

SMALL TOWNS, SMALL COMPUTERS...BIG DECISIONS?
THE INTRODUCTION AND USE OF MICROCOMPUTERS IN SMALL TOWNS

by

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B.A., Hampshire College
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PAUL BOCKELMAN

Submitted to the Department of Urban Studies and Planning,
Massachusetts Institute of Technology
on May 27, 1986 in partial fulfillment of the requirements for the
Degree of Master of City Planning

ABSTRACT

This study looks at the introduction and use of microcomputers in seven small towns in western Massachusetts. Microcomputers are introduced into small towns along traditional paths of technological innovation, depending on a 'champion' to initiate and carry through acquisition. One reason towns purchase microcomputers is the non-rational desire to 'move into the computer age'. Microcomputers are primarily used for the routine chores of town accountants and town clerks.

I argue that the state's policy of encouraging computerization by providing funds for feasibility studies is inefficient and inappropriate for microcomputer technology.

Thesis Advisor: Dr. Joseph Ferreira

Title: Professor of Public Management
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My two years at M.I.T. have been made very special by my friends in the department. We always worked hard at being political and having fun...and managed to think some pretty interesting thoughts in the process.

A special salute to my nocturnal friends in the computer room kept me awake and tap, tap, tapping into many a night.

Ellen Tohn and I literally ran through many of my ideas and Eric Brown was there when I needed to slow down.

Finally, most of these ideas were discussed at length with Cathy Barber. I am incredibly grateful for her unquestioning love and support.

This thesis is dedicated to Whoosh-Woo, who should have been on my lap but who was so brave.

This is the first MCP thesis typed entirely using WordPerfect. It has 90,943 bytes.

INTRODUCTION

There is a new worker taking up residence in town halls across Massachusetts. This worker is tireless - always ready to work and at a low wage; flexible - willing and capable of helping out in every town department; and friendly - responsive to every query from a fellow worker.

At the same time, this worker is a stranger to most of its fellow workers. And although it follows instructions to the letter, sometimes to the point of frustration, it demands constant attention from its supervisor - it won't do a thing without an explicit command.

This worker is a microcomputer.

Small towns throughout the Commonwealth are discovering that computerizing their operations is now within their financial reach. A complete microcomputer set-up with printer can be had for as little as \$2,000. Software to carry out most town operations costs another \$1,000. And the payoffs are lucrative. Towns are writing success stories documenting \$3,000 savings in the first year of operations alone.

As small towns take these initial steps into the computer age, we are able to observe how towns acquire computers and how they actually use them in their day-to-day operations. In this paper, I look at the phenomenon of small towns purchasing small computers. I ask why now; what is different about small computers and small towns and the general environment that has caused this rush to computerization? I also ask how towns use this technology; are they using it just to automate routine tasks or are they using more creatively to improve decision-making.

I use personal observation, interviews with five data processing/

microcomputer consultants, and interviews with officials from seven towns to explore the nuances of microcomputer use. The towns are all located in central and western Massachusetts with populations under 8,000, ranging from Middlefield with a population of 385 to Monson with a population of 7,315. This range represents over half of the local governments in Massachusetts.

The paper is organized into three sections. The first section looks at how microcomputers are introduced into small towns. I describe the web of environmental factors that affect a town's decision to computerize. I then review theories of how computers have traditionally found their way into government operations. I use these theories to discuss how small towns have obtained microcomputers and ask if they have followed the traditional paths of technological innovation.

In the second section, I look at uses of microcomputers in small towns. First, I examine the administrative functions of a town and how the towns have used their microcomputers in each of these functional areas. I examine what functions the towns have computerized and what they haven't and discuss the effects on the towns of computerizing.

In the conclusion of the paper, I discuss two broader questions related to the introduction and use of microcomputers:

1. How does the state affect how and what towns computerize, and;
2. Given their current use in small towns, can microcomputers play a role in decision-making by public managers and citizen boards.

BACKGROUND ON CASES

In my research, I interviewed officials in seven towns that had bought or were about to buy microcomputers. Since the towns had only acquired microcomputers in the last six months, their experiences are instructive to

understanding why they bought them and how they initially use them. In this section, I will give a brief overview or thumbnail sketch of each town's experience. (See also Table One on page 8.)

BRIMFIELD (Population 2,318) - Brimfield bought a MacIntosh with an external disk drive (and are considering a hard disk for the town clerk's needs). It was the only town to buy a MacIntosh. They had a computer study committee in operation for several years prior to purchasing it.

They bought MacWrite for word processing, MacPaint for graphics, Excell for spreadsheet analysis, and PFS File for data base management. They anticipate purchasing Ready, Set, Go or Page Maker for further graphics work. Currently, the town clerk, tax collector, finance committee, board of selectmen, and circuit rider use the machine.

The computer is in the circuit rider's¹ office about 50% of the time, which is also where the boards and committees meet. The rest of the time, department heads take it to their offices or homes to work on it there. One of the reasons they bought a MacIntosh was for its portability. The main impetus for purchasing a computer was that it would make town officials, who are paid a stipend, more efficient by taking some of the drudgery out of their time spent on town affairs. Instead, they would now be able to do more work to meet town needs in the same amount of time.

BUCKLAND (Population 1,864) - Buckland has had a computer, a Radio Shack Model 2, for two years -- but never figured out how to really use it. Three years ago a computer study committee was established to develop a better bookkeeping system

¹ Circuit Riders are professional administrators that work in several different towns. They are funded by a four year, declining percentage grant from the Executive Office of Communities and Development.

T A B L E O N E

	<u>BRIMFIELD</u>	<u>BUCKLAND</u>	<u>ERVING</u>	<u>HATFIELD</u>
POPULATION	2,318	1,864	1,326	3,045
HARDWARE	<ul style="list-style-type: none"> ✧ Apple MacIntosh with external disk drive 	<ul style="list-style-type: none"> ✧ Currently, Radio Shack Model 2 ✧ Awaiting delivery of IBM-AT 	<ul style="list-style-type: none"> ✧ 2 IBM-XTs 	<ul style="list-style-type: none"> ✧ Currently, an Apple IIE ✧ About to purchase 3 IBM-ATs
SOFTWARE	<ul style="list-style-type: none"> ✧ MacWrite for word proc. ✧ MacPaint for graphics ✧ Excell for spreadsheet ✧ Page-maker for graphics ✧ PFS File for data mgt. 	<ul style="list-style-type: none"> ✧ Radio Shack: business software ✧ IBM-AT: town clerk package ✧ IBM-AT: town acct. package ✧ IBM-AT: word proc. unchosen 	<ul style="list-style-type: none"> ✧ Wordstar for word proc. ✧ Lotus 1-2-3 for spreadsheet ✧ DBaseIII for data mgt. ✧ Future purchases include clerk, town and school budget packages 	<ul style="list-style-type: none"> ✧ Apple software for word processing, spreadsheet, file keeping ✧ None purchased to date for IBM-ATs
LOCATION OF COMPUTER	<ul style="list-style-type: none"> ✧ Portable, but kept in circuit rider's office 50% of the time 	<ul style="list-style-type: none"> ✧ Separate, air-conditioned room 	<ul style="list-style-type: none"> ✧ One in Accountant/Clerk's office ✧ One in Collector's office 	<ul style="list-style-type: none"> ✧ Shared town office
USERS/USES	<ul style="list-style-type: none"> ✧ Circuit Rider: word proc., graphics, spreadsheet, data ✧ Town Clerk: word processing, spreadsheet ✧ Tax Collector: word proc. ✧ Secretary to Selectmen: word processing 	<ul style="list-style-type: none"> ✧ Assessors: data base ✧ Hired staff person with comp. experience to operate AT - but all town workers will learn 	<ul style="list-style-type: none"> ✧ Circuit Rider: word proc. ✧ Town Clerk: data management ✧ Accountant: spreadsheet ✧ Tax Collector: spreadsheet 	<ul style="list-style-type: none"> ✧ Assistant Assessor: data management ✧ Administrative Assistant: word processing
REASONS FOR COMPUTERIZING	<ul style="list-style-type: none"> ✧ Make elected officials efficient allowing them to do more ✧ Make general town operations better run 	<ul style="list-style-type: none"> ✧ Better bookkeeping so Sel. can get more up-to-date info. ✧ Reduce paperwork by elected officials 	<ul style="list-style-type: none"> ✧ Had money available ✧ EOCD funded study ✧ Town officials interested ✧ School union suggested sharing one ✧ Town staff wanted to enter the computer age 	<ul style="list-style-type: none"> ✧ Wanted more up-to-date info. ✧ Computer donated ✧ Save money spent on service bureaus ✧ EOCD funded study

