Political Implications of E-voting in Korea

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Preface

The development of Information Communication Technology (ICT) has had substantial effects, not only on everyday life but also on public sphere. It is possible through ICT to realize new concepts like electronic government and electronic democracy. In the meantime, a considerable number of discussions have been conducted on E-voting. The advocates who agree with E-voting strongly insist on accepting it for several reasons, including an increase of the voting rate along with reduced costs, greater accuracy, and the enhanced efficiency of ballot counting. On the other hand, those who oppose the adoption of E-voting hold strongly that there should be care in adopting an E-voting system. They cite possible security and mechanical troubles.

As is apparent in existing discussions, most of the arguments about E-voting have dealt with the technical side. However, there are important political implications which involve questions of universal, equal and direct voting. In Korea the turnout rate is declining, a fact driving some to find a means to raise the turnout rate. But an increase in the turnout rate does not necessarily promote the quality of representation itself. Because of disproportional representation in society, it may further over-represent the group that has been over-represented already while an under-represented group becomes more under-represented. Accordingly, improvements in quantitative representation are meaningful only if qualitative representation is achieved at the same time.

In one sense, it is not necessary to worry much about the declining turnout rate, and we also need not work out inappropriate ways to increase the turnout rate at the expense of ignoring other important aspects of voting. What we have to consider in advance is why the turnout rate is going down. The easiest way to improve that rate is compulsory voting as Australia and Belgium have. But this idea was discarded in South Korea because it, too, has many problems. The voting rate will increase dramatically if a presidential election, a congressional election and a local election are carried out concurrently. However this is not compatible with Korea's presidential system.

Thus, the introduction of E-voting may succeed in raising the turnout rate, but it is obviously necessary to consider the political implications of any such change before adopting E-voting. The goal of this article is to discuss the political implications.

Reconsidering the need for E-voting: Technical Perspectives

The National Election Commission officially created the Internet Election Promotion Committee in March 2005, and will try to test E-voting in student associations or labor union elections before implementing it in the 18th National Assembly Elections. E-voting has been promising so far. The Uri Party elected a Party Chairman and a Senior Member of the Central Committee by way of a KIOSK-type of E-voting in the National Congress of Representatives last April 1, and has used it in selecting a Youth Representative in each of 16 branches of Si/Do including a Chairman of Youth Council. In this process, personal authentication was managed by KIS (Korea Investors Service) and voting procedures were conducted by POSDAK. Although E-voting was done successfully, a more prudent attitude toward E-voting is still needed because the plan which the National Election Commission has suggested is based on the too optimistic prospect that there will be no errors or problems in the process of E-voting.

The efficiency of election management, the security of the system, and the accuracy of vote counting are standards which must be considered in determining the usefulness of E-voting. Efficiency is being emphasized on the administrative side, and the other two standards are highly technical. Efficiency is not only measured by the effectiveness of voting management but also by the increased number of voters and reduced voter costs. That is, the efficiency implies managing elections with cheaper costs and higher turnout rates.

Efficiency is regarded as one of the important attributes because E-voting is being championed as an avenue toward achieving E-government[1]. The practical goal of E-government is to provide the people with more information and services, and to encourage them to participate actively and with greater satisfaction. Thanks to information technology, the government enables people to obtain information more easily. It is generally believed that E-government will have a positive effect on participatory democracy, providing greater satisfaction and a higher voter turnout.

Proponents of E-voting insist that it enables voters to vote more easily than in the past. Someone may judge E-voting as efficient if the turnout rate increases after utilizing the new voting method. However, it is not enough to jump to the conclusion that E-voting enhances the development of democracy based only on increasing the turnout rate. Keeping in mind questions of quality, it is a rash act to

accept a new voting system simply because of an improved turnout rate. Majority rule can be justified only by assuring that voters will possess sufficient knowledge about candidates or issues to make informed choices. Although this assumption is too idealistic, it is important that potential voters at least be motivated to participate.

