



COMPUTERIZING ELECTORAL ADMINISTRATION

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COMPUTERIZING ELECTORAL ADMINISTRATION

When one looks at the fundamental nature of electoral administration, it soon becomes evident that the organization of elections has more to do with managing information than it has to do with producing products or providing services.

There is a staggering amount of information to be managed in modern electoral administration. A typical jurisdiction will require its election officials to collect and professionally manage information about each of the citizens who are registered to vote; the addresses at which they reside; the electoral districts and administrative areas they are part of; the sites where they go to get registered; the specific locations where they are permitted to mark and deposit their ballots; the candidates or parties they may choose to cast their vote for; the results of each election at the local, regional and national level; the names and party affiliations of representatives in each newly elected government; a breakdown of the costs of election financing, detailed public disclosures of political party contributions and expenditures as well as the expenses associated with individual candidate's campaigns; and the names and qualifications of each and every election official appointed to assist with the delivery of a particular electoral event.

Election administrators all over the world have to be good at managing information in order to survive at their jobs. All smart managers know that information can be effectively managed in a high tech, low tech or no tech environment. It can also be disastrously mismanaged in each of these environments. The smartest computer managers in both private and public sector organizations around the globe think about effective information management before they think about their information technology. Finding ways to apply information technology in order to be able to more efficiently and more cost-effectively manage information that is critical to an organization's success has become a management challenge that many electoral administrators are facing as computer technology matures and becomes more affordable.

This paper explores some of the issues, options and opportunities that election administrators might consider when they contemplate going from no tech to low tech, low tech to high tech, or possibly even from using no technology for the majority of their information management directly into an environment that applies very high levels of technology to the gathering, processing and maintenance of electoral information.

The tone of the discussion that follows attempts to avoid being overly technical. Information technologists, like all other specialists, devise their own language in order to be able to communicate in succinct terms and develop an aura of sophistication about the work they do. Electoral administrators who voluntarily choose to enter the realm of applied computer technology are frequently surprised to find that they very quickly both use and understand mysterious acronyms such as SQL, GUI and WYSIWYG as well as strange sounding words like

gigabyte, nanosecond, and interoperability.

If advertising claims are to be believed, everything everywhere is being or should soon be computerized in order to make it "faster, better, and cheaper." The unfortunate reality is that the promise of enhanced efficiency, increased reliability and reduced costs do not always hold true in the real world of applying information technology. The experience of most electoral organizations that have computerized could be summed up as "it takes a lot of time to go fast, it takes a lot of energy to make things better, and it costs a lot of money to build things right so that they work when you need them to." Technology is never a panacea; it is always simply a tool. Applying the tool effectively takes patience, determination and careful allocations of monetary investment.

This is not to say that information automation isn't worthwhile or that its benefits shouldn't be actively pursued by electoral administrators. Automation can and has resulted in many electoral agencies taking mere seconds to find information that would otherwise have been buried deep inside their filing cabinets. Automated election organizations have electronically accrued vast amounts of historical information which can be used for improving their administration. Many use their computers to rapidly generate succinct and valuable management reports that simply couldn't be created using manual methods. Senior election administrators who have managed the transition to using computer technology in their operations generally concur that benefits center around the reuse of information from previous electoral events, streamlined research and planning methods, enhanced reporting ability, and cost avoidances that were a direct result of introducing information quality controls. Most will also confess that introducing technology cost more money and took more time than they expected or were told it would.

One of the risks of embracing the process of computerized operations in election administration is that of technical obsolescence. While election administrators may only face one event every four or five years, this amount of time is a small eternity in the rapidly changing world of information technology.

Within the computer industry there is a principle called Moore's Law. It was named after Gordon Moore, who is one of the founders of Intel Corporation. Intel is the company that manufactures central processing chips which appear in the majority of computers which exist today. Moore's Law is frequently cited as the reason that the computer industry is different from every other industry in the history of commerce.

Moore's law simply states this:

Microprocessors get twice as powerful, or twice as cheap, every eighteen months.

What this means is that in ten years the most difficult tasks we see computers performing today will be done at least sixty times faster on machines that will only cost about fifteen per cent of what they do now. Moore's law is said to be the reason that some of the computer giants of a decade ago are now in serious trouble or already obsolete.

