

Information Technology and Economic Development Practice:

OPPORTUNITY OR OVERLOAD?

By: Paul Parker, Bob Sharpe and Tod Rutherford

"(I)nformation resources now power the economy in the Information Age. To succeed in the 1980s and beyond, your organization must recognize the strategic dimensions of its information sources, services and systems."

Burk and Horton 1988 p. 1.

Over the past decade information technology has played an increasingly important role in the operations of Economic Development Professionals (EDPs) in Ontario. The use of computers, software and telecommunications promises to have a profound impact on these operations in terms of increased productivity, analysis of data, presentation of results and the computer networking of economic development offices. However, it is also possible that the EDP may be overwhelmed by the data made available by this technology and thus the potential benefits of computers and other techniques may go unrealized. This study presents the results of a survey of EDPs in Ontario on the use of information technology. Despite a high level of adoption we find that not only are there significant differences in information technology usage between large (over 25,000) and small (under 25,000) communities but the time and task allocation associated with information technology usage within economic development offices varies considerably. Furthermore, computer use has focused more on data base development and increased productivity and efficiency and less on the analytical and networking potential of this technology.

Introduction

The information age is upon us. Each day we read or hear how information and information technology are being used to change our economy and our jobs (Antilla 1992; Burk and Horton 1988). The

economy is considered to be increasingly information intensive. The implication is that labour intensive and land intensive industries and jobs are being replaced by those that incorporate more information in their product or service. EDPs witness these changes both in their local economy and in their own profession (Darragh 1990).

EDPs have been called information brokers (Bryant 1987). They collect, analyze and disseminate information from many sources for many clients or user groups. This information role can be divided into two major components. The first is to collect local information and provide it to local and external clients. The second is to select and summarize information from the external environment which is important to set the context for local economic development initiatives. In each case, the EDP provides a specialised information service and is potentially aided by increasingly sophisticated information technology.

Information technology is a term commonly used to describe the combined use of computers, software and telecommunications and the integration of various information media including voice, text, data and images. In recent years, computer-based data, statistical analysis and information technologies have become more readily available and more extensively used. To some professionals this trend represents new opportunities to increase productivity and efficiency and to reduce costs. It also has the potential to improve the quality and flexibility of information services offered



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through improved analytical abilities, enhanced presentations and extended communications networks. As one EDP stated:



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through improved analytical abilities, enhanced presentations and extended communications networks. As one EDP stated:

"Those with the best computer information systems shall have the advantage. The computer allows quick and accurate dissemination, analysis and use of that information."

To other EDPs, the need to learn new in-

formation technology skills, and to cope with the quantity of information generated, is perceived as overload or beyond the capacity of limited staff resources. As the EDP of one small community stated:

"As a one Senior Officer department, it is difficult to find sufficient time to use computers let alone know what one is doing with it."

However, even in larger centres, new technology could fail to live up to expectations:

"Somehow we have not fully realized their potential."

In addition, key ideas can be buried under too many details, or unrelated information. Despite the quantity of information made available, it may not include important qualitative or political considerations.

To gain insights into the role of information technology and the current provision of economic development information services in Ontario, a series of questions can be posed: How important is information to the performance of key economic development tasks? Where is information about the local or national economy obtained? What information technology is being used? How much time is spent using information technology? How is the information used? Is the experience similar among different types of offices? What changes are needed and what can be expected in the future?

This paper seeks to answer some of these questions by presenting selected results from a 1993 survey of EDPs in Ontario. The results confirm the important role of information technology in Economic Development Offices throughout Ontario. However, the experience is not universal, so a contrast is made between the experience of EDPs in 27 small centres (0-25,000 population) and those in 36 larger centres (over 25,000 population).

Method

A team of researchers (P. Parker, T. Rutherford, and B. Sharpe) and graduate students (D. Blacklock, B. Dufault, D. Kershaw and C. Langstaff) from the Local Economic Development program at the University of Waterloo designed and tested a survey to provide quantitative and qualitative insights into the changing role of information and information technology in economic development offices. The survey was designed to expand upon and extend the results of earlier annual surveys conducted by the Economic Developers Coun-

cil of Ontario (EDCO). The EDCO executive supported the survey and provided a membership list which served as the basis for the selection of one member from each of 153 municipalities where EDCO members worked. The survey was mailed to each of these 153 EDPs in March 1993. By June 1993, 64 questionnaires had been returned for a response rate of 42%. Most of the questions were completed fully with thoughtful comments added in the open ended questions.