Korea tries to encourage people to vote by fixing election days on national holidays. In fact, there is no provision in the election law that this must be done. The constitution simply requires that the government take measures to guarantee the right to vote. In Britain and the US, it costs a great deal more to vote than in Korea because neither the British nor the Americans fix election on holidays. In addition, 13,471 polling places were installed in the last Korean presidential election, so that it takes only a few minutes to find a polling place. Therefore, it is incorrect to say that the low turnout rate in Korea caused by the barriers of time and inconvenient voting locations.

If there is no practical factor discouraging voting, it can be said that the low turnout rate stems from low voter interest. The rate for congressional elections is lower than that for a presidential election, and the rate for local elections is much lower than for congressional contests. It is clear that this is not because of different voting conditions but because of different voters' perception and the relative importance of elections at various levels. In addition, voter ages should be discussed seriously. If E-voting is helpful for certain ages only (e.g. young electors) we must be cautious in adopting E-voting if it proves problems for other voters.

Second, with regard to security, there are endless worries. Security problems can be divided into two different aspects: disrupting of the voting system through hacking and the creation of instability. Many experts are recommending that security should be primarily considered in adopting E-voting[2]. Touch screens in ballot booths are among many types of E-voting and are regarded as simple changes from paper ballot. In this traditional system there is no danger like hacking. However, security risks can rise if we accept networking including using KIOSKs, telephone or internet connections, PDAs, mobile phones, or other wireless handsets. The National Election Commission claims that it can install provisional ballot booths in a department store, a market, a subway station or a resort for the 18th congressional elections in 2008. Voters can use smart cards for identification purposes. Furthermore, it has a plan to introduce an internet E-voting system which will allow voting through personal computers, PDAs, and mobile phones starting in 19th general election in 2012.

It should be recognized, however, that remote voting involves considerable security risks. The results of a study in the US in which E-voting was used revealed many problems. The most representative study was published in VIP Report Entitled "Is Internet Voting Safe?"[3] It explained many of the difficulties of remote E-voting and pointed out problems such as hacking, bottlenecks, and privacy concerns during the process of personal authentication.

The spread of computer viruses is also getting more serious as the internet becomes more a part of daily life. In the same way there is every probability that voting systems can be invaded externally when we adopt remote voting. We cannot know that a virus has intruded into a computer system and cannot realize the magnitude or implications of the problem until long after the election is over. Remote voting carries similar risks. It is impossible to detect the presence of a hacker immediately; until by the time the hacker is revealed, the vote count seriously altered or ballots miscounted. Furthermore, this will bring about irrevocable results if the number of votes obtained is fabricated with no recognition of a patch program[4]. One of the existing electoral programs is that questions about an error can be addressed. In a E-system, however, distrust of even trivial errors in a ballot count can entirely depreciate the trust of the electoral results itself.

Some experts believe that security defects are no longer technical problems, but this is an opinion which ignores political realities. When financial trading through use of ICT has errors, the victims are revealed, and financial agencies monetarily compensate for their damages. Moreover, an electronic financial system cannot be abolished by only one or two accidents because there are many compensating merits to it. However, in the case of E-voting, it is impossible to clear and correct the errors after they are made. The lack of confidence in electoral results is critical and not comparable with that of private business. Electoral error impedes the legitimacy of political power. In this respect, the question of why we must choose a new voting method having a high possibility of error, demands careful consideration.

The other problem involving security relates to systemic stability. It is difficult to say E-voting has reached a satisfactory level thus far. According to past experiences, several errors have happened frequently due to mechanical defects or limitations. Problems with E-voting also occurred in the American presidential election of 2004. For instance, malfunctioning E-voting machines kept voters from casting votes in New Orleans. In Ohio, 4,000 ballots were unfairly added to Bush's tally because of mechanical defects. And ballots

numbering more than 4,500 were not tallied due to a flaw in a recoding device in North Carolina.

