.000
Gender	.588	.052	.000	.230	.048	.000
Education	.783	.040	.000	.627	.038	.000
Income	.303	.020	.000	.252	.019	.000
Class	.827	.066	.000	.919	.062	.000
NATION						
Sweden	1.01	.188	.000	1.10	.112	.000
UK	.966	.186	.000	.003	.131	.984
Finland	.784	.189	.849	-.121	.118	.391
Netherlands	.578	.190	.012	.966	.107	.000
Denmark	.573	.190	.003	.727	.110	.000
Ireland	.359	.221	.104	-.620	.120	.000
Austria	.020	.210	.923	-.602	.120	.000
Germany	-.035	.187	.012	-.832	.106	.000
Italy	-.507	.201	.002	-.534	.120	.000
Portugal	-.563	.224	.000	-1.42	.166	.000
Belgium	-.628	.254	.013	-.584	.117	.000
France	-.774	.202	.000	-1.04	.132	.000
Spain	-1.02	.217	.000	-1.33	.146	.000
Greece	-1.43	.257	.000	-2.11	.179	.000
Constant	-5.3			-2.968		
N.	65178			16078		
% With Internet access	5.0			22.4		
Cox-Snell R ²	.073			.187		
Nagelkerke R ²	.209			.293		
% Correct	94.5			81.0		

Note: The table reports the beta coefficients predicting use of the Internet based on logistic regression models. Use of the Internet and use of party websites are each measured as a dichotomy where 1=yes, 0=no. Luxembourg as closest to the overall mean was excluded from the national list in both surveys.

Age: Years

Education: Age finished FT education

Income: Harmonized HH income scale

Class: Manual (0)/Non-manual HoH

Gender: Male (1) Female (0)

Source: EuroBarometer 44.2bis Spring 1996, EuroBarometer 53.0 Spring 2000.

Table 5: Explaining Turnout in 25 Older Democracies in National Elections held during the 1990s

	Model A				Model B:				Model C:			
	b	(s.e.)	St. Beta	Sig.	B	(s.e.)	St. Beta	Sig.	B	(s.e.)	St. Beta	Sig.
Constant	98.6	(40.70)		**	40.5	(44.2)			11.707	(79.18)		
DEVELOPMENT												
Human Development	-.051	(.040)	-.12		-.076	(.036)	-.39	*	-.071	(037)	-.35	
Level of Democratization	2.23	(2.26)	.17		3.576	(1.86)	.28		.50	(2.23)	.04	
POLITICAL INSTITUTIONS												
Electoral System					2.952	(1.87)	.19		8.34	(2.68)	.55	**
Population per MP					-.0262	(.00)	-.56	**	-.044	(.000)	-.11	
Frequency of election					-1.386	(.871)	-.18		-4.00	(1.33)	-.53	**
Presidential election					4.042	(2.95)	.11		3.81	(2.79)	.10	
Fragmented party system					3.546	(4.16)	.09		-4.00	(5.07)	-.11	
LEGAL RULES												
Age of voting eligibility					3.630	(2.14)	.14		5.71	(3.99)	.22	
Length of women's enfranchisement					.416	(.078)	.54	***	.322	(.095)	.42	***
Use of compulsory voting					10.413	(2.75)	.34	***	14.87	(3.53)	.49	***
VOTING FACILITIES												
Automatic registration	6.32	(3.33)	.22						-4.37	(5.49)	-.16	
Number of polling days	-12.19	(3.49)	-.65	***					.696	(6.03)	.04	
Polling on rest day	7.20	(3.44)	.24	*					-8.94	(5.08)	-.30	
Postal voting	1.22	(3.21)	.04						-5.43	(3.38)	-.20	
Proxy voting	-11.55	(3.50)	-.40	**					5.60	(4.98)	.19	
Special polling booths	1.070	(3.92)	.03						6.90	(3.11)	.23	*
Transfer voting	3.67	(3.34)	.13						5.03	(3.00)	.18	
Advance voting	1.78	(3.44)	.06						-3.59	(3.13)	-.12	
<i>Number of elections</i>	70				70				70			
Adjusted R2	.339	(11.16)			.687	(7.68)			.735	(7.06)		