How societies will react and what they will do with all the additional computing power that will be available is, as yet, unknown. The futurist Gorge Gilder writes eloquently about his conception of a near-future where the fusion of computer and communication technologies has made them "as mobile as the watch and as personal as a wallet." He argues persuasively that the changes of technology will necessarily lead to massive decentralization of the way organizations operate. If Gilder is right, citizens will be demanding the ability to vote electronically via their very affordable hand-held PDAs (Personal Digital Assistants) within the next decade.

Clearly, the technological revolution will change how election administration operates all around the globe. To permit easy conversion from one generation of technology to the next, systems must be scientifically designed, not merely crafted. They must be built flexibly enough to handle multiple electoral events in rapid succession: by-elections, referendums, general elections, plebiscites, initiatives, and legislative recalls.

In order to be cost-effective, computerized electoral systems will generally need to become more standardized and "scaleable" than most that exist today. Being scaleable means that it is both easy and cost-effective to add computer workstations, processors, network connections and operators to the system.

New election-related information technology systems need to be built to "open" standards. This means that their computing interfaces will allow communication and data exchange that conforms to widely held industry standards, which in themselves are steadily evolving.

The nature of electoral activity will likely always see more information being collected and processed at the time of an event than in between events. This translates into certain challenges with regard to the training and support that must be given to people who operate electoral computer systems during events.

The systems must be fast, simple and robust but also "friendly" because untrained or undertrained people will likely be using them. Electoral systems must have very high levels of availability during electoral events. Many election organizations find that they need to run their systems twenty hours per day, seven days per week during an election.

The standard annual maintenance for most hardware and software systems should be expected to cost between ten and fifteen per cent of the original purchase price. The special levels of

support that are required during electoral events (which may not be held on predictable dates) can cause this figure to rise exponentially. Special product warranties and hardware maintenance agreements are necessary if systems are to be depended on during the crunch of an event; these requirements must be clearly foreseen to be negotiated at cost-effective rates. Support issues should not be underestimated--the lack of experienced and trained people can become the most difficult election administration hurdle to overcome even with the very best technology solutions currently available.

If technology support is to be provided by in-house elections organization staff, there will be a need not only to recruit informatics professionals but also to continually provide for their training so they can acquire the new skills and knowledge they need in order to remain if effective.

Election administrators everywhere are conversant with the concept and practices of contingency planning. Especially in parliamentary democracies, multiple scenarios and alternative plans must be developed to be adequately prepared for the unscheduled timing of electoral events. In the information technology industry contingency planning around computer systems has been given the rather ominous sounding term "disaster recovery planning." Disasters get defined as everything from the power going out to an earthquake destroying a computer site. The most elaborate plans generally involve a secret "hot site" where data backups can be loaded and processing can be fully resumed.

The simplest level of computer contingency planning is to have redundant components. If a piece of hardware fails, having a "hot spare" to replace it while the original is being repaired can save the day or make the difference between meeting or missing a statutory deadline. The rule of thumb many electoral administrators use is that one generally does not want to recover from any more than eight hours of down time and must never be in the position where there is a massive loss of data. All critical data should have backup copies prepared on regular intervals --daily or after each work shift, for example.

Computer systems used for electoral administration create a need for special security procedures as well. Concerned citizens will want to know that voters list information is not being tampered with, that election results are not being modified by "hackers" who have broken through security codes, and that computer viruses are not going to cause software contagion or data corruption. To be successful, an application of technology in election administration must insure absolute confidentiality and security. Security almost always equals controlled access. The computer networks, the software applications, the equipment and the data copies must all have rigidly defined and enforced access controls if they are to be secure. Security conditions must be established in such a way that the actual theft of any component of the overall system will not jeopardize that system's integrity.

Given this myriad of concern and issues, where does an election administrator begin when contemplating the introduction of information technology? An observation of numerous electoral organizations indicates that their systems planning and analysis generally results in the following order of priority in terms of technology application:

- office automation tools (word-processing, spreadsheets, electronic mail etc.)
- voters lists (or a maintained Register of Voters)
- logistical planning
- supply management
- election financing
- voting results
- others

It is almost without question that the best payback on investment in computer technology at present involves the application of off-the-shelf personal computer hardware and software products. The computer industry has standardized much of the setup work associated with hardware installations and greatly improved the speed at which new computer users can productively apply and use powerful and standardized software. Stand-alone machines, which are not connected to each other, end up being powerful little islands of information; this power can be greatly expanded through the introduction of networking. Even very small offices are able to make strong business cases today for the expenditures associated with constructing a Local Area Network (LAN) that connects all the computers in their office to allow communications and sharing of information files. Emerging "shrink-wrap" products that support automated workflow processing and electronic forms usage are further strengthening this equation. However, even the purchases made to start up office automation should be done carefully and in the context of an overall information systems strategy. To do otherwise will likely result in painful data conversions and the necessity of new hardware and software when the LAN needs to be connected to a WAN (Wide Area Network) or the personal computers need to double up as data entry workstations for large data entry applications.