Although miscounting was not such a serious problem in affecting the final results, it shows that there still are problems caused by the mechanical flaws of E-voting. In politics, the value of each ballot can be considered as high as the sum of all the other ballots. In the case of seventeen counties in California, Diebold, the company providing E-voting machines, tried to use a new program, stating that they were upgrading the existing system. The government did not allow this. The Commission on E-voting in Ireland concluded that E-voting in 2004 was not acceptable before sufficient investigation of that problem. In this respect, we can see that a further examination of E-voting should be required.

Another important standard is the accuracy of E-voting. In the US, the rate of invalid ballots in the 2000's presidential election was approximately 1.6 million ballots, which was 1.9% of the valid vote total. Here, it is relevant to consider whether the invalid ballot rate is different, depending on the method of voting. To examine this, variables should be controlled such as level of education, age, income, and ethnic background when comparing with a county which has selected a different voting method for the same election. According to the report of the GAO, the result of voting methods affecting invalid ballots is only 2% after controlling the other variables[5].

A Caltech-MIT report, which analyzed the 2004 U.S. presidential election, found that the rate of invalid ballots decreased to 1.1%. The decrease was prominently found in the counties which had made some electoral reform after the 2000 election and converted to some other type of voting than the lever-using type. As Table 1 indicates, it cannot be said that E-voting significantly decreased the invalid ballot rate. In the 2004 election, there was a reduction of 0.6 % with no change in the voting equipment. In light of this, the pure reduced effect was 0.85% by changing a punch card method to E-voting. On the other hand, there appeared a 0.65 reduction of the rate when converting an optical scan to E-voting. However, the improvements were modest and fell short of expectations. And the results were the same in the analysis of the 2000 election in 2004[6]. After all, E-voting provides no panacea.

Table 1
Change of voting equipment and invalid ballots (comparison of 2000 and 2004)

Voting equipment in 2000	Voting equipment in 2004	Changes of Invalid ballots(%)	The number of Counties/voters(04)
Punch card	DRE	-1.46	76/9.9mil
Optical scan	DRE	-1.26	96/4.1mil
Punch card	Optical scan	-1.12	154/13.5mil
Lever	DRE	-0.79	148/2.7mil
No change of equipment		-0.61	1335/57.2mil

Mechanisms of E-voting

Proponents of E-voting raise their voices based on unproven theories, despite the fact that many political scientists and computer experts point out the insecurity of the new voting method. First, they, particularly the bureaucrats, believe that any new technology will produce better results[7]. Under the Help America Vote Act (HAVA), opinion polls were recently conducted on the best replacement for the punch card voting system. About 54% of the respondents favored Direct Recording Electronic (DRE) voting systems, and 40% were for the optical scan system. Voters also supported E-voting machines: 7.7% of the voters in 1996, 12% in 2000 and 30% in 2004 cast their ballots using DREs. They chose E-voting machines simply out of trust, even without a paper trail. The latest technology is not necessarily the best, given the fact that the most worthy method by far is the standard paper ballot system.

Second, supporters of the DRE think little of its vulnerability. As mentioned earlier, voting is one of the most critical civil rights and therefore even a trivial error during the process can result in a catastrophe. The best way to minimize the possibility of manipulation is to adopt the simplest, most reliable method. True, no system is perfect, but it is also true that the more complex and complicated, the more vulnerable it is. This is because in a complicated system, a problem in one part easily leads to problems in another. This idea is supported by systems theory and natural accident theory.

The US has made efforts to replace lever machines since the 2000 Florida election fiasco. The problem has been that officials in charge of the task have not considered what the most desirable replacement is, but have simply wanted to avoid criticism. They

embraced the DRE without considering whether it is the most accurate or not[8]. As a result, 350 counties employed E-voting machines, and arguably the most accurate, the optical scan system, was adopted by only 154. It was a subjective decision made by officials who just believed that any new technology would bring better benefits. They didn't fully understand the new system's shortcomings.