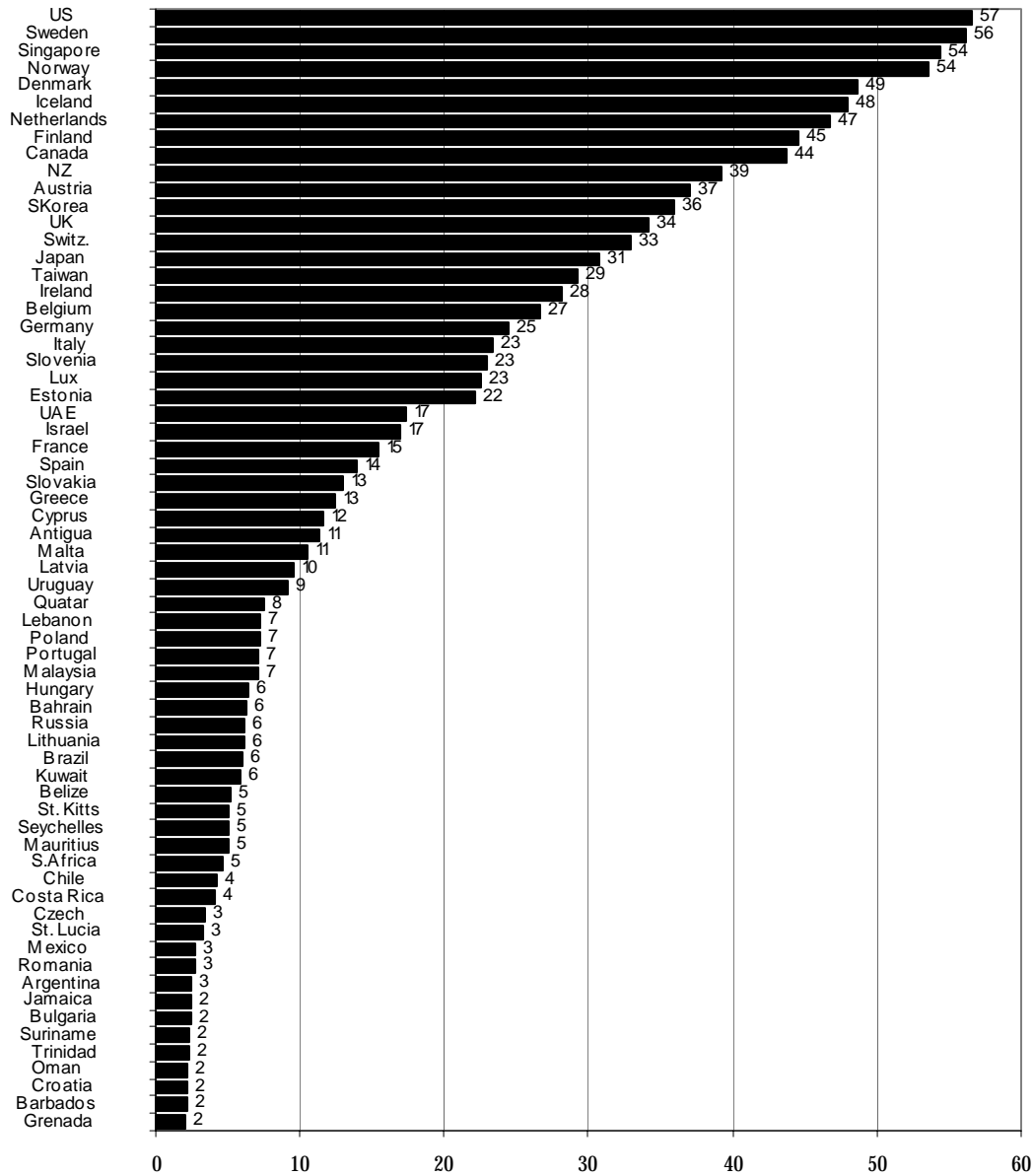
Notes: *Vote/VAP* is measured as the number of valid votes as a proportion of the Voting Age Population in 70 parliamentary and presidential national elections in 25 older democracies during the 1990s. The figures represent unstandardized regression coefficients, standard errors, standardized beta coefficients, and significance, with mean *vote/VAP* as the dependent variable. *= $p < .05$ ** $p < .01$ *** $p < .001$

Human Development: Human Development Index 1998 combining literacy, education and income. UNDP. *Level of Democratization*: Freedom House Index in the year of the election. Combined reversed 14-point scale of political rights and civic liberties. Freedom House. www.freedomhouse.org *Electoral system*: Majoritarian/plurality (1), semi-proportional (2), PR (3). *Party System*: Fragmented party system where the party in 1st place gets 30% of the vote or less. *Compulsory Voting*: Australia, Belgium, Costa Rica, Cyprus, Greece, Italy, Luxembourg. *All Voting Facilities*: Coded Yes (1) No (0).