The responses are assumed to be representative of the population of 153 municipal organisations with EDCO members. However, it must be recognized that economic development activity is conducted by a wider group of municipalities as indicated by the 297 municipalities which report expenditure on commercial and industrial development activities in their annual financial returns to the Ministry of Municipal Affairs (MMA 1993).

The survey responses were coded and entered into a computer data base. Statistical analysis was then undertaken to gain insights into the importance attached to information, the sources of information, current and future information needs, the types of hardware and software used, the time allocated to computer activities, and the types of analysis undertaken either in house or in conjunction with other agencies. The written comments of EDPs were used to identify the objectives for and the achievements of the introduction of information technology into Economic Development Offices. The classification of these objectives required some interpretation when respondents argued for more than one objective or outcome. In these cases, the classification reflects the emphasis of the response.

The Importance of Information (Table 1)

Respondents were asked to indicate the importance they attached to computer-based data and statistical analysis in nine of their routine tasks. The importance of computer-based data and statistical analysis was rated on a five point scale for each task and a ratio calculated of those who considered computer-based information to be of low importance (response of 1 or 2) and those who considered it to be of high importance (response of 4 or 5). In all cases,

Table 1:
The importance of computer-based information

<i>Task</i>	<i>ratio of low : high importance</i>
Strategic Economic Planning	1 : 9.3
Economic Forecasting	1 : 4.6
Marketing Strategies	1 : 4.1
Annual Reviews	1 : 1.6
Program Development	1 : 1.4
Policy Development	1 : 1.0
Performance Evaluation	1 : 0.5
Community Programs	1 : 0.5
Daily Decision Making	1 : 0.3

opinions varied with some respondents considering computer-based information to be of low importance while others considered it to be of high importance. The ratio between those giving it a low or high ranking varied with the task under consideration.

Strategic Economic Planning (SEP) was the task where computer-based information was valued most highly with nine respondents rating it high for each one that rated it low. This high value placed on computer-assisted SEP can be interpreted as a desire to improve the quality of information and analysis involved in the SEP process. Economic forecasts and marketing strategies were also seen as tasks where EDPs placed a high value on computer-based analysis. In these cases, computers may improve productivity with faster and easier production of forecasts and support materials for marketing strategies. Opinions were more closely divided when rating the importance of information for annual reviews and program development. An equal number of EDPs placed a low and high importance on information for policy development.

In contrast to the six tasks where an equal or larger number of EDPs gave computer-based information a high importance, there were three tasks where the reverse was the case. A high rating of information importance was given by one-half as many EDPs as those which gave it a low rating for performance evaluation and community programs. Similarly, daily decision making was considered to be least dependent upon computer based information.

Overall, 68% of EDPs responded that statistical analysis influenced their economic development efforts. In general, greater importance was placed on computer-based data and analysis in larger centres. However, 95% of respondents fore-

saw a future for statistical analysis in the field of economic development. Given this important role, where do EDPs find information to support their data-intensive efforts?

Sources of Information (Table 2)

A wide range of information sources are available to support economic development activities. EDPs were asked to indicate which sources they used for local/regional information to support their local information role. In addition, they were asked to identify the sources they used for national/international information to support their role as a supplier of external information

Table 2: Sources of local and national information

Local (% of respondents)		National	
newspapers	(81)	newspapers	(66)
census	(76)	business pub.	(63)
municipal pub.	(51)	federal pub.	(61)
provincial pub.	(49)	trade assoc. reports	(53)
newsletters	(46)	books	(44)
computer data bases	(46)	census	(42)
Stats Can (non-census)	(42)	newsletters	(39)
federal pub.	(34)	provincial pub.	(39)
business pub.	(29)	bank reports	(34)
trade assoc. reports	(24)	Stats Can (non-census)	(25)
books	(22)	other	(25)
other	(22)	computer data bases	(15)
bank reports	(14)	municipal pub.	(12)

note: n = 59

to support local initiatives.

In general, EDPs rely upon many sources for local and national information. Newspapers are the most widely used source. The population census is the second most used source while municipal and provincial publications are used by one-half of the EDPs for local and regional information. In contrast, business periodicals and federal publications are usually examined to gain national and international information.