Third, election officials are likely to have less information than voting machine manufacturers. Much research on internet voting is sponsored by manufacturers. Some are all about advantages of the internet voting system, not about objective, academic assessments. This means that manufacturers are intentionally spreading information about the system's merits to voters, and it is different to make good decisions from general commercials. With fierce competition among manufacturers in the US, Diebold, the largest voting machine manufacturer, hired a former secretary of state as its lobbyist. Election officials and counselors lacking expertise in the ICT sector have negotiated with experts. As a result, they have paid little attention to how perfect the program is, but more to the superficial process of voting and counting.

When it comes to the feasibility test of DREs, it is necessary to consider the possibility of errors and their consequences. To decide whether to adopt a system or not, it is imperative to weigh benefits against costs.

Prob x Fail< Ben.: feasible
Prob: possibility of error
Fail: consequences of error
Ben: benefits

Regardless of the level of perfection, every program needs to be upgraded for improvement. Therefore, it is not fair to rule out the possibility of errors since nearly all software has bugs in it, and if bugs are found, there need to be further changes. The consequences of errors vary from county to country, and they also vary from election to election, according to the extent of each election's importance. For example, the Central Election Committee is careful in introducing E-voting machines for presidential elections, considering the huge consequences of possible errors. They plan to do it at a later time with sufficient experiences.

On the issue of the system's benefits, it is said that DREs are accurate, good for a higher turnout and economically efficient during the process of voting and ballot counting. As seen in the case of the US, however, a dramatic drop of invalid votes should not be expected. And significant cost savings are unlikely to materialize, although the

Central Election Committee announced that E-voting machines could save 24 billion Won. That is because they should take into account machine installment and maintenance costs. According to research findings from Japan, it is estimated that E-voting machines can contribute to cost savings only when they are used in more than 30 rounds of elections[9]. On top of that, those voting machines using software need to be upgraded after every election. According to US estimates, E-voting machines cost every voter between 18 and 25 dollars and their lifespans are about 15 to 20 years. If the estimates are also valid for Korea, the new system is not that economically attractive.

It can also be said that the DRE is a time saver in vote counting. Of course, the early announcement of election results is important, but the new system is not that effective in saving time in ballot counting: it is expected to produce results in 30 minutes after the polls are closed. Regarding counting time, the current situation is not so bad. Whether it is general elections or presidential elections, rough results are available about six hours after elections are finished and the winners are formally announced within twelve hours. Under normal conditions during which there is no pressing issue or political disorder, is saving time for ballot counting critical?

E-voting and the possibility of changes in voter turnout

Although many topics have been discussed so far, how much the turnout rate will increase is the most important issue to be considered for E-voting. Turnout rates in Korea have been continuously decreasing and the National Election Commission is saying that adaptation of E-voting will increase the rate as much as 20 percent. However, several other factors affecting the voting rates must be considered. First, whether the turnout rate in Korea is low compared with that of other democratic nations should be checked. Second, the reason or not, some eligible voters abstain from voting must be found. Next, whether E-voting has increased the voting rate in the countries which have adopted E-voting should be examined. And, finally, if the rate increases after E-voting is adopted, whose vote has contributed to the increase and whether that is plausible or not must be discussed.

Table 2
Turnout rates in Korean Electons
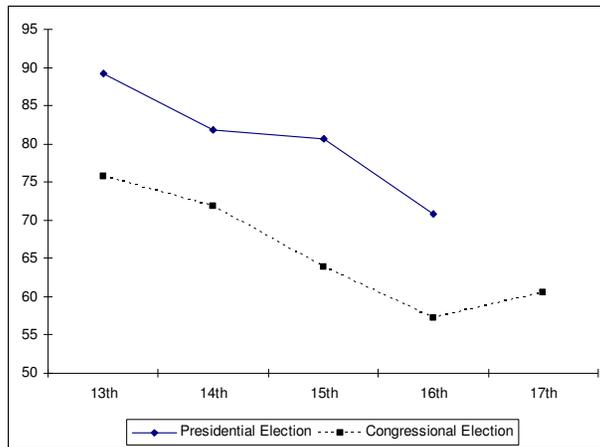
Britain, and Japan have a turnout rate of about 50% and the Philippines and Argentina, which have received a relatively low score on the index of Freedom House, have a high voting rate. Completely free nations in the Freedom House rating have an average rate of 69.1, while the partially free nations have the average voting rate of 58.5%. Korea recently had a voting rate of 70.8% in the most recent national election, which puts it very slightly above the average for all free countries. Consequently, comparing the rate of Korea with that of other nations, one cannot say that turnout rate in Korea is seriously low.