Source: Calculated from International IDEA database *Voter Turnout from 1945 to 2000*. www.idea.int.

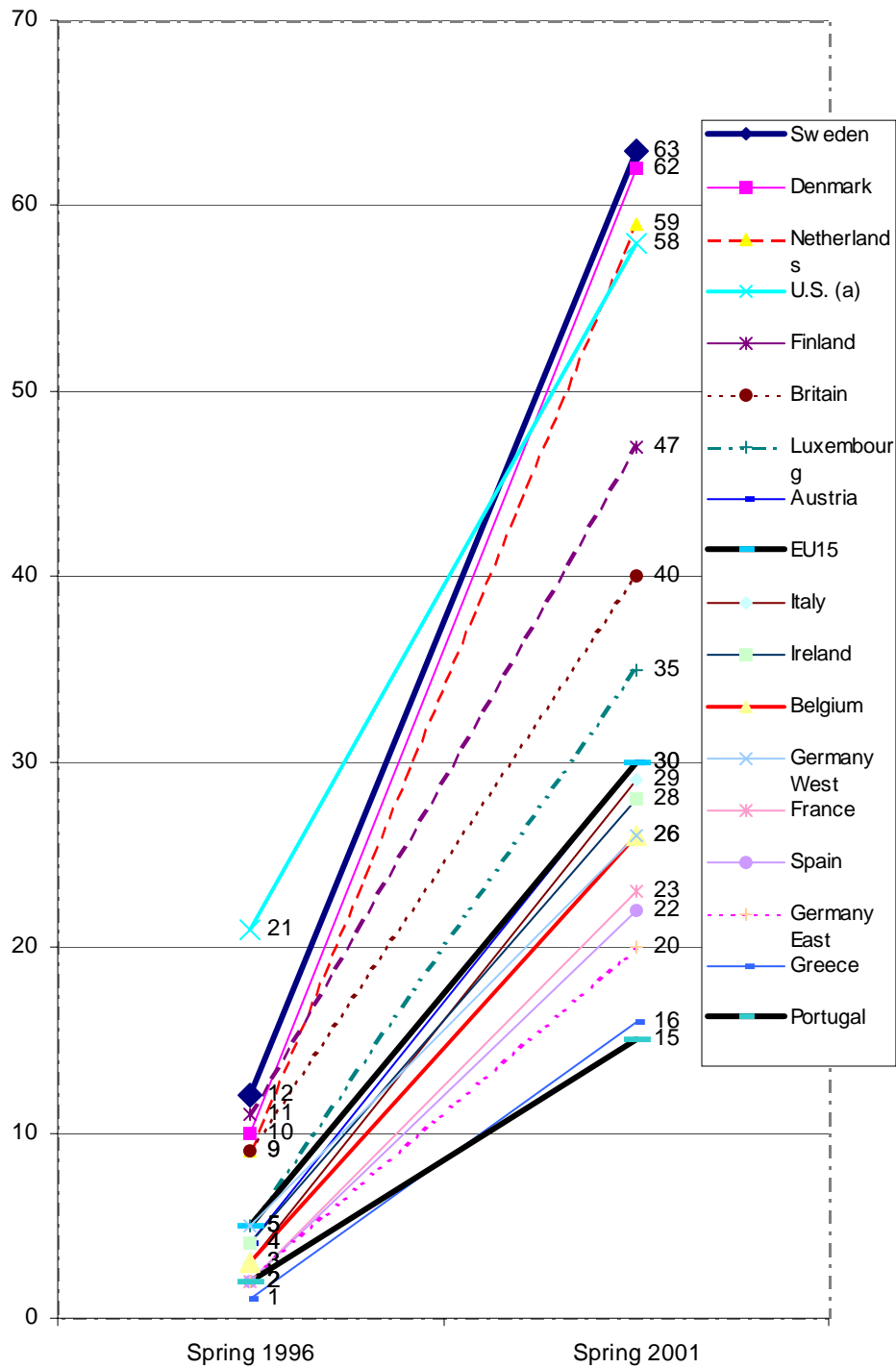
For full technical details see Pippa Norris. 2003. *Democratic Phoenix*. NY: Cambridge University Press.

Figure 1 The Percentage of the Population online by nation, Spring 2001



Source: All countries worldwide with 2 percent or more of the population online. Calculated from 'How many online?' Spring 2001. www.NUA.ie.