TABLE 1

00

	<u>HEATH</u>	<u>MIDDLEFIELD</u>	<u>MONSON</u>
POPULATION	482	385	7,315
HARDWARE	<ul style="list-style-type: none"> ✧ IBM-PC 	<ul style="list-style-type: none"> ✧ Apple IIC 	<ul style="list-style-type: none"> ✧ IBM-AT ✧ About to purchase IBM-XT or AT
SOFTWARE	<ul style="list-style-type: none"> ✧ Wordvision for word proc. ✧ Visicalc for spreadsheet analysis ✧ PC File for data management ✧ BPI general accounting package (future) 	<ul style="list-style-type: none"> ✧ Appleworks for accounting assessing, data management 	<ul style="list-style-type: none"> ✧ Wordstar for word processing ✧ Listing program for town clerk lists (census, voter)
LOCATION OF COMPUTER	<ul style="list-style-type: none"> ✧ Kept in shared town offices 	<ul style="list-style-type: none"> ✧ Monitor kept in town office, but computer is portable 	<ul style="list-style-type: none"> ✧ Treasurer/Clerk's desk
USERS/USES	<ul style="list-style-type: none"> ✧ Town Clerk: word proc., data management ✧ Town Accountant: spreadsheet ✧ Tax Collector/Treasurer: back taxes/payroll 	<ul style="list-style-type: none"> ✧ Assessor: accounting and assessing ✧ Town Clerk: data mgt. 	<ul style="list-style-type: none"> ✧ Treasurer/Clerk: word processing, listing programs ✧ Assistant Treasurer: payroll (future) ✧ Assistant Clerk: word processing, list maintenance
REASONS FOR COMPUTERIZING	<ul style="list-style-type: none"> ✧ Selectmen wanted better information ✧ Expedite repetitive chores ✧ Town officials were interested/willing to invest in computers 	<ul style="list-style-type: none"> ✧ Interest of town assessor 	<ul style="list-style-type: none"> ✧ Had studied it for two years and were ready to purchase ✧ EOCD funded study ✧ Eliminate dependence on service bureaus

for the town and to explore the possibility of obtaining a computer. The town leased the Model 2 from a man who had several in his business, but was not using them all. He also provided software, but it was software designed for business use. Twice, elderly gentlemen volunteered their services to adapt the software for the town's use. They succeeded in setting up a payroll system, but the town was not able to use it because it was set up as if the town was a small business. Eventually, the assessors developed some information on a data base software, but the town clerk continued to send her lists to a service bureau. In February of this year, the town hired a part-time clerical person with computer experience who educated herself on hardware and developed a request for proposals for computer hardware and software. They are now waiting arrival of a new IBM-AT which they have outfitted with an accounting package for \$4,700 and a town clerk package for \$750. One problem the assessors are facing now is how to get their approximately 1,000 assessor data files from the Radio Shack machine onto the new AT.

ERVING (Population 1,326) - Erving bought 2 IBM-XT's plus Wordstar, Lotus 1-2-3 and DBase III 4 months ago. They put one XT in the tax collector's office and one in the office that is shared by the town clerk and town accountant. The circuit rider has access to the machines, but uses them infrequently because she is not familiar with them and because they are located away from her desk.

These purchases were made after extensive study by two separate consultants.

The first study was prepared by the Massachusetts Municipal Association (MMA) under a grant from the Executive Office of Communities and Development (EOCD) and examined the needs of five neighboring towns and their school systems. MMA recommended a mini-computer which would be based in the largest town, Montague, with terminals to all the other towns. That proposal failed to attract the

interest of the smaller towns, not all of whom were prepared to computerize at that time and who feared the management problems associated with dealing with a large host community (Montague) on a daily basis. They maintained their interest in regional cooperation in the future, however.

Erving was still prepared to computerize and contracted with a second consultant who recommended the present system of personal computers as a pilot project which the other towns could then follow. The report recommended that Erving initiate computerization because 1) it was ready politically (the board of selectmen were supportive), 2) it had allocated the funds and, 3) it was the largest of the remaining four towns. The choice of microcomputers was driven primarily by the software the town wanted (i.e. DBaseIII, Lotus 1-2-3, and Wordstar).

HATFIELD (Population 3,045) - Hatfield obtained its first computer, an Apple IIE, as a gift from a bank. They keep it in the secretary's office and use it for tax billing and census/voter registration. The town also rents a North Star computer for assessing purposes.

Last year, Professional Business Systems Group carried out an extensive study of Hatfield's operations and computer needs. Based on this study, they recommended microcomputer systems for both the town hall and the school department. The study recommended that the two systems be compatible and be able to accommodate up to three users processing at the same time. In town hall, the first activities to be computerized would be payroll, property tax assessment and billing, and census/voter registration. Recently, the town put out a request for bids for 3 IBM-AT's.

HEATH (Population 482) - Heath bought an IBM-PC just over one year ago on the recommendation of the town's computer study committee and after the expressed

interest by the town's department heads. The computer was placed in the town's single office and is shared by the town clerk, town accountant, and tax collector.

They bought Wordvision, Visicalc, and PCFile at that time. Recently, they also bought BPI, an accounting package for business that a member of the study committee who teaches computers at the community college is adapting for Heath's use.

MIDDLEFIELD (Population 385) - Middlefield is a very, very small town. In fact, there are only ten towns in the state that are smaller. And it just may be the most computerized town in the state. The town assessor owns an Apple IIC on which he has developed a data base for the town's 500 parcels of property.

In addition, he prepares balance sheets and statements of expenditures for the treasurer. And, for the board of selectmen, he prepares financial reports, projects departmental expenses, monitors the town's stabilization fund, and lists depreciation schedules for town vehicles.

The assessor is the primary user. He first got interested in computers many years ago because "I'm an engineer," he said. Since it is his personal machine, he carries it back and forth from town hall with him, maintaining a monitor at both locations. The town clerk also uses the machine for her own use.

She happens to be his wife (it is a small town). Any future purchases will not be made until they find out how the state's CAMA system works.

MONSON (Population 7,315) - Monson was the largest town I interviewed. They just bought an IBM-AT which was placed on the desk of the town clerk/treasurer and they were preparing to purchase either an IBM-AT or XT for the town accountant (who is also the executive secretary to the board of selectmen).