Although there are many explanations for why the voting rate is decreasing in democratic nations, a great number of scholars insist that as different types of political activities have increased, the relative importance of voting has decreased. As people put less trust in national organizations and as civil society develops more, there are ways, beside through a political party, to speak out about one's political concerns. In short, the role of civil organizations becomes greater. As a result, party role declines, which means the influence of the political party is relatively decreasing[10].

Thus a comparison between the turnout rate of almost 90% in the non-democratic age in Korea and the current rate is meaningless. Moreover, it is universally true that as post-materialism is introduced and civil society is extended, voter turnout rates decrease. Of course, this hypothesis is possible only on the assumption that the decrease of

the rate is not caused by factors that can interrupt the voting of ordinary voters or certain groups.

Next, it is important to see why eligible voters abstain from voting. Table 2 shows the reasons for abstention in the United States and Korea. The most common reason for abstention in both countries has been a busy life. What is interesting is that Korea actually makes Election Day a national holiday in consideration of busy Korean voters. Yet, in spite of this, Korean voters, twice more than Americans, respond that they cannot vote because of their busy lives. The second biggest reason for the abstention is simply disinterest in voting and a considerable number of absentees also respond that they did not like any candidate in the election.

Table 3
Reasons for voting abstention, US and Korea (%)

	USA		KOREA	
	1996	2000	1997	2002
Sickness	.5	6		
Being in remote place from voting district	1.5	1.1		
Forgetting	.5	.3		
Not interested	7	3.2	6.1	8.7
Busy	2.1	2.6	0.4	4.6
Traffic problem	.5	.6		
Have no candidates or issues	3.4	.3	3.4	0.3
Other	0.6	1.0	.1	.4

Source: Korea - Korean Election Study Society, USA - Caltech -MIT 2001, 90.

Analyzing the reasons for abstention reveals that more than 40% of the abstainers have no interest in elections, nor any candidate they wanted to vote for. Disinterested, they were likely to abstain from voting even if voting were more convenient. It is also doubtful that E-voting will be effective, since many Korean voters do not vote merely because they are busy. Previous research also has shown that

one's interest in an election is the most important factor in explaining participation or abstention at the polls[11]. The result of this research suggests that a change in voting methods would not be a great help in increasing the voter turnout rate.

Studies done in other countries also provide useful information on the relationship between E-voting and voter turnout. In Japan, E-voting has been adopted for the election of mayors and members of the municipalities since 2002. Voters choose a touch screen type machine which is the most basic level in E-voting systems. Voters do not recognize much difference between a paper ballot and a touch screen because they go to the polls and "mark" on the computer screen in a way similar to their previous use of a paper ballot. Since the cost voters pay for voting using KIOSK is almost the same as the cost of the conventional paper ballot, a much improved turnout rate cannot be expected. In fact, in 7 of 12 elections using KIOSK, the turnout rates were lower than those of the previous elections without KIOSK[12].

E-voting was introduced in order to save time and to provide an accurate count in Australia, which has a preferential vote system. It took 10 days to decide winners with the preferential vote system counting 75,000 transferable ballots in the 1988 election. Therefore, a more convenient and accurate ballot counting method was required. From among several types of E-voting machines, a touch screen type was chosen, one similar to those in Japan. In 2001, E-voting was utilized nationally for the first time, but it wasn't possible to use in all places. Only 8.3% of voters who could use the E-voting system did so in the 2001 election. Even in the 2004 election, only 13.4% of voters preferred to use the E-voting system. Thus, though it was recognized in Australia that E-voting was convenient (86% of actual users), it was considered to be difficult to fully utilize this system[13].

