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Data Processing Analysis and Recommendations for Butler County, NE

Donald F. Norris

University of Nebraska at Omaha

David R. DiMartino

University of Nebraska at Omaha

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**DATA PROCESSING ANALYSIS AND RECOMMENDATIONS
FOR BUTLER COUNTY, NEBRASKA**

**Donald F. Norris
David R. DiMartino**

June, 1983



**Center for Applied Urban Research
University of Nebraska at Omaha**



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ACKNOWLEDGEMENTS

The authors wish to thank the elected officials and staff personnel of Butler County for their cooperation and for providing us with the information about the county's current operations and future needs upon which this report is based.

We also want to thank the following CAUR staff for their assistance in preparing this report: Joyce Carson and Michelle Schmitz for word processing and Marian Meier for editing.

DATA PROCESSING ANALYSIS AND RECOMMENDATIONS
FOR BUTLER COUNTY, NEBRASKA
JUNE 1982

I. Introduction

This report presents an analysis with recommendations regarding the data processing needs of Butler County, Nebraska. It was undertaken pursuant to a letter of March 11, 1983 from the Center for Applied Urban Research of the University of Nebraska at Omaha to the Butler County Board of Supervisors.

This analysis has been undertaken within the context of a broader effort to assist small and rural local governments to acquire and use microcomputer technology more effectively. This effort is supported by a grant from the W.K. Kellogg Foundation. In addition to Butler County, the city of Gordon, Nebraska and the Ashland-Greenwood Public Schools, Ashland, Nebraska are demonstration sites for this project.

This report reviews the current state of data processing in Butler County government, the county's information management data processing needs, and the applicability of microcomputer or other computer technology to these needs. It also presents a recommended configuration and cost for a computer system to meet these needs.

Recent advances in technology have brought computers within the reach of many local governments in America.

These advances have substantially reduced the cost of computer systems and have also made it possible for local government personnel who are not data processing experts to use computers effectively with little additional training.

The first advance has been the tremendous reduction in the physical size and cost of computers coupled with dramatic increases in their functional capabilities. Second, the current generation of application programming or software available to local governments is characterized by flexibility and "user-friendliness." That is, the programming is designed for interactive use on video terminals by personnel with little or no knowledge of computer technology or programming.

The third major advance has been the introduction of the microcomputer. These small, inexpensive, yet powerful machines, when coupled with appropriate software, can become significant tools in the performance of local government functions.

Microcomputers can be used as "personal" computers. That is, they can be single user, single function machines, somewhat analogous to the telephone or adding machine, or they can be used by several persons to perform a variety of activities. Certain microcomputers can also be linked together to form networks of small machines in organizations.

II. Acquiring the Technology

Regardless of the type of hardware, a computer system should be viewed as a tool to be used just like any other piece of office equipment. It is an integral part of the work routine, just like the typewriter, the calculator, or the filing cabinet.

Computers are technically feasible in almost all organizations. Technical feasibility, however, is often less important to local governments than several other factors. These include:

* Cost. Cost is perhaps the best understood and most definitive means of determining the feasibility of any new system. Is the new system more or less expensive than current methods? However, although cost may be the best understood criterion for determining feasibility, accurate cost estimates are often difficult to obtain, especially in cities with limited current data processing capability.

A word of caution is in order here. Few local governments that implement computer technology can expect to reduce overall costs. Thus, a strict cost justification for a data processing system may be impossible. At best, a local government can anticipate cost displacement (e.g., the moving of costs from one place in the budget to another) or cost avoidance (e.g., the use of more efficient technology to prevent, avoid, or move into the future costs that would otherwise occur).

* Ease of Operation. Some computer systems can be operated only by technically trained personnel. A factor in favor of the current technology, especially the present generation of mini- and microcomputers, is that in many cases local government personnel who are not trained in the technology can easily operate these systems, and a technical staff of programmers is not required.

* Available Programming. The availability of proven, easy-to-use software or programming to make a computer system do what a local government wants, when it wants, and how it wants is crucial to system feasibility. Without adequate software, a computer is only an expensive box that fulfills no useful purpose. Software is available in most functional areas of local government from a variety of sources.