Prior to these purchases, the town had talked about computerizing for two years.

Then they were awarded an Incentive Aid grant to study their needs. They chose microcomputers for three main reasons: 1) the school department has microcomputers and they wanted their software to be compatible in order to share a data base, 2) a neighboring town had bought a minicomputer and had a lot of trouble with it and no one used the terminals and, 3) because town offices are located in different offices, they thought micros would be more adaptable to working in separate areas.

SECTION ONE

THE INTRODUCTION OF SMALL COMPUTERS INTO SMALL TOWNS

Although the use of microcomputers by local governments has been slow in the past, the last few years have signalled explosive growth. In 1982, the International City Management Association reported that 13% of governments surveyed (mostly larger cities) were using computers. By 1985, a similar survey by the Government Finance Research Center revealed a full 88% of governments surveyed were using computers.(Ostrowski, 1986)

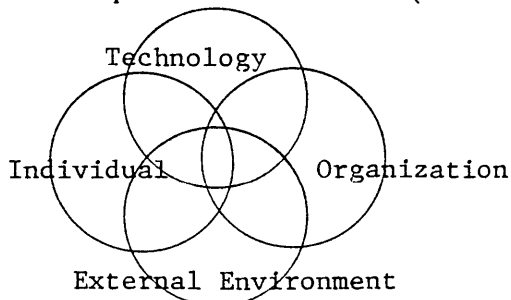
Recently, the new federalism has placed high technical demands on local government to supply more and more environmental and human services information.

As a result, the local government sector is an area ripe major payoffs from technological innovations aimed at improving productivity.

In this section, I review how microcomputers come to be accepted in government operations. I look at this process in two ways: by looking at the climate for innovation in a 'snapshot' view and by observing the steps toward innovation in a 'moving picture' format.

A. CLIMATE FOR INNOVATION: A Snapshot of the Microcomputer Climate

The transfer of microcomputers to small local governments does not occur in a vacuum. There is a web of factors that affect whether and how a technology is accepted. These factors (shown schematically) include:



1. organizational factors that differentiate small towns from larger towns;
2. characteristics that are specific to microcomputer technology;
3. the external environmental context in which the innovation takes place;
and,
4. characteristics of the individual decision-makers.

In this 'snapshot' approach, microcomputer innovation is made up of a bundle of components. First, there are organizational factors peculiar to the local government - the internal policies, procedures, and organizational arrangements of the individual towns that make small towns different from other levels and sizes of government. Second, there are factors peculiar to microcomputer technology - those characteristics that make microcomputer hardware and software different from other computer technology. Third, there is the societal infrastructure for computerizing - factors in the environment that are external to the towns - such as state policies and economic climate. And fourth, there are factors that influence the individuals who are making the decisions to innovate.

ORGANIZATIONAL FACTORS:

What Makes Small Towns Different From Larger Towns?

The subject of this study is towns in Massachusetts with populations under 8,000. Of the 351 local governments in Massachusetts, 179 fall into this category. This grouping of towns has several characteristics in common that are different from larger towns.

- They often, but not always, will not have a professional town administrator (over two-thirds of the towns in the state do not employ, part-time or full-time, general management assistance). If a town administrator does exist, s/he serves more as staff to the Board of Selectmen than as general manager of the government.

- The key department heads are elected (not appointed), often work part-time, and are paid a stipend rather than a professional salary.

- There are few clerical workers in most towns. Most department heads handle their own clerical tasks, including data entry and data management. The staff work of maintaining voters lists, preparing payroll, developing town meeting warrants and selectmen agendas are the direct responsibility of the actual elected officials.

- The data needs of very small towns, since there are very few people, are less than larger towns. Small towns are near the bottom threshold on the practicality of computerizing certain functions of government.

- Very small towns tend to be more rural and pay their employees less than larger towns.

In sum, very small towns differ from larger towns in their level of professional management, the responsibilities of department heads, and the data needs they have. In addition, unlike most larger cities, small towns have never computerized and therefore do not have an elaborate technological base or personnel trained on computers.

The specifics of the local governmental organization is obviously different from town to town. Although there is no typical bureaucratic structure for Massachusetts towns, some generalizations can be drawn. In most small towns management tasks are divided among many elected officials. The board of selectmen serve as the town's chief executive body, but it has no formal authority over offices and boards which are independently elected. These officials, who may include the treasurer, tax collector, clerk, planning board, and school committee, are responsible only to the electorate. In practice, most towns have a mix of elected and appointed officials. It is not uncommon in small towns for the same person to hold two of these jobs simultaneously. These jobs usually come with a very modest stipend. Most officials work part-time and often from their homes. This type of bureaucratic structure is very decentralized (some would say balkanized) and leads to difficulty in coordinating tasks among departments. The dependence on part-time officials with few trained

professionals often leads to crisis oriented management due to lack of communication and coordination.

The general climate of the towns I have studied tends to be healthy with regard to innovation. Most small towns have a solid group of citizens who are familiar with microcomputers, usually through their workplace, who quickly see the advantage of computerizing town operations. Town budgets are not as stressed as they were even two or three years ago in the immediate aftermath of Proposition 2 1/2. Most towns, due to increasing property values, are recovering from the devastating cuts imposed by 2 1/2.

TECHNOLOGY FACTORS:

What Makes Small Computers Different From Larger Computers?

Microcomputers are a relatively new technology, first developed in the early 1970's. They are significantly different from the traditionally larger mainframe and mini-computers. The first difference is an obvious physical one.

Early large computers used a "terminal" with the only interaction between the user and the machine being a line-by-line printout. Microcomputers, on the other hand, are more personal, interactive, and user friendly. They have a keyboard much like a traditional typewriter and were the first to use a video screen that reflects stroke-for-stroke the keys you press. Information is stored on diskettes which are handled by the user instead of tapes handled by data processing personnel.

Secondly, there is a language barrier to communicating with traditional mainframe and mini-computers. With large computers, you have to learn an entirely new language and write in "code". In contrast, software developed for the microcomputer is relayed to the video screen in traditional written languages and is more easily understood by people who have never encountered computers.

This software is becoming standardized and marketed at relatively low cost.

Third, the nature of the microcomputer is that it is malleable and can be adapted to many different uses, which is very important for small towns. It is also iterative, meaning that it repeatedly refreshes the screen as you enter or commands or exchange information via keyboard or pointing systems. You can see the results of your commands immediately.

Micros have experienced a meteoric rise in popularity. With the introduction of the IBM-PC, what had been essentially a toy (usually called a 'home computer') developed into an essential business tool. Business applications such as word processing, spreadsheet analysis, and data base managers were now available in one machine. The personal computer soon developed beyond word processing and rote keypunching, to more sophisticated decision making aids, eventually finding its way onto the desks of major corporate executives. During this period, software for the microcomputer multiplied at an astounding rate; firms serving the personal computer industry opened and prospered (or failed) faster than even industry experts could monitor. The personal computer itself was transformed from a small processing machine with 64K of memory to a highly charged piece of business equipment capable of bundling 640K of memory, storing 20 megabytes of disk information, and linking with practically any other computer in the world.

Hundreds of articles have been written on the rise of the personal computer.

Most have attributed the great gains by micros to their low cost (a complete system now costs little more than a professional typewriter), their versatility (you can buy programs for everything from word processing to sophisticated sophisticated real estate financial analysis and computer aided design), and for their user friendly interface (many machines and programs now make use of

pointing devices to further simplify interaction).