Switzerland also has a positive attitude toward E-voting. For a while and because of geography they used the postal system to transport ballots, but they are now experimenting with a pilot E-voting system. In fact, they have already performed three experimental pilot projects. When we examine internet vote results, performed by four communes in September 2004, the turnout rate was only 1.25% higher than the national average. Moreover, on November 2004, eight communes introduced internet voting and their turnout rate was 2.8% higher than the national rate[14]. In fact, the increase in voter turnout being (less than 3%) is lower than expected.

Since it is difficult to find a case in which E-voting has been done regularly, it is impossible to calculate exactly how much E-voting increases the turnout rate. However, it should be pointed out that if E-

voting is adopted for the convenience of voters, most likely only those who actually have voted in the past, not the abstainers, will choose to vote. If that is true, every voter who chooses E-voting is not a new voter and thus the increase in voting rate, brought by the adoption of E-voting, will possibly be lower than expected.

E-voting and its effects on classified generations

Among the various E-voting systems, the National Election Commission plans to do more than simply change the method of counting ballots. Starting with the 18th general election, they plan to increase the number of districts by four times the present number. So, approximately 50,000 districts will be using a new KIOSK system. In addition, they will introduce a voting method which will allow voters to cast a ballot at any polling place nationwide for greater convenience of voting. Furthermore, starting in 2012 they have an ambitious plan to make it possible to use internet or mobile phones in the polling system.

The purpose of the changeover to this voting system is expected to increase the total turnout rate by raising that of the younger generation. Table 3 displays the fact that the turnout rates of eligible voters in their 20s and 30s do not even reach the national average.

Introducing the remote voting system in order to increase the turnout rate of the younger generation aims to reduce the discrepancy of voters by age. But ahead of this goal, we should examine the reasons behind it. Variation in voter turnout rates according to generations is not only a characteristic of Korea. It is a universal phenomenon found in all countries [15]. Generally, the younger generation has less social responsibility than older citizens and have resistant feelings toward the public social order, thus, they tend to have antipathy against politicians and politics. Accordingly, they have relatively fewer concerns and less attachment to elections. It is doubtful that changing the voting system will persuade them to vote.

Table 4
Voting rate by generations

Classification		20s	30s	40s	50s	over 60
The 16th Presidential Election (12. 19. 2002)	Rate of electors	3.2	5.1	2.4	2.9	6.4
	Rate of voters	8.5	3.9	4.1	5.3	8.2
The 15th Presidential Election (12. 18. 1997)	Rate of electors	6.2	7.6	9.2	2.9	4.1
	Rate of voters	2.2	8.3	0.9	4.3	4.3

The most important voting motivation is whether or not there is a political party, politician, or issue that represents one's own interests. It is highly possible that if an elector intends to support a certain party or candidate, he/she will vote. Table 5 below shows responses to the question of whether voters have a political party and/or candidate who can represent their opinions. Clearly, the rate of the 20s group is low compared with the other groups. This result appears to be the same as in the investigation about voting interest. In the 20s group, the rate of respondents who are interested in voting is 32.8%. This is extraordinarily low in comparison with 43.5% of the total respondents.

In light of this data, young voters do not have special obstacles to voting but have little motivation because they cannot find a candidate who represents their opinions. Moreover, in the groups over 40 experiences in voting may be a motivation for voting in the next election because it is an established habit. But electors in their 20s are more affected by the electoral conditions themselves because they lack experience in voting. So they avoid voting if there are no issues or candidates that engage their interest. This indicates that a change of the voting system is not an efficient way to lead young people to vote.