The registration of voters and creation of lists of electors is almost universally found to be the most expensive component of election administration in democracies. There are many approaches to establishing a list of citizens who are eligible to vote, and most jurisdictions use a continuous Register of Electors to manage the challenge. The application of computerized data base technology for a Voters Register is generally an expensive customized solution designed

to meet each jurisdiction's unique requirements. The expense is generally well tolerated because there is no doubt that computers are better suited than humans to the mind-numbing process of sorting names, addresses, polling divisions and electoral district into various types of lists and then printing them consistently, quickly and with verifiable statistical controls.

Logistical planning can be done, to a large extent, with off-the-shelf office automation tools. However, the application of data base technology can tighten the planning process by making use of each event's planning data and comparing it to actual usage. Over the process of several events, the data associated with activities such as deliveries, communications, printing and training can become very sophisticated and support complex and rational decision making with significant cost savings.

Supply management applications frequently evolve from the process of computerizing logistical electoral event planning. Having adequate quantities of the thousands of items that need to be supplied during an election is critical to proper event delivery. Using data base technology to manage the information around inventory stock controls, orders of supply replenishment, allocation and lot distribution as well as returns of unused materials can result in the avoidance of considerable and unnecessary costs.

Elections financing can range from standard financial budgeting, payroll and accounting to elaborate formulas of party and candidate expenditure controls, post-election formula-based reimbursement of expenses, and financial disclosure of standardized information on the contributions made to political parties and candidates as well as the expenditures of parties and candidates during an election. Applications of computer technology will therefore range from the use of standard government financial management systems to sophisticated custom data base applications that can even involve political party auditors being required to provide their reports in standardized machine readable formats.

Computerizing voting results generally works in stages. First, it makes good sense to use automation tools to compile the results of an electoral event in the preparation of official statements of votes. Errors can easily be corrected after proofing, the computers can check the paper-based calculations of polling officials as the results are entered, and electronic publishing standards make printing from a computerized file faster and less expensive than working from conventional camera-ready copy. Secondly, it becomes evident that the entire results publication process could be made faster and more accurate if the results are placed into computer files immediately upon being compiled. In this process, the data entry function is either distributed to local offices who generally use a simple computer system to enter the results on a personal computer program designed for the process, or the results are communicated to a central site where operators key them in as they are received. In either case, the complexities of quickly, accurately and completely gathering all the data to a central location presents major challenges. An established computer communications infrastructure can be used to accommodate such

requirements.

There are a host of other potentially critical applications that can be used to support electoral administration. In a proportional representation system there may be a need for a seat allocation program that takes the raw number of votes that are won by each party and converts them to seats in the legislature. As electoral administrators know, proportional representation rules are generally based on incredibly complex mathematical formulas. Digitized cartography--the making of electronic maps--is a strong area of potential application as is political party registration, the construction of election official profiles, list of officially nominated political candidate, systems to track incidents and events, the monitoring of adjudication and legal challenges, programs that track training and certification, and various asset and site management processes.

Electoral administrators who can start with a "clean slate" in their automation initiatives are, in many ways, at a distinct advantage compared to those that already have an established computing infrastructure in place. Over the past decade there has been a conscious realization on the part of the information technology industry that there is a need to do much more than simply automate existing manual systems, which is analogous to "paving the cowpaths" when building roads. If computerization is to really deliver on the promise of improved efficiencies and the increased productivity of human resources, it has been found, there must first be an elimination of the information barriers between functional areas of an organization. Ironically, this is seen to be easier to do before systems are built than it is after a "stovepipe" computing infrastructure is installed and successfully operating.

The fundamental objective in constructing electoral information systems should be to manage the organizational information so that those who need it have access to it and can easily find it. Building systems with this type of a ground rule requires starting with a blueprint of what is to be contained in a central repository--or warehouse--of all electoral related information. Such an approach assumes that the organization is willing to treat information as an asset that needs to be managed at least as rigorously as it manages its fixed assets and finances. Because they generally need to play multiple roles, most electoral administrators know that data used in one process is frequently needed in another. If that data is to be computerized, plans should focus on having it entered only once and then reused whenever it is needed. Clearly such data must be updated when it gets out of date, and it is not difficult to add a requirement that systems have an electronic audit trail so that mistakes can be traced and reversed when they happen.