* Growth. An important factor in the feasibility of a data processing system is the extent to which it can grow to meet future requirements. Not only should the system be capable of accepting more sophisticated uses but it should also accommodate normal growth in activities.

* Staff Considerations. The degree of acceptance of computer technology within a local government is a significant consideration in system feasibility. Similarly, the degree of competence to perform specific local government functions (e.g., accounting, payroll, utility billing), aptitude and enthusiasm for the use of computers can be constraints on system effectiveness. Support for

computerization, competence in key positions that will rely on computer technology, aptitude for using automated equipment, and interest or enthusiasm for automation are most important to the effective implementation of a computer system in local government.

* Political Feasibility. Finally, political feasibility is probably the most difficult factor to deal with and the single most critical element in the success of computerization in a local government. Political feasibility means the extent to which local elected officials and administrators understand and support the need for an electronic data processing system. In the absence of such support, a local government would be well advised not to proceed with system procurement. On the other hand, the support of these persons can help immeasurably to ensure smooth system acquisition, installation, and operation.

Once a local government has reviewed these factors and determined both the need for and feasibility of acquiring new or enhancing existing automated technology, a systematic procurement plan should be adopted. Such a plan should include the following steps:

1. A data processing requirements analysis and feasibility study should be undertaken. For Butler County, this report represents such a study.
2. Shortly after review of this report by county officials, they should decide whether to acquire a

computer system based on the recommendations contained in this report.

3. If the county decides to acquire a system, a Request for Proposal (RFP) to meet the requirements identified in this study will be developed and submitted to data processing vendors.
4. Proposals received by the county will be evaluated and a selection made of two or three finalists for additional consideration.
5. County officials will be asked to approve the selection of finalists and to authorize further evaluation of these proposals, including visits to local governments having systems installed by the finalists.
6. Site visits and detailed evaluations of the finalists' proposals will be made and a system vendor selected.
7. A contract will be negotiated with the vendor selected.
8. Finally, system installation, testing, and acceptance will complete the procurement plan.

This procurement plan is recommended for use by Butler County as a method proven effective for computer system acquisition in numerous local governments throughout the country.

III. Current Data Processing in Butler County

The current level of data processing in an organization, whether manual or automated, is an indicator of the organization's need for improved technology. It also provides insight into potential problems that may arise with implementation of newer technology. A review of an organization's data processing operation also allows the development of a cost analysis that can be used, in part, to suggest whether new or enhanced data processing capabilities are justifiable.

The following pages present a brief overview of current data processing activities in Butler County in order by major functional area and according to current extent of automated data processing use. Data for this section of the report were provided by Butler County officials during interviews by CAUR researchers.

A. Functional Areas Using Automation

1. County Clerk

The county clerk's office¹ owns a Burroughs L-4000 bookkeeping machine purchased in 1973 at a cost of \$14,000. Current maintenance costs for this system are \$2,800 per year, and \$600 per year is budgeted for software support.

The Burroughs L-4000 is an antiquated machine that can perform only a limited range of activities. It is a single user, single function system that lacks expandability to accommodate additional functions. Maintenance for the system can be expected to become increasingly costly and

difficult to obtain. Due to its age and functional limitations, enhancement of present operations on this equipment (e.g., a more up-to-date budgetary accounting system) would not be advisable.

The following activities are automated on this machine:

- county payroll (110 monthly payroll checks)
- budgetary accounting (12 funds)
- accounts payable
- vendor ledger (300 vendors)
- revenue ledger (miscellaneous receipts)
- general fund accounting including monthly reports for all funds and general fund offices (e.g., clerk, treasurer, assessor, county board, superintendent of education, election commission, clerk of district court, county court, buildings and grounds, extension service, sheriff, county attorney, community center, jail, surveyor, veterans service office, and others.
- voter registration list (6,000 registered voters and 300-400 new registrations per year).

The clerk's office uses a non-encumbrance, cost accounting system.

The following manually performed activities of this office appear to be candidates for some form of automation:

- land transactions (e.g., deeds, mortgages, contracts, surveys)
- motor vehicle titles
- ambulance billings.