This broad range of information sources is not used equally in all economic development offices of both small and large centres. Local information was much more likely to come from municipal publications in large centres (63%) than in small centres (37%). In part, this reflects the more limited resources of small centres to produce such material. An even bigger difference was found when the role of computer

data bases was considered. Local information was derived from computer data bases in 66% of the large centres, but only 22% of the small centres. This finding will be reinforced by the differences found in the analytical capability of many smaller offices.

Federal and provincial publications were also much more important as sources of national information in large centres (75% and 50%, respectively) than in small centres (44% and 26%, respectively). Similarly, bank reports were used twice as often in large centres (44% of respondents) as in small centres (22%). These differences may reflect differences in financial resources to acquire desired material as well as differences in the awareness of material

available and the evaluation of its relevance to local office activities. Clearly EDPs need to monitor many sources of information to fulfil their role as providers of both internal and external information.

In the case of local information, most economic development offices monitor many variables on a regular basis. Community profiles often contain information on over 100 local

variables. In many cases, the same variables are monitored at least annually by EDPs in over 80% of the small and large centres (Table 3). In other cases, differences arose in the selection of variables to be monitored annually.

Over 80% of economic development offices monitor population, building activity, unemployment, business start-up and tax base data at least annually. Within this group, EDPs in small centres tend to pay more attention to population change, unemployment rates and business start-ups while EDPs in large centres tend to monitor building permits and tax base. Detailed employment variables and demographic variables tend to be monitored more frequently in large centres. In contrast,

Table 3: Selected variables monitored annually.

Variable	Small centres (% of respondents)	Large centres (% of respondents)
population change	100	81
building permits	85	91
unemployment rate	92	84
business start-ups	88	84
tax base	81	84
employment by type	69	81
employment by sector	54	78
skill levels	65	56
household size	38	53
participation rates	31	38
unionization level	23	38

note: n = 26 for small centres and 32 for large centres

smaller centres paid greater attention to skill levels, perhaps reflecting concerns about the availability of education and training to enhance the skills of the local labour force.

Current and Future Influence of Information Technology (Table 4 and 5)

An interesting dichotomy was noted between the current influence of computers on EDP development efforts and their anticipated future use. When asked about their current influence, most EDPs placed priority on increased productivity and cost reduction rather than increased quality and flexibility. Overall, 43% identified productivity gains as the most significant while only 11% introduced new technology primarily to increase quality and flexibility. After increased efficiency, the next most

Table 4: Influence of computers on EDP development efforts

Variable	Small centres (% of respondents)	Large centres (% of respondents)
increase efficiency	45	41
increase quality and flexibility	10	12
increase quality and efficiency	7	10
increased data base and analytic capabilities	7	29
other	31	9

note: n = 29 for small centres and 34 for large centres

Table 5: Future Impact of Computers on Economic Development

Variable	Small Centres	Large Centres
	(% of respondents)	
Networking	35	32
Increased Efficiency	7	9
Increased Analytical Capability	10	6
Data Base Development	31	32
GIS	0	12
N/A Other	29	9

note: n = 29 for small centres and 34 for large centres

significant influences computers were having on EDPs was to increase their data base and analytical capabilities (19%). However, data base development was viewed as the most important component of this category. Only two respondents (3%) identified new technology as improving the analytical ability of the EDP. This emphasis on speed and efficiency is made clear in the following quotes:

"We can access information quickly for proposals, statistics, industrial site catalogues and manufacturers directories. Speed in gathering information is important."

"Made it easier- speeded it up - allowed spread of information - cut down on production time - saved money."

In contrast, other responses emphasised the improved quality and flexibility offered by computers. They focused on the improvement of the EDP image through the more professional presentation of data. In the opinion of these respondents, new technology made:

"More professional correspondence and information presentation."

In addition, there were some differences in the influence of information technology according to size of the community. In terms of the use of computers to increase efficiency, there was relatively little difference between large and small communities. However, large communities were much more likely to use computers to increase their data base and analytic capabilities than small centres (29% versus 7%).