Another significant impact of the growth of microcomputers was that it put processing power, be it word processing or data processing, where professional managers needed it -- on their desks. No longer were managers tied to the data processing department for statistical analysis. Personal computers put the capability of organizing data and playing 'what if' games in the hands of the analysts and managers. The user-friendly software removed computing from the computer programmer and allowed people who considered themselves computer illiterates to interact with a computer using simple commands or pointing at items on a menu.

Despite its popularity, the personal computer faced barriers to implementation. Studies found that many executives still resisted the idea of having a keyboard on their desk, believing it was a vestige of clerical work. At the organizational level, there were pitched battles over whether to go micro or go mini. Larger municipalities with data-processing departments had to figure out how to handle this new technology within the constraints of their traditional hierarchical organization of information processing. And smaller organizations lacked even the minor knowledge necessary to wisely purchase computers.

EXTERNAL ENVIRONMENT:

What Factors Encourage Innovation?

Now I look at factors other than characteristics of microcomputers and the specific size town that influence the transfer of microcomputers to small towns. I describe the current external climate for innovation in small towns in Massachusetts.

The external environmental factors include:

1. the dynamism of the immediate local economic and political climate;
2. the infrastructure of information exchange among towns; and,
3. the role of the state and the increasing complexity of intergovernmental relations and rising level of vertical governmental integration.

State-wide, there is an economic boom going on, much of which is associated with the development of the high tech industry. As a result, the state has registered budget surpluses for the last two years. The effect of this on small towns in terms of increased state aid has been significant, though mitigated by Federal budget cuts to revenue sharing. This phenomenon can affect microcomputer innovation in two ways: economically the state has increased the flow of cash to the towns, and politically, the Governor and Legislature have been more generous in funding a number of programs at the state level to improve management capacity and encourage cooperation between towns and school districts to meet their information needs.

While there is some cross fertilization among small governments, I was surprised by how little neighboring towns knew about each other's governments. News of technological innovations at the local level is not disseminated by any state-wide body as one might expect. There is one newsletter put out by the Institute for Governmental Services at the University of Massachusetts called Microcomputer News. It, however, serves as an introduction to the basics of microcomputers, not as an information sharing organ.

The exceptions to this rule are the towns with circuit riders. The circuit riders not only know the situations of neighboring towns, but also keep in touch with fellow circuit riders and shared war stories, multiplying their information base by the number of towns the other circuit riders serve.

Perhaps the most important factor influencing a town's likelihood to

innovate are the requirements placed on localities by state government. Each town must produce a series of lists, including registered voters, residents, streets, and dogs. Each town must also prepare financial reports and personal and property tax documents for the Department of Revenue (DOR). In addition, state granting agencies such as the EOCD Small Cities Program and the Department of Public Works require extensive financial documentation of expenditures.

For its role, the state sends a variety of messages to local administrators concerning microcomputer technology. Probably the loudest message comes from the Department of Revenue (DOR) and its CAMA and UMAS systems. CAMA (Computer-Assisted Mass Appraisal) was initiated by DOR in the wake of the 1974 Sudbury Case in which the state Supreme Judicial Court mandated 100 percent valuation in all cities and towns in the Commonwealth. Every town has accomplished this. The challenge now is to maintain this level of appraisal in an efficient, up-to-date manner. With CAMA, the Department of Revenue has committed itself to developing mass appraisal software which will run on microcomputers. This software will be placed in the public domain for use by all towns free of charge. DOR is also preparing to train local assessors how to use CAMA. The target towns will be those with between 1,000 and 10,000 parcels of property, under the assumption that larger towns already have a computerized appraisal system smaller towns don't need computerization.

This is an important development because assessing is a major target for computerization among towns. Using a service bureau, Hatfield, for instance, spends about \$7,500 for computing services for the assessors and an additional \$10,000 during revaluation.

The UMAS (Uniform Municipal Accounting System) project, also promoted by DOR, aims to improve financial reporting and management in towns by encouraging

towns to transfer their accounting system to a system which conforms with Generally Accepted Accounting Principles. This system, although generally ignored by most towns, provides the community with increased consistency in reporting and record-keeping and provides DOR with enhanced comparability of data among cities and towns.

INDIVIDUAL DECISION-MAKER FACTORS:

What Makes a Champion?

One of the most important factors in the implementation of innovation in small towns is the existence of an individual who will advocate for an innovation. In every town studied there was an individual or group of individuals who propelled the process of computerization forward. Schon has called this role a "champion" of the innovation. Several characteristics seem key for a person to become a successful champion of an innovation, including the level of risk aversion, the personal status (power, self-interest, and job security) of the individual, the location of the person in the organization, personal and professional contacts, personal biases, and an understanding of innovation models. Other variables that determine an advocate's effectiveness include how long the person has been in the town and how much power and persuasiveness the person has. The need for these characteristics and the fact that the key decisions are usually made in the clubby atmosphere of town meeting has made it difficult for an outside professional such as a circuit rider to be the person able to champion an innovation. Especially since the nature of the circuit rider's job is to spend only 8-12 hours per week in each town.

B. PROCESS OF INNOVATION: A Motion Picture of the Innovation Process

There are four general approaches to the study of innovation in

organizations.(YIN, 1977) The first is the Research, Development, and Diffusion approach in which the innovation proceeds through a series of steps, very similar to the scientific method. The theory posits a linear progression starting with (1) laboratory testing of the innovation, (2) field demonstrations, (3) diffusion of the innovation to potential users, (4) testing by the users, and finally, (5) acceptance or rejection of the innovation. This theory places greater attention on the production and diffusion of the technology in the marketplace than to conditions within the innovating organization. The main criticisms of this approach are that it assumes a clear understanding of the needs so that its linear process is possible. It also ignores implementation factors which may prevent adoption such as internal organizational resistance to innovation and external environmental factors and that it assumes that similar innovations will have similar experiences in widely varying sites.

The second approach is the Innovative Organization approach which identifies key characteristics of innovative organizations. Once identified, these characteristics provide clues to how innovation will occur in organizations with similar characteristics. Many studies have suggested varying sets of variables that influence whether an organization will be innovative or not. Unfortunately, no dominant set of characteristics has emerged from the numerous organizational studies. In fact, there are as many sets of characteristics as there are studies.

The third approach to the study of innovation is the Social Interaction approach. It is somewhat more useful because it focuses on individuals within the organizations, rather than the organizations themselves, as the key adopters of new technology. It also posits a linear sequence of events in which the adopter (1) becomes aware of the innovation and expresses interest in it, (2)

evaluates the innovation and tests it, and (3) finally adopts or rejects the change. The focus of this approach are the horizontal and vertical lines of communication among individuals of similar interests (focusing especially on professional organizations). While this approach rightly values the role of the individual in the innovation process, it sometimes is difficult to identify one individual who plays the role of adopter. In addition, this approach completely omits consideration of the process of implementation.

The fourth approach Yin calls the Organizational Change approach. It looks at the critical factors that occur in organizations that have attempted to innovate. It views what goes on in the technological transfer process as one variant of normal organizational flux. While the sequence of events have been defined in many different ways, four stages are consistently included: (1) the prior state of the organization in which there is a recognition of what Anthony Downs calls a performance gap or window of opportunity, (2) the process of planning for and initiating specific changes to address the performance gap, (3) implementation and organizational responses to the change, and (4) routinization of the innovation into the overall workings of the organization.