Table 5
Existing rate of political party and politician speaking by proxy

	Representing party			Representing politicians		
	yes	no	don't know	yes	no	Don't know
20s	16.6	71.1	12.2	15.5	73.5	11.1
30s	23.8	68.3	7.9	23.6	68.8	7.6
40s	23.4	67.4	9.1	22.6	70	7.4

Over 50	25.1	65.1	9.8	19.4	71.2	9.4
Total	22.5	67.8	9.7	20.3	70.9	8.9

Source: Korean Election Study Society

Another concern is whether the ubiquitous E-voting is reasonable technically. It is highly possible to violate some basic principles of voting if various kinds of voting systems are permitted. First, secret voting cannot be maintained. It cannot prevent voters from gathering to cast their votes on their mobile phones at a certain place designated by political parties or civil organizations. In remote voting, the voters can cast their ballots imprudently if they use a PDA or mobile phone in voting. We can easily imagine voting just for fun. Second, it is doubtful whether one of the basic principles of elections, the direct vote, can be sustained. Vote fraud is possible unless there is personal authentication at the voting district. It is easy to imagine a situation such as the selling of votes without appearing in person at a voting place.

In a normative view, some doubt remains whether we have to provide the voters who would not want to wait for a few minutes in line to vote with a more convenient method to vote. One of the functions of elections is to educate democratic citizens. However, it is difficult to do so through E-voting. When internet voting was tried in the 2000 Democratic primary election in the US, the headline in one newspaper, "pajama voting", implied several meanings.

Political Concerns on E-voting
The National Election Commission has announced that it will introduce remote E-voting and extend elections approximately one week. In other countries, the convenience of voting has been promoted by an early voting system. However, for early voting, political stability is essential. In other words, it is possible only under stable conditions. Korea still sees radical changes in politics during elections as when there was the change of political direction involving presidential candidate Mong-Jun Jeong just before the 16th presidential election. In addition, there are always rumors about voting outcomes to confuse voters. In Korea there is a limited duration for campaigning for each election. Considering this, the one-week election is relatively long, raising questions of how to prohibit election activities during this time. Therefore, if early-voting results can be determined by political events, the early voting system can bring further confusion to elections.

Another issue related to E-voting concerns the equality of voting under democracy. The traditional voting method, which is the so-called paper voting, is possible only for one day, and it cannot be fair to compare it with one-week E-voting duration. For example, considering the fact that younger voters prefer the E-voting system, they can take advantage of this during the election. Of course, any voters can decide to use the E-voting system, and in this context, it can be said that E-voting system is for all.   However, if there is a particular group which prefers E-voting systems, it is likely to give them extra benefits.   It also can be a way to mobilize young voters.

One advantage in E-voting is that it can prevent invalid votes. However, at the same time, it should be considered that a voter may want to cast an invalid ballot on purpose.   In America, it was reported that about 30 percent of invalid votes were intentional. Even though there is no formal data in the case of Korea, Table 2 above implies the possibility of intentionally casting invalid votes in Korea.   In this respect, there has been a movement against the introduction of compulsory voting because abstention is also a political expression. Accordingly, the protection of invalid votes under the E-voting system can limit the right to choose.

Especially in local elections, when the four levels of elections are held concurrently, this issue can be worse. Some voters may prefer not to participate in all those local elections such as voting for a member of city government or a local assembly. However, the E-voting system pushes voters to mark all contests. Then, it may need to consider creating a "no nominees I want to vote for" option or an "abstain" option to provide all possible choices in the E-voting system. If there are many votes for these new options, it can deliver a noticeable message. Moreover, these new options can encourage some absentees to participate in voting.

As seen above, the voting environment of Korea has been better than many other democratic nations in terms of timing, access to the polls and voter registration.   If one is concerned that the voting rate tends to decrease in Korea, we should be reminded that the reason is more often because of disappointing politics rather than the voting environment itself. Unfortunately, the 16th general elections desired to change parliament and the 17th elections anticipated the creation of a people's parliament, but they brought disappointment instead. Therefore, it is doubtful that a new voting system can increase voting rates or reduce disappointment in politics unless other changes occur in their political system itself.

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