In contrast, when EDPs were asked to assess the future influence of computers there was a significant shift in responses. Only about 8% of respondents thought that the main impact of future computer use would be to increase efficiency. More important was the perceived qualitative advantages offered by computers in terms of

networking with other EDPs (33%) and increased data base capabilities (32%). These views were shared almost equally by EDPs in large and small communities. In contrast, the future use of computers for explicitly analytical purposes was identified by only 8% of respondents. Future adoption of GIS applications was the least common response (6% overall) and was concentrated exclusively in communities over 25,000. The networking capabilities of information technology

came out strongly in the comments of respondents. An emphasis was placed not only on EDPs accessing information from each other, but also from firms and other levels of government by utilizing E-mail and modems. As two EDPs pointed out, information technology would allow:

"Improved access to information for industry representation at the Provincial and Federal level. More information at our fingertips will allow us to improve our proposals."

"More linkages ... provincial - municipality and municipality - municipality networking."

Information technology (Table 6)

Table 6: Types of computers and software used

Type	Small centres	Large centres
	(% of respondents)	
hardware		
IBM compatible	92	100
Macintosh	8	0
Unix	4	3
software		
word-processing	100	100
data base	88	71
spreadsheets	73	71
desktop publishing	50	49
IPLS	23	54
graphics	19	54
E-mail	23	37
statistics	19	26
GIS	4	14

note: n = 26 for small centres and 35 for large centres

The dominant type of computer used in economic development offices is an IBM compatible with a 286, 386 or 486 micro-processor. IBM compatible machines were

reported in all 26 of the offices in larger centres which identified the type of their computers and in 92% of the offices in smaller centres. The larger offices had an average of 4.9 machines each, while the smaller offices averaged 2.2 machines. Two of the smaller offices reported having Macintosh computers while one of the smaller offices had a Unix system. One large office reported a Unix machine in addition to 6 IBM compatibles. The clear dominance of one type of computer should facilitate the transfer of programs, specialised templates and files between offices and EDPs.

One way to transfer files and data is by using the telecommunications network and many offices have modems to facilitate direct electronic interaction. Most small offices (62%) reported having modems while only 29% of their larger counterparts reported these devices. This could imply that smaller offices were using electronic data exchange more extensively. However, when asked about the use of E-mail, only 23% of the smaller offices reported using it while 37% of the larger offices used this form of network. Similarly, the provincial Industrial Property Listing Service (IPLS) was used much more extensively by offices in larger centres (54%) than by their smaller counterparts (23%). While most smaller offices have the hardware to participate in electronic networks, their participation rate remains lower than that in larger offices. This could reflect time and resource constraints in the office or the recent acquisition of such technology.

Respondents were asked how long computers had been used in the office for more than word processing purposes. The small offices were more likely (22%) to have started a variety of computer based operations within the last year than larger offices (6%). Conversely, the larger offices (34%) were twice as likely as small offices (15%) to have had diverse uses in operation for over five years.

Having acquired the hardware and software, it is interesting to learn what proportion of time is spent on computer-based tasks, and what types of analysis were being undertaken in economic development offices.

Time Allocation (Table 7)

The amount of time spent on computer related tasks may vary with the position held in an economic development office.

Table 7: Time allocation by position

Activity	Small centre		
	support	junior	senior
	% of time		
non-computer activity	24	22	77
word processing	46	23	10
data base	8	17	3
spreadsheet	5	10	8
statistical package	3	13	1
other	11	13	4

Activity	Large centre		
	support	junior	senior
	% of time		
non-computer activity	17	34	78
word processing	63	21	11
data base	10	23	6
spreadsheet	3	12	4
statistical package	2	2	0
other	3	1	3

note: n = 21 for small centres and 24 for large centres

Three general types of positions (senior EDP, junior EDP and support staff) were identified and the percentage of time allocated to different types of computer activities estimated. A comparison was also made between the time allocations in offices in small centres (less than 25,000 population) and those in larger centres.

A clear correlation emerged between the amount of time spent on different activities and the position held in the office. Senior EDPs spent three-quarters of their time on non-computer activities. In contrast, support staff spent over three-quarters of their time on computer activities with word processing being the largest single activity. Junior EDPs spent more time doing data base and spreadsheet work than other colleagues. In the smaller centres, junior EDPs also spent a significant amount of time using statistical packages or other software like accounting or desktop publishing packages. In general, junior EDPs divided their time more evenly among various computer activities than other colleagues.