I will use this fourth approach to technological innovation as developed by Lambright in his article "Decision Making for Urban Technology"(Lambright, 1980) to illuminate the discussion of microcomputers in small towns.

Lambright identifies six stages of innovation. First is the awareness of a performance gap. This is a realization by someone in the bureaucracy that what could be is not what is. Second is the trigger, which is an external event that catalyzes the need and initiates the search for solutions. A trigger may be an outside funding source, a new manager or complaints. Third is the search process in which the problem is defined and the solution identified. Fourth is

the adoption in which the authoritative decision is made to allocate scarce resources to the new technology. Fifth is implementation in which the innovation is tried out in an actual operating environment. Sixth, and finally, is incorporation in which the innovation is routinized.

Given that the towns I studied have only recently obtained microcomputers, I will focus on the first four of these stages. The first stage of technological innovation is the recognition on the part of the municipality of a 'performance gap'. I found this level of realization to be true in two of the cases studied. In Hatfield, the Board of Selectmen found its ability to make wise decisions impaired by the lack of timely information. An example of this occurred during the annual budget setting process. During the last budget preparation period, the Board of Selectmen asked how much money was spent on various programs and services, how effective the programs were, if their budgets could be cut and, if so, where. The town accountant had information for some of these questions, but it was six months old. As a result, the budget process was reduced to a simple guessing game.

In Brimfield, there are no full time town employees. All functions of local government are performed by either part-time elected officials who receive a stipend (usually about \$2,000) or the town's half-time circuit rider. The circuit rider, somewhat familiar with computers, convinced the board of selectmen that operations could be better handled, and that a computer could save time and make the stipended town officials more efficient during the few hours they do work.

In other cases, this performance gap was not as concrete. This is best illustrated by the responses of one Erving official. After he had explained all of the things he could do on his computer and all of the things he wanted to do

with it, I asked him why it had even occurred to him to computerize in the first place. His reply, like that of the town accountant in Monson, was that it was time for Erving to "update its offices" and "move into the computer age."

This reply indicates not so much a 'performance gap' as pursuit of an image of modernity in which the players in the don't want to be left behind. Decision makers are driven by non-rational factors to computerize. It is more of a mind-set in which the employees/department heads in the towns want to keep up with each other; a kind of "me, too" attitude. The implications of this are profound for it indicates that a major determinant for a town even considering computerization in the first place is subjective, which is normally not considered in traditional theories of innovation.

Secondly, the recognition of this abstract performance gap shows that computers are more than just tools or problem-solvers. They are symbols to the people in the town and the people who use them. They symbolize progress to people who identify themselves as residents of a high-tech state.

In Lambright's model of innovation, there is a trigger which ignites the implementation process. Occasionally, this trigger is as simple as a bank donating a computer to a town as happened in Hatfield. In other cases, the availability of 1. state money to do a feasibility study and, 2. someone to write the grant application (i.e. a circuit rider) is the determining factor in a town taking the initial step toward computerization.

But in each case, there is a predisposition of the town officials toward wanting computers, and it was this attitude along with the readily available funds to do a feasibility study and adequate town funds, that permitted the innovation. Almost every town had either a computer use study committee or a consultant do a needs assessment, and some towns had both. The people who sat

on these committees tended to be either 1) young professionals who used some type of computer or word processor in their work or, 2) computer or data processing professionals. The nature of the committees was that those town meeting members who were already interested in computers self-selected themselves to evaluate the town's needs for computers. This bias becomes most obvious in a town like Brimfield. The head of their feasibility committee became the chief advocate for purchasing a microcomputer. He was a computer professional at DEC by trade and, eventually, his fellow town meeting members agreed to his proposal.

The third stage of this innovation process is the search in which there is a conscious effort to define the problem and identify a solution. For the most part, this was not a stage in small town decision-making. Most of the towns had decided that they wanted a microcomputer and then developed arguments based on efficiency and economy to justify their desire. Towns form computer study committees, not committees to figure out how to send the tax bills out more efficiently or to help the town clerk maintain voter lists. In some ways, the solution of computers is obvious and the computer study committee is established to decide what kind of computer to buy. A second reason is that the makeup of the computer study committees is biased toward computers, specifically microcomputers. Membership is drawn from town citizens who have experience with computers. These people tend to be workers in high tech firms or who use microcomputers in their office in one way or another. Certainly, they know the computer and office automation fields, but it's like the classic medical joke that you never ask a surgeon if you need surgery, for surgeons believe that to cut is to save. So the choice of the committee determines what you are going to get.

Towns that hire a consultant to carry out their computer feasibility studies

know what they are going to get by whom they hire. Erving, for instance, hired a consultant to conduct a computer feasibility study. The consultant recommended a mini-computer system to be located in Montague and shared by five towns. Erving, with the other smaller towns, decided that the management problems associated with a computer located out of town would be too difficult to manage and they felt they would either have to hire their own data processing person to communicate their concerns to Montague or they would be overly dependent on Montague. Erving then commissioned a second firm that works primarily with microcomputers to conduct a study of its needs and, surprisingly enough, the consultant recommended a microcomputer system.

In Lambright's model, the fourth stage of innovation is adoption which is a decision by those in authority to allocate scarce local resources to the new innovation. In every instance, the final decision was made by the Town Meeting, which decides on all capital expenditures. In each case the grounds for approval were unique to that town. In Erving, for instance, the decision-makers followed the recommendation of the board of selectmen who were young and willing to try innovative things. In Monson, the sentiment of the town meeting was to approve the request so as to get the department heads off their backs.

Lambright identifies five actors in this motion picture of innovation. One is the adopter, officials who have the formal authority to make decisions. In very small towns, adopters tend to be the Town Meeting voters or, occasionally, the board of selectmen. A second group is the implementors, administrative officers who carry out the policy of the adopters. A third group is the clients, members of the public served by the innovation. The fourth group is the suppliers, people who market and sell the product. Each of these groups is relatively consistent from town to town. The adopter is the town

meeting or board of selectmen. The implementors are town department heads. The clients are the citizenry of the towns. And the fourth group are the hardware and software salespeople.

Most importantly is a fifth role, the role of the local champion or advocate for the system. The role of local champion can be played by any of the four actors above. The champion can be an individual, such as a circuit rider, or a group, such as a computer study committee. The champion is responsible for giving action to the process. This person serves as a coalition builder and provides the impetus for the organization to move through each of the six stages.

In most of the towns, the process of innovation had been going on for years.

There was usually one person who was the driving force and enlisted the aid of the professional manager. be it the executive secretary in Monson or the circuit rider in Erving and Brimfield, to write grant proposals. The entire process was incremental: there was a computer study committee established, then they get a grant to do a feasibility study, which then recommends that the town buy computers. The cost of the recommendation is not huge, and the bureaucratic inertia is already rolling in that direction, so the town approves it.

In most towns, the local entrepreneur was a citizen or elected official who initiated the computer study committee. In Erving, the town accountant and chair of the board of selectmen pushed for the two study reports and enlisted the aid of the circuit rider to write the grant proposals to EOCD. The direction of the recommendation came from the consultants.

In Brimfield, the local entrepreneur was a professional computer person who worked at DEC and enlisted the aid of the circuit rider who was predisposed to support computers.

CONCLUSION: Small Computers in Small Towns

The advent of microprocessor technology and the microcomputer in the last few years have put sophisticated management information and office automation systems within the grasp of even the smallest of towns. Brimfield, a town of 2,300, recently purchased a complete computer setup for under \$2,000. Microcomputers, having experienced wide-spread acceptance in the private sector, are fast becoming the 'computer technology of choice' by small towns.