Figure 2: Growth in Internet Access, EU15 1996-2001



Note: This paper draws on several recent books where more details can be found including Pippa Norris. 2001. *Digital Divide* NY: Cambridge University Press; Pippa Norris. 2002. *Democratic Phoenix: Political Activism Worldwide*. NY: Cambridge University Press; Pippa Norris. 2003. *Institutions Matter: Electoral Rules and Voting Choices*. NY: Cambridge University Press. Details are available at www.pippanorris.com.

¹ See, for example, Christopher F. Arterton. 1987. *Teledemocracy*. Newbury Park, CA: Sage; Edward Schwartz. 1996. *Netactivism: How Citizens Use the Internet*. Sebastapol, CA: Songline Studios; Ian Budge. 1996. *The New Challenge of Direct Democracy*. Oxford: Polity Press; Wayne Rash, Jr. 1997. *Politics on the Net: Wiring the Political Process*. New York: W.H. Freeman; Howard Rheingold. 1993. *The Virtual Community: Homesteading on the Electronic Frontier*. Reading, MA: Addison Wesley; Benjamin R. Barber. 1998. 'Three scenarios for the future of technology and strong democracy.' *Political Science Quarterly*. 113(4): 573-590.

² J.S. Stratford and J. Stratford. 2001. 'Computerized and networked government information.' *Journal of Government Information* 28 (3): 297-301; T. Borgers. 'Is Internet voting a good thing?' *Journal of Institutional and Theoretical Economics*. 156 (4): 531-547.

³ For details of the availability of these facilities see www.ACEproject.org

⁴ For more details of this argument see Pippa Norris. 2001. *Digital Divide: Civic Engagement, Information Poverty and the Internet Worldwide*. New York: Cambridge University Press.

⁵ *Report of the National Workshop on Internet Voting*. March 2001. Internet Policy Institute for the National Science Foundation. http://www.internetpolicy.org/research/e_voting_report.pdf; The Independent Commission on Alternative Voting Methods. *Elections in the 21st Century: From Paper-Ballot to e-voting*. Electoral Reform Society. January 2002.

<http://www.electoral-reform.org.uk/sep/publications/books/exec.pdf>

⁶ http://news.bbc.co.uk/1/hi/english/in_depth/sci_tech/2000/dot_life/newsid_1746000/1746902.stm

⁷ Rachel Gibson. 2002. 'Elections online: Assessing Internet voting in light of the Arizona democratic primary.' *Political Science Quarterly*. 116 (4): 561-583; F.I. Solop. 2001. 'Digital democracy comes of age: Internet voting and the 2000 Arizona Democratic primary election.' *PS-Political Science & Politics* 34 (2): 289-293.

⁸ Andreas Auer and Alexander H. Trechsel. 2001. *Voter par Internet? Le projet e-voting dans le canton de Geneve dans une perspective socio-politique et juridique*. www.helbing.ch

⁹ 'May elections to trial online voting.' Press release 5th February 2002. UK Department of Transport, Local Government, and Regions. Pilots include:

- Gateshead, North Tyneside, Stevenage and Chorley to pilot all-postal ballots throughout their area.
- Parts of Liverpool and Sheffield to trial e-voting including mobile phone text messaging and using local digital television.
- Parts of Crewe and Nantwich, St Albans and Swindon to trial internet voting from home, local libraries and council-run information kiosks.
- Others including London Boroughs of Camden and Wandsworth, Chester, Rugby and Broxbourne to trial electronic counting, early voting and extended polling hours.

http://www.press.dtlr.gov.uk/pns/DisplayPN.cgi?pn_id=2002_0033 It should be noted that the preliminary results of the use of all-postal ballots, which seem to have had a positive impact on

turnout when used in selected wards, may require some qualification to the conclusions drawn in this paper.

¹⁰ Derek Dictson and Dan Ray. 2000. *The Modern Democratic Revolution: An Objective Survey of Internet-Based Elections*. www.Securepoll.com

¹¹ Estimates are derived from NUA *How Many Online?* www.NUA.ie

¹² Estimates are derived from NUA *How Many Online?* www.NUA.ie

¹³ UNDP. 1999. *World Development Report* Oxford: Oxford University Press. P.63.

¹⁴ Eszter Hargittai. 1999. 'Weaving the Western Web: Explaining Differences in Internet Connectivity Among OECD Countries.' *Telecommunications Policy*. 23(10-11): 701-718

¹⁵ International Telecommunications Union. 1999. *Challenges to the Network: Internet for Development*. Geneva: ITU. www.itu.org. See also Francisco Rodriguez and Ernest Wilson III. 2000. 'Are Poor Countries Losing the Information Revolution?' *WorldBank InfoDev* www.infodiv/library/wilsonrodriguez.doc .