Despite the specialised positions and associated time allocations within the office, it is noteworthy that each type of position typically involved some time on each type of activity. This implies that each employee should be familiar with the operation of the various computer packages. However, the use of a package by all members of an office, does not imply that all members are doing the same job. For example, all three

types of workers might work with spreadsheet or data base packages in an office, but the support person could be doing data entry, while the junior EDP conducts most of the analysis and the senior EDP considers more detailed scenarios or specialised questions. Each task uses different skills and specialisation despite the use of a common package.

The specialisation of activities can be more striking than that implied by the average figures presented above. For example, senior EDPs in small centres spent an average of 8 % of their time using spreadsheets, but one-half of this group spent no time on this activity. The remaining senior EDPs averaged 16 % of their time using spreadsheets. Different allocations of time arise in different settings.

Given that most employees in economic development offices will spend over half of their time on computer based activities, attention needs to be paid to the acquisition and transfer of computer skills. Individuals need the skills to effectively carry out their task, but communication also needs to be effective to ensure that all three types of employees are able to contribute to the efficient provision of information services. Indeed, as one respondent said, in the near future the typical Economic Development Office will be:

"Highly automated in terms of all staff will need to use PCs and software like word perfect and graphics packages - this will be a staff hiring requirement!"

Types of Analysis Undertaken (Table 8)

Many types of analysis are undertaken by EDPs as part of their information service. Rather than simply redistribute raw data, an important part of EDP information services is the interpretation of the data. Some of these interpretive and analytical tasks are being undertaken in conjunction with other municipal departments, with consultants or with provincial and federal government partners. Computers are frequently used as a means to enhance the analytical capacity within offices. One of the most common types of analysis identi-

Table 8: Economic base analysis

By whom?	Small centre	Large centre
	(% of respondents)	
not done	16	10
Econ. Dev. Department	72	76
other department	12	7
consultants	16	3
fed./prov. government	24	7
manually	20	3
computer	8	21

note: n = 25 for small centres and 29 for large centres
note: multiple responses were given in many cases

fied was economic base analysis.

Over 80% of the respondents to this question undertook economic base analysis. In three-quarters of the cases, the analysis was undertaken by the Economic Development Department. In 10-15% of the cases, the analysis was independently completed by a consultant or another department, more frequently it was through their combined efforts. This practice of combined analysis was particularly common among the offices in small centres. In some cases, this reflects the limited resources in smaller offices and the appropriate use of specialists to assist with particular tasks.

Similarly, economic base analysis was usually done by using a combination of computers and manual techniques. However, offices in large centres were more likely to specialise in the use of computers only while those in smaller offices were more likely to use manual techniques only. This pattern is consistent with the more recent introduction of computers for more than word processing tasks in some small offices.

Conclusion

The survey findings confirm the expected general trend of increased acquisition and use of information technology by EDPs in Ontario. The implication is that the extension of information technology into economic development offices was largely achieved by the early 1990s. Nevertheless, the full potential of information technology in economic development has yet to be realised. At present the most extensive use is for word-processing tasks which are undertaken by support staff.

Similar types of hardware have been adopted in most offices. This should facilitate information sharing through the transfer of data, files and skills among offices. Such common standards are particularly

noteworthy given fairly widespread usage and value of such data sources as the Industrial Property Listing Service. This suggests that future consideration should be given to increased access to central data bases.

Furthermore it was noted that most information comes largely from non-computer sources. This raises issues about the efficiency of current means of data input and suggests that consideration be given to more efficient technologies for data entry and data sharing. However, the use of general purpose software provides less than ideal results and many EDPs await the

promised user friendly software to meet their more detailed and specific requirements. Similarly, the promise of accurate, appropriate and usable data remains to be fulfilled. There is a need to clearly identify the priority information needs of EDPs and the appropriate analytical skills required. Given systematic differences in the use of computers by senior, junior, and support staff, there is a need to clearly identify the appropriate skills and training required for each of these positions.

The survey findings indicate that the experience with information technology is not universal between EDPs in large centres

and small centres. In general, large centres have more fully adopted information technology and integrated it into their operations. These differences mostly reflect the greater resources and earlier acquisition of computers in the larger centres. However, some small centres have also been very innovative and effective in the use of information systems. Do these differences imply that larger centres, and those with superior information systems, will have a permanent advantage over smaller have-not centres? The challenge to use information technology to your future advantage has been issued as a product of global transformation and professional evolution. □

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