Microcomputers and small towns form a great team. Many of the characteristics that are part of a small town -- such as decentralized operations, lack of clerical help, increasing data needs, and small budgets -- match very well with the capabilities of microcomputers, which are flexible, easy to use, powerful, and inexpensive.

In this section, I took two views of computer innovation in small towns. The first was a static, snapshot of the factors influencing the potential for innovation. In my research, I found that every small town that computerizes does so within a web of both external and internal considerations bounded by the characteristics of the technology and the personality of the decision-maker. These four major variables,

- the characteristics of the organization;
- the characteristics of the innovation;
- the characteristics of the decision-maker, and;
- the external environmental factors,

must be taken into consideration when evaluating a technological innovation in an organization.

The second view was a fluid, moving picture of an approach to technological innovation. I looked at four stages that microcomputers have progressed

through:

- recognition of a performance gap;
- presence of a trigger;
- search for a solution;
- adoption of the innovation.

I found that while not all the towns went through all of the stages that Lambright outlined, the theory proved useful for understanding the process and pitfalls of innovating in small towns. Each town followed a similar path to computerization. First, the town was ready, both politically and mentally, to computerize. Elected selectmen tended to be acquainted with the technology. Second, in every case there was a champion of the new technology pushing for its acceptance. Much of the interest in microcomputers stems from the outside experience of these champions/decision-makers. In nearly every case, there was at least one person who had experience with microcomputers. In Brimfield a key town meeting member worked for DEC, in Buckland the chair of the board of selectmen had seen what microcomputers did for his friend's business, and in Erving several members of the finance committee and board of selectmen used micros in their own work. In the next few years, first hand experience with computers will become more prevalent, especially among white collar workers. This experience, along with increased numbers of young professionals, will translate to a higher likelihood that towns will computerize if they haven't already done so. And third, there was an impetus to computerize such as the availability of an EOCD grant.

Many of the barriers to computer innovation, such as high cost and lack of technical expertise, that had traditionally prevented very small towns from incorporating computers into their operations are no longer present with

microcomputers. In the past, the cost of mini-computer hardware was well over \$20,000 with one town of 3,000 people spending over \$100,000 for a system. A town could expect to spend an equal sum on specially written software because the public sector market was not developed enough to attract off-the-shelf software. Now, most software written for the public sector is composed for the microcomputer with two companies in western Massachusetts serving that area's needs. In addition, mini and mainframe computers usually required that a computer professional be hired to run the machine on a day-to-day basis since there was no existing in-house computer expertise.

Another impetus for computerizing may be in the offing, although it did not show up in any of the towns studied. Towns may soon be viewing microcomputers in the same way as businesses, as a personal productivity tool rather than a data processing machine. This image will be advocated by newly trained professional managers who require the use of a computer as a prerequisite for employment. As students from professional degree programs graduate into management positions, it is reasonable to assume that they will have received at least a moderate amount of training on microcomputers. They may view microcomputers as an essential tool for any professional manager. Perhaps the most interesting finding of this study is that economics is not the major reason for computerizing. The primary motivation for computerizing was non-rational -- wanting to stay up with the neighbors' technological advancements. This was coupled with the articulated need for better information by decision-makers.

SECTION TWO

USES OF MICROCOMPUTERS IN SMALL TOWNS

In unpacking their microcomputers, small towns also unpacked new problems. Some of these problems, like the need for standardization, documentation, and licensing, are being thrashed out in the microcomputer marketplace. Others, such as lack of security and trained personnel, must be faced by the towns themselves. In many towns, microcomputers are the sole source of computing power. Towns are now faced with managing it -- deciding where to put it, who should learn it and how, monitoring who gets to use it and what it will be used for, and deciding how accessible to have it be to the public.

In the previous section, I discussed the various circumstances under which microcomputers find their way into local government. In this section, I look at how these towns actually use the computers once they get them. I approach the analysis of microcomputer use in small towns from a functional perspective. First, I give examples of how some of the towns have gone about learning to operate microcomputers. I then list and discuss the functions involved in running a small town in broad terms. Then, I go behind this listing to tell the stories of the actual towns to explain what they did and why they did or did not automate a particular function or set of functions.

A. HOW TOWNS LEARN TO USE MICROCOMPUTERS

Before using a microcomputer is one must learn how to use it. The process of learning will often define how we conceptualize its use the future. It is interesting to see the range of learning techniques that were used in the towns I studied.

One town, Buckland, had no training on their Radio Shack Model 2 and

consequently used the machine infrequently. Other towns had a primary user who then taught other staff how to use it. In Brimfield, the circuit rider took a special interest in the computerization process and recommended that the town buy a MacIntosh specifically because it was easy to learn. Even though he had never used a personal computer before, he read books and magazines and became the town's primary user. He has taught other town workers to use the machine by first familiarizing them with it by playing games which he bought out of his own pocket. Now, there is rising demand for using the machine among town officials.

Heath followed a similar route. The primary user there is the town accountant. She had never used a computer before but was introduced to it by a member of the computer study committee who invited her over to his house to play video games and do word processing. She has since taught the town clerk and tax collector how to use it and is now investigating the purchase of BPI general accounting package which she plans to adapt for town accounting.

Other towns have followed a more formal path, either taking classes on specific software or specifying computer training as part of their service contract with the software vendor.

It is evident that some sort of training encourages use of the computer. It is less apparent that the way you learn is an indicator of how you will use the computer. From my limited interviews, the towns that had strong champions or primary users were most likely to be self taught. They also tended to be the most likely to explore beyond the limited scope of a particular software package and test other software packages. The circuit rider in Brimfield, for instance, was exploring graphics packages in order to produce town checks and newsletters.

B. FUNCTIONS OF TOWN GOVERNMENT

Administrative functions of small town government can be categorized into four broad areas: Town Budget; General Accounting; Property Tax; and Census/Voter/General Town Clerk Lists. I have not considered other functional areas of small town government such as Public Works, Emergency Services or School Departments for two reasons. First, their overall administrative issues are usually included in the Town Budget and General Accounting functions of the town and second, the development of computer capabilities in police² and school departments has occurred more extensively than in town halls with little interaction or sharing of technology or skill. Recently, however, EOCD has been encouraging town governments to work with school departments to share computer facilities.

In this section, I briefly describe the tasks within each function and look at how towns have or have not computerized them (or expect to computerize them).³

While many of the tasks are self-explanatory, it is important to understand how the task is handled manually, how it is handled if it is contracted to a service company, and how it is handled if done by an in-house microcomputer. Other issues such as the data base each task draws from will also be addressed.

Town Budget

All of the towns I looked at followed a line item approach to budgeting.

² Police departments have received extensive financial assistance over the years for computerization from the Law Enforcement Assistance Association (LEAA) whose purpose is to build a vertically integrated law enforcement information network.

³ The outline of these descriptions is taken from a feasibility study prepared for the Town of Hatfield by Professional Business Systems Group, 1985.

This format separates the budget by department. Each department manages its own finances and proposes a budget to the town finance committee based on the cost of work planned for the next fiscal year. To properly project current costs and propose an accurate budget, department heads must have information on prior year expenditures, which is maintained by the accounting department. Decisions on each department's budget are made by the finance committee on an item-by-item basis, often with little or no baseline data to judge from.

For the most part, this task is done by the town, usually manually. Automation of this activity would require the development of a chart of accounts that would generate prior year budget and compare it to actual expenditure statistics and provide percentage change, multiple year trend factoring, and inflation ratios.