¹⁶ See Pippa Norris. 2001. *Digital Divide*. Cambridge: Cambridge University Press.

¹⁷ Everett Rogers. 1995. *Diffusion of Innovations*. New York: Routledge.

¹⁸ Of course none of this provides any evidence concerning the potential use of voting electronically via text messaging, using conventional or mobile telephones, since this is not measured in the Eurobarometer surveys under comparison. The widespread access of telephones in European societies could mitigate some of the social inequalities of Internet voting, although of course this does not necessarily overcome, and may even exacerbate, the concerns about security.

¹⁹ For an analysis of the social disparities in turnout see Pippa Norris. 2002. *Democratic Phoenix: Political Activism Worldwide*. NY: Cambridge University Press. Chapter 5.

²⁰ See Pippa Norris. 2002. *Democratic Phoenix: Political Activism Worldwide*. NY: Cambridge University Press.

²¹ Richard Katz. 1997. *Democracy and Elections*. New York: Oxford. Table 13.2. It should be noted that under other less democratic regimes, citizens face far more serious barriers, such as in the recent presidential election in Zimbabwe where electors stood in line at polling stations despite delays of up to 50 hours and the serious threat of intimidation, violence and coercion.

²² See the discussion in Anthony Heath and Bridget Taylor. 1999. 'New sources of abstention?' In *Critical Elections: British Parties and Voters in Long-term Perspective*. Eds. Geoffrey Evans and Pippa Norris. London: Sage.

²³ See, for example, Paul Whiteley. 2001. 'Turnout'. In *Britain Votes 2001*. Ed. Pippa Norris. Oxford University Press.

²⁴ The best discussion of the administrative arrangements for registration and balloting found around the world can be found at www.ACE.org developed by International IDEA and IFES. For further details see Michael Maley. 2000. 'Absentee Voting.' In *The International Encyclopedia of Elections*. Ed. Richard Rose. Washington DC: CQ Press. See also entries by Andre Blais and Louis Massicotte. 'Day of Election'. See also Ivor Crewe. 'Electoral Participation.' In *Democracy at the Polls*, edited by Austin Ranney and David Butler. Washington, DC: AEI Press; G. Bingham Powell, Jr. 1986. 'American Voter Turnout in Comparative Perspective.' *American Political Science Review*. 80(1): 17-43; Robert W. Jackman. 1987. 'Political institutions and voter turnout in

industrialized democracies.' *American Political Science Review*. 81: 405-423; Robert W. Jackman and Ross A. Miller. 1995. 'Voter turnout in industrial democracies during the 1980s.' *Comparative Political Studies*. 27: 467-492. Andre Blais and A. Dobrzynska. 1998. 'Turnout in electoral democracies.' *European Journal of Political Research*. 33(2): 239-261; Arend Lijphart. 1997. 'Unequal Participation: Democracy's Unresolved Dilemma.' *American Political Science Review*. 91: 1-14.

²⁵ Mark Franklin. 2002. 'Electoral Participation.' In *Comparing Democracies 2: Elections and Voting in Global Perspective*. Eds. Lawrence LeDuc, Richard G. Niemi and Pippa Norris. London: Sage.

²⁶ Raymond E. Wolfinger and Steven J. Rosenstone. 1980. *Who Votes?* New Haven: Yale University Press. For a more recent study see Mark J. Fenster. 1994. 'The impact of allowing day of registration voting on turnout in U.S. elections from 1960 to 1992.' *American Politics Quarterly*. 22: 74-87.

²⁷ Stephen Knack. 1995. 'Does 'motor voter' work? Evidence from state-level data.' *Journal of Politics*. 57: 796-811; M.D. Martinez and D. Hill. 1999. 'Did motor voter work?' *American Politics Quarterly*. 27(3): 296-315.

²⁸ One evaluation of the Oregon experience found that postal ballots have a modest effect on electoral turnout, particularly in low-salience contests, but the main impact has been to increase voter participation among the groups already most likely to vote, increasing socioeconomic inequalities in turnout. See Jeffrey A. Karp and Susan Banducci. 2000. 'Going Postal: How All-Mail Elections Influence Turnout.' *Political Behavior* 22 (3): 223-239.