One of the keys to "integrating" administrative systems and breaking down the barriers of information usage between organization groups is to define common data definitions. What exactly is a poll? A candidate? A district? A vote? Standardizing the understanding of what each of these and other election elements are can be very time-consuming, but it will ultimately provide for much higher quality information systems if the time is invested in doing it

thoroughly. Election information systems analysis has been observed to generally devolve into four abstract classes or "objects" of information: persons, events, locations and things. Establishing what data elements belong in which class of information, and then defining what the relationship is between the classes and their elements is what building the blueprint for an integrated elections management system is all about.

While defining the blueprint for information management, it is frequently useful to consider how aspects of the electoral process could be re-engineered to be more streamlined, more cost-effective, and better establish administrative controls while providing improved service levels to the electorate. This process is most effective when senior managers allow their support staff to question why things have to be done a particular way. By necessity, this may result in questioning the very statutes governing the electoral process and in suggestions about how they could be improved.

This, in a nutshell, is what the "business process re-engineering" revolution is about that is reportedly transforming government operations around the world. It has been found that assuming technology to be part of the processes being considered can open avenues to dramatically improve performance in areas of cost, quality and the time associated with each process cycle. Much of the focus in re-engineering has to be on the business process, but it is important to remember that by its nature re-engineering is people oriented. It will change people's jobs, careers and the way they relate to each other. Done well it will provide employees opportunities to develop their competencies and enhance their careers; done poorly it can have disastrous results. The management challenge associated with making organizations active and successful components of the information age is to create a positive work environment while living with constant change.

Active consideration should be given to establishing partnerships between electoral agencies facing similar information management challenges. There is the potential to save much time and money if electoral administration organizations share software solutions, computer hardware, training programs, technology experiences and even staff. Being effective in such sharing arrangement requires an institutionalization of accepted best management practices and agreement on minimum standards and shared procedures. This can only be undertaken in an organizational framework within which communications and agreements can be made effectively and cooperatively.

Most electoral organizations are part of an overall government infrastructure. This makes partnerships with other government agencies another potential avenue to achieving cost-effective success in technology ventures. Some governments will have central computing services available, and others will have a general strategy with regards to the application of technology and computing communications. Working with other government components will raise security, technical and standards issues which must be resolved early to make progress.

Government organizations all over the world are making significant transformations through partnerships with private sector firms. Such "strategic alliances" have allowed some organizations to build multi-disciplined teams made up of the "best and the brightest" from government and industry. To be successful alliances of this type need to be carefully designed, implemented and immediately repaired when they start to fail. The largest obstacles to success are frequently found in the difference of working culture between public and private sector groups and issues such as risk sharing, collaborative decision-making and "fair" pricing.

Another method some electoral organizations have chosen is to simply "outsource" their technology management aspects to a systems integration firm through a competitive process. Successful models generally have a very strong information technology management component in the election organization that acts to balance the dynamics of relations and expectations between users and the systems integrator. One reported advantage of such an arrangement is the flexibility a systems integrator has in adopting better solutions made available as a result of fast changing technology.

In summation, it is important that electoral administrators are careful to manage expectations, timing and costs associated with automating their information management.

Expectations will always be generated by humans, not computers. These expectations should be documented in a succinct strategic plan that sets out the priorities, timeframes and measurements of success that are to be associated with introducing automated systems. Large dividends will be paid from remembering that people are ultimately the key factors in successful information management and that they must ultimately "own" the technology solutions that are created. To this end, training of electoral support staff in general technology education and specific software usage should be viewed as an investment, rather than as an optional expense.

Good information technology systems require time: time for planning, for designing, for building, for testing, for training, for implementing, and for supporting. Prudent administrators should not be afraid to insist on proof-of-concept pilot projects, prototype production systems and phased-in implementation of election applications. It is important to remember that the information technology industry is still in its infancy; its track record on the successful delivery of large systems is not stellar--success is seen to be more easily achieved in small steps than giant leaps.

The costs associated with introducing information technology as a way of more professionally managing electoral information can be tremendous. The costs of taking risks with applying computer technology can be even greater. Avoiding the information revolution could prove to be the costliest option of all. Rational planning processes require that the costs of computerizing electoral administration be managed at a macroscopic level and on the basis of reducing overall expenditures for election administration.