An example of this occurred in Hatfield during the annual budget setting process. During the last budget preparation period, the board of selectmen asked how much money was spent on various programs and services, how effective the programs were, whether their budgets could be cut and where. The town accountant had information for some of these questions, but it was six months old. As a result, the budget process was reduced to a simple guessing game.

Now the Hatfield treasurer and accountant expect to use their new computer for budgeting and forecasting and preparing trend analysis and general account information much more current than the 6 month old information they have been using to make decisions.

General Accounting

The Town Accountant is responsible for providing the board of selectmen with the tools to maintain adequate control over cash flow. The more current the information is, the more valuable it is in the decision-making process. As the

time interval between statements lengthens, the selectmen's ability to effectively use this information diminishes proportionately.

A second responsibility of the town accountant is to project anticipated demand on available cash versus anticipated receipts. Projections of this sort allow the accountant to estimate the liquid cash deposits needed and allow her or him to invest the remaining funds more profitably in longer term instruments at higher interest rates.

These two elements of an effective accounting system: 1) the ability to provide management with a current and accurate picture of financial status and, 2) the ability to project fiscal status by projecting anticipated receipts and expenses, are even more important as a town grows or comes under financial constraints, as most of these towns are. Hatfield's feasibility study concluded that:

The Town of Hatfield utilizes a financial accounting and reporting system which is simply not geared to the expanded information needs of a modern community. Town operating departments must contend regularly with management requirements for information which they cannot produce, or at best must spend long hours gathering. Management on the other hand is continually frustrated by the lack of such information to aid them in their daily administrative decision-making process.(Professional Business Systems Group, 1985)

As in this example, the data is generally available to prepare this kind of information and reports, but towns usually don't have the means to gather it or else the expenditure of resources is prohibitive.

In Heath, the Town Accountant used to manually post transactions and issue a report every quarter. Now she enters the transactions on Visicalc and prepares a report every week in time for the meeting of the selectmen who then use the information to monitor departmental spending. At the most recent meeting of the Board, there was a question regarding changes in budget projections. She went back to her office, made the changes and returned fifteen minutes later with

revised projections from which the board made a decision.

Property Tax

The principal source of revenue for the average town is the property tax which includes both real property (i.e. real estate) and personal property (i.e. machinery) with real property providing the bulk of the revenue. Responsibility for maintaining property tax records and preparing tax billings rests with the Town Assessor or an elected Board of Assessors. While these two responsibilities are intimately linked, it is best to consider them separately.

PROPERTY RECORDS MAINTENANCE

In December of 1974 the State Supreme Court issued a mandate to all cities and towns in Massachusetts to reach equalized property valuation through 100% revaluation. Since that time, every town in the state has met this mandate. Now, however, towns are faced with the necessity of maintaining 100% valuation through periodic (usually every 2-3 years) revaluation procedures.

While many towns will continue to contract this chore out to private service companies with a limited amount of town staff work, a majority hope to maintain 100% valuation using existing in-house personnel and resources. To accomplish this, each town's assessing office will need to maintain current and accurate property information (which will require ongoing inspection of town properties and continual updating of property records) and carry out periodic property reassessment.

In Heath, while the Tax Collector has used the microcomputer to list delinquent tax properties, the Assessor does not expect to use it until the town purchases a hard disk (which is being studied at present by the computer study committee). She explains that with over 1,000 properties and about 20-30 pieces of information on each property, a hard disk is essential. But even with the

proper hardware, she questions how soon the assessor's office will be computerized because there is no clerical help to perform the extensive data entry to switch from a manual system. This is not as severe a problem in other departments such as the town clerk's where the transfer from a manual system to computers takes little more than the effort to retype the street list in the first place.

Each town is required to prepare and maintain several different documents for the public record. They include:

- The Valuation List - the town's current year tax roll listing all current properties by owner's name.
- The Street Cross Reference File - the same valuation list prepared by street name and number.
- The Map Number Cross Reference List - the same valuation list prepared by map and lot number.
- The Property Record Card - which is the principle instrument for recording detailed descriptive information on each parcel from a temporary journal maintained throughout the year. This information is used for property valuation and is kept in map and lot number order.

Final approval of a town's tax rate must come from the state Department of Revenue which requires that every parcel be reviewed by the Assessors. This information is presented to the Department with values summarized by land, building, and accessory structures according to their property tax class and equalized value code.

Records for Personal Property are maintained in a similar fashion.

PROPERTY TAX BILLING

Upon approval of the town's valuation by the Department of Revenue, the assessing office must prepare and mail bills for each property in town (2,000 properties in Hatfield, a town of 3,000 people). This, in itself, is a monumental task.

The Tax Collector in Erving uses the computer to maintain a ledger of who is paying their bills and a list of delinquent owners. The town would like to begin printing tax bills on their printer, which would result in a substantial savings. Currently, however, they use a service bureau for most assessing chores and they fear that if they take the lucrative billing component away from the bureau, the bureau will drop the town altogether, which the town cannot afford. They have not computerized any assessing information themselves because they are waiting to see what kind of assessing package the state is going to recommend. They are fairly sure, however, that whatever package the state chooses, it will be too complex for Hatfield.

WATER AND SEWER BILLING

All towns provide water to at least some of their residents and some towns provide sewer service as well. Aside from the physical maintenance of this infrastructure, the primary administrative task of these departments is the act of billing the users. Towns that provide one of these services maintain a listing of each location served including address, type of equipment installed, and the approximate location of the equipment hookup. A map of coordinates is also maintained which describes the location of the main connection and various distances from the dwelling. A second set of records for billing is also maintained by the department.

In Hatfield, the procedure for preparing 1,100 water and 400 sewer bills is a huge commitment by town staff. It takes approximately 70-80 hours to simply do the clerical work necessary to prepare a complete set of water and sewer bills. As a result of this time commitment, bills for these services go out just once a year, hampering the town's cash flow position and imposing a once a year burden on many property owners.

Census and Voter Lists

The Town Clerk is probably the most list-intensive position in town government. Each year, the Town Clerk is responsible for preparing a complete street list, voter list, jury list, school census list, and list of elderly citizens for the entire town. To fill these lists, the Town Clerk (or voter registrar in some towns) maintains a data base of detailed information which describes every resident of the community by name, address, birth date, party affiliation, previous address, occupation, primary language spoken, and much more. Much of this information is gathered by census enumerators going door-to-door. Unfortunately, this process is quite expensive and is not totally reliable if residents are not at home or if the enumerator is less than conscientious.

More and more towns are turning to mailed questionnaires as a more effective means of soliciting census information. This task is greatly assisted by the advent of computers to prepare the original information that is sent out to each resident for verification.

In Hatfield, The Town Clerk prepares the once a year street list, updates the voter list, and does the dog list on her AT. She also prepares the weekly Selectmen's warrants and Town Meeting warrants. She does not use it for word processing in general, however, preferring her Selectric typewriter. The major advantage for her is the economy of time and the efficiency of not having to do a boring job. She also anticipates preparing the town's newsletter on it in the future.

In Monson, the Town Clerk/Treasurer currently uses the AT for word processing and voter and street lists. She would like to use it for demographics to show the age ranges and number of senior citizens in the town to

anticipate the need for senior citizen centers and elderly housing. She would also like to project school enrollments to project classroom demands. This type of information is frequently requested by the housing authority and for the school department. She uses the word processing package for form letters and the required notification of precinct changes to every voter in a precinct that changes.