²⁹ Craig Leonard Brians and Bernard Grofman. 1999. 'When registration barriers fall, who votes? An empirical test of a rational choice model.' *Public Choice*. 21: 161-176. See also Stephen Knack and James White. 2000. 'Election-Day Registration and Turnout Inequality.' *Political Behavior* 22 (1): 29-44.

³⁰ Raymond E. Wolfinger, David P. Glass and Peverill Squire. 1990. 'Predictors of Electoral Turnout: An International Comparison.' *Policy Studies Review*. 9: 551-574.

³¹ Richard S. Katz. 1997. *Democracy and Elections*. Oxford: Oxford University Press. Table 13.1 and 13.2.

³² The mean Vote/VAP in the 1990s was the same (72%) in the countries classified by Katz as using automatic and those using application registration procedures, and the mean Vote/Reg in the 1990s was slightly higher (78.1%) in countries with application procedures than in those with automatic processes (75.1%).

³³ For the full study see Pippa Norris. 2002. *Democratic Phoenix: Political Activism Worldwide*. NY: Cambridge University Press. Especially chapters 3,4 and 5 on turnout. www.pippanorris.com.

³⁴ It should be noted that the same models were run with turnout measured by vote as a proportion of the registered electorate (Vote/Reg), and no significant differences were found in the overall results.

³⁵ *Established democracies* are defined as nation states with average Freedom House ratings of political rights and civil liberties of 2.0 or less in 1999-2000 (plus India rated at 2.5) and with at least twenty years continuous experience of democracy (1980-2000) based on the mean Freedom House rating 1972-1999. For the complete list see Pippa Norris. 2002. *Democratic Phoenix: Political Activism Worldwide*. NY: Cambridge University Press. Appendix A.

³⁶ Previous studies have commonly found that the type of electoral formula shapes participation, with proportional representation systems generating higher voter participation than majoritarian or plurality elections. See G. Bingham Powell. 1986. 'American Voter Turnout in Comparative Perspective.' *American Political Science Review*. 80(1): 17-43; Robert W. Jackman. 1987. 'Political institutions and voter turnout in industrialized democracies.' *American Political Science Review*. 81: 405-423; Robert W. Jackman and Ross A. Miller. 1995. 'Voter turnout in industrial democracies during the 1980s.' *Comparative Political Studies*. 27: 467-492. Andre Blais and A. Dobrzynska. 1998. 'Turnout in electoral democracies.' *European Journal of Political Research*. 33(2):239-261; A. Ladner and H. Milner. 1999. 'Do voters turn out more under proportional than majoritarian systems? The evidence from Swiss communal elections.' *Electoral Studies* 18(2): 235-250.

³⁷ For the full theoretical reasons for the inclusion of these items, as well as their operationalization and measurement, see the discussion in Chapter 4 in Pippa Norris. 2002. *Democratic Phoenix: Political Activism Worldwide*. NY: Cambridge University Press.

³⁸ It should also be noted that in worldwide comparisons including consolidating democracies the use of compulsory voting was not significant, probably due to differences in implementation.

³⁹ See Pippa Norris. 2002. *Democratic Phoenix: Political Activism Worldwide*. NY: Cambridge University Press. Chapter 5.

⁴⁰ Pippa Norris. 2002. 'Preaching to the Converted? Pluralism, Participation and Party Websites.' *Party Politics*.

⁴¹ Pippa Norris. 2002. 'The Bridging and Bonding Role of Online Communities.' *The Harvard International Journal of Press-Politics*. 7(3): 3-8.

⁴² Pippa Norris and David Sanders. 2001. 'Knows Little, Learns Less? An Experimental Study of the Impact of the Media on Learning during the 2001 British general election.' Annual Meeting of the American Political Science Association, San Francisco. 1st September.

⁴³ Pippa Norris. 2001. 'Who Surfs? New Technology, Old Voters and Virtual Democracy in US Elections 1992-2000.' Revised edition. *democracy.com* Ed. Elaine Kamarck. Washington, DC: Brookings Institute.

⁴⁴ For more details of this argument see Pippa Norris. 2001. *Digital Divide: Civic Engagement, Information Poverty and the Internet Worldwide*. New York: Cambridge University Press.

⁴⁵ There is some ambiguity in these items whether they refer to use at home or work or both. It should be noted that Eurobarometer 50.1 did differentiate by asking users whether they had access at home or at work to different types of technology, like a computer. The comparison of the results in 50.1 with other surveys suggest that in these other surveys respondents may have based their answers on their home use. If so, this measure may considerably underestimate the total proportion of computer users and online users in Western Europe.