SECTION THREE

CONCLUSION

I began this paper by asking two simple questions: Why are small towns computerizing now and how are they using microcomputers in their day-to-day operations. In this section, I summarize the answers to these questions. I then discuss these findings in relation to state policies toward computerization and investigate the potential for using computers in more creative ways.

I have identified two primary reasons why there is currently a rush among small towns to purchase microcomputers. First, on the supply side, for the first time there is a computer that is within the price range of small towns with the power to meet their needs. And second, on the demand side, town administrators and citizens have developed over the last several years a keen interest in computerizing -- much of this interest a spillover from individual experiences with microcomputers in the private sector. In addition, there are several triggers that ignite this process, including state sponsored computerization efforts by the Executive Office of Communities and Development and the Department of Revenue. Interestingly, cost savings was not cited as a major reason for computerizing.

On the second question of how towns are using microcomputers, I found that towns were using microcomputers to automate the routine chores of the town accountant and town clerk by using spreadsheet, data base, and word processing software. Other uses such as budget forecasting and population projections were not explored. Interest in assessing packages is keen, but mitigated by the expectation of a free, state approved CAMA package.

ROLE OF THE STATE

Current state efforts to assist municipalities with computerizing their central administration reside with the Department of Revenue (DOR) and the Executive Office of Communities and Development (EOCD). The greatest potential interest among towns is in the assessing field where state requirements for reporting and the burden of revaluing property every three years demand automation. Standardization of these efforts into one assessing package, as the state is doing with its CAMA project, however, may inhibit experimentation with wider and more creative applications of assessing software by the towns.

The towns are receiving a different message from EOCD, which is encouraging a systematic approach to town data needs, an approach that includes school departments. EOCD's program is based on establishing a clear understanding of the town's activities and data processing needs to provide a sound basis for choosing a computer system. EOCD emphasizes the information needs of the entire town rather than the discrete data-processing needs of individual departments.

To this end, EOCD offers Incentive Aid grants to towns to perform feasibility studies. Several consultants, including a couple who benefit from this program by procuring contracts, said that the quality of many of the reports prepared under this system was less than should be expected. They suggested that rather than spend 2-3,000 dollars on studies, the money should be spent to give hardware directly to the towns.

This raises the question posed in the title of this paper. How big a decision is it for a town to computerize? The typical path to computerization for small towns in Massachusetts begins with a town computer feasibility study committee which meets for a couple of years. The town then obtains an Incentive Aid grant of several thousand dollars from EOCD to prepare a professional

feasibility study. After evaluating the study's recommendations, the town puts a system out to bid, settles on a vendor and request funding from town meeting. The entire process can take years. All this for a relatively minor investment of a few thousand dollars.

This model is based on the process followed by larger cities with large data processing needs that must carefully evaluate competing departmental needs for an integrated data base. The data requirements of small towns are fairly standard. Obviously, the larger the town, the larger the data base that must be managed, i.e. the greater the number of properties and citizens to list. But, on the whole given the constraints on town governance structure by state law, towns under 8,000 in population have very similar data management needs. One consultant, who prepares very good, in-depth reports, suggested that the report he prepared for Hatfield was applicable to just about every town of comparable size in the Commonwealth.

EOCD follows the big city model which requires even the smallest town to evaluate its data needs. But is this really necessary? Do you need to assess your data needs to purchase a calculator? Less work goes into the purchase of public works trucks or even new firefighting technology. Microcomputers are a new technology and must be evaluated in a new way. Microcomputers are small and inexpensive. The risks of failure are lower, making it much more likely that a town will take a chance that microcomputers will pay off. EOCD should move beyond the traditional data processing approach in light of this new technology.

The Department of Revenue is following another policy direction. It encourages all assessors to attain a certain level of competence through a linear growth path. Towns will be encouraged to use a standard software package chosen by DOR. Assessors will be integrated into a state-wide system, producing uniform

reports and using comparable data from across the state.

By focusing only on the needs of assessors, DOR will develop a coherent, vertically integrated, state-wide approach to assessing at the local level. There is some question, however, whether DOR's efforts will be successful since its recommended package will be UNIX based, requiring towns to purchase additional hardware. DOR's approach does not address the wider question of how to meet a town's larger data processing needs.

The question for towns is not whether to computerize or not, which is the question most often posed by state-funded feasibility studies. There is ample evidence that microcomputers can meet the data processing needs of small towns. The question is how do you use this technology in the towns.

DOR has chosen to integrate Massachusetts towns function by function. Although effective vertical integration is certainly a priority for the state, it fails to take into account the broader data processing needs of the towns.

The challenge to the state is to develop programs both to assist towns in computerizing, perhaps by offering matching grants for hardware purchase, and to help towns define their data processing needs and understand how microcomputers can be used to meet those needs. The state should go further and help towns think of future needs for information.

DECISION MAKING

As towns become more comfortable with their computers, they may begin to use them for things other than routine tasks. One direction they may follow is to help town officials make better decisions. In fact, several of the towns cited this as a priority. Unfortunately, there was only one town that could actually recount an example of using a microcomputer in decision-making. Confronted with a decision on a department's budget, the board of selectmen of

Heath turned to the town accountant for up-to-date information. She went to the microcomputer in the next room, inserted the revised figures, and returned with the results from which the board made a decision.

Not only was this desire for improved management information heard from the towns, but a private firm, Computer Resources Associates, has directed its entire marketing campaign to boards of selectmen and finance committees of small towns and their desire for better financial information.

As it stands, towns are computerizing routine chores and, in the process, are establishing independent data bases for the town clerk, the town assessor, and water and sewer departments. While these data bases may meet each department's current needs, once established, they may prove difficult to integrate when the town wants to pursue more sophisticated uses.

New, more creative ways to use microcomputers should be encouraged by the state. Some uses have already been identified by the towns such as projecting school enrollments in order to decide whether to sell an old school or rehabilitate it for rising class enrollment. Larger cities have computer programs to assist in predicting targets of arson, to evaluate land use plans, and to integrate geographic information with assessor records. For small towns to consider innovative approaches, towns need to see how effective these approaches are in other small towns. To this end, the state could fund pilot projects developed by both the state and individual towns to explore new and creative uses of microcomputers.

There are several barriers to using microcomputers in this way. One problem is that people who are first learning a computer are overwhelmed with simply understanding the basics of computers and are speculating how it could be used. Another problem is that small towns have few professional managers and are run

primarily by part-time elected officials who have little time and sometimes little interest in learning these things.

In conclusion, two images of microcomputers emerge from this study. The first is the microcomputer as traditional data processing center. In this image, advanced by the state, the microcomputer is viewed as the primary source of computing power designed to meet the data processing needs of the town. The second image is of the microcomputer as personal productivity tool. In this image, the microcomputer is viewed and marketed to meet the specific needs of the individual manager, be it for word processing, financial analysis, or project management. This is the image projected by the computer manufacturers.

The avenue of entry for microcomputers into small towns may soon be along two paths: the first is the traditional data processing path of data needs analysis and feasibility studies; and the second is as a requisite tool for professional managers.

The question remains as to how microcomputers will be viewed in the in the future. In very small towns, the data processing needs of the town are small enough that one or two microcomputers can meet the needs of all departments. But if the image of microcomputers as a personal productivity tool catches on, and the the price is low enough, microcomputers may soon be found on every department head's desk, replacing the typewriter and calculator.

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