2. County Treasurer

The county treasurer's office owns an IBM System/32 minicomputer purchased in 1978 at a cost of \$31,026. An additional \$7,000 was spent to lease this system for the

first six months it was in the treasurer's office, and \$4,765 was spent for programming. Maintenance costs on the system for 1981-82 were \$2,904.

The IBM System/32 is an older, single function minicomputer that has essentially been replaced in the IBM line by the multi-user, multi-programming System/34. The functionality and expandability of the System/32 are quite limited.

The functions currently automated on this system include:

- general ledger accounting and monthly reporting
- miscellaneous receipts
- tax collection and reconciliation
- tax distribution
- special assessments
- motor vehicle taxes.

The county treasurer is responsible for collecting and/or distributing taxes among 115 to 120 tax districts including 17 townships and 12 villages. The office also maintains records for tax purposes on 7,000 to 7,500 real estate parcels, 2,500 personal property records, and 12,000 motor vehicles. The treasurer also handles an estimated 200 accounts for which revenues are received and distributed. All banking transactions are made by the treasurer's office. Accounting and disbursement of all funds are handled on the System/32.

The following manually performed activities in the treasurer's office are candidates for some form of automation:

- motor vehicle registrations
- drivers' licenses
- record of taxes paid
- delinquent tax list.

3. County Assessor

The county assessor's office owns a Burroughs L-8000 bookkeeping machine purchased in 1975 at a cost of \$32,000. Annual maintenance costs for 1982-83 are budgeted at \$4,800, and annual programming for this same period at \$950.00

At the time of its purchase, the L-8000 was Burroughs' updated version of its earlier L-series bookkeeping or accounting machines. These machines are very limited function computers, and even the most advanced L-series equipment cannot approach the power, versatility, functionality and ease of use of contemporary micro- and mini-computers. Hence, the L-8000 suffers from the many of the limitations of the L-4000 in the clerk's office and cannot be recommended for consideration for enhanced use. Its expandability is negligible.

The following functions are performed on this system:

- tax statements on motor vehicles
- personal property tax assessments

- real property tax assessments
- valuation change notices.

Real property valuations for assessment purposes are performed using standard reference guides or with information from a consultant hired to appraise new construction. Assessments statements are prepared on the L-8000 from records containing valuation information. Motor vehicle assessments are made in a manual process using the "Nebraska Motor Vehicles Values" manual.

The assessor's office maintains extensive records on real and personal property, motor vehicles, and utilities in the county, including records on approximately 7,000 parcels of real property in rural, commercial, residential, and exempt categories. A considerable number and variety of forms and records are employed in the office for the various categories of properties for assessment purposes.

4. County Sheriff

At present the county sheriff makes no use of electronic data processing. The sheriff's principal need is for a computer terminal and printer in his office connected to data supplied by the county treasurer in the following areas:

- motor vehicle registration
- drivers' licenses.

Additional areas for consideration of possible automation include:

- complaint file
- want and warrant file
- criminal history file.

5. Clerk of District Court

Interviews in this office revealed no current uses and no present requirements for electronic data processing.

B. Summary of Current Equipment and Cost

Figure 1: Current Costs

<u>Equipment</u>	<u>Date Purchased</u>	<u>Purchase Cost</u>	<u>Current Annual Maintenance</u>	<u>Current Annual Programming</u>
Burroughs L-4000	1973	\$14,000	\$2,800	\$600
IBM System/ 32	1978	\$31,026 7,000 ^{a/} 4,765 ^{b/}	2,904	-0-
Burroughs L-8000	1975	32,000	4,800	950
	<u>Total</u>	<u>\$88,791</u>	<u>\$10,505</u>	<u>\$1,550</u>

^{a/}Six-months lease cost.

^{b/}Cost of initial programming.

For purposes of figuring total data processing system cost, a five-year time period is used because it tends to be the maximum period for time payment (e.g., lease or lease-purchase) by local governments for such systems. In

addition, the rate of technological change in the recent past in this field has meant that a new generation of systems has appeared about every five years. Current indications are that this five-year period is becoming compressed and that major technological break-throughs are occurring in less than five years. Nevertheless, a five-year system life is a reasonable period to use for cost analysis purposes.

On this basis, using original purchase, plus current annual maintenance and programming costs, Butler County's five-year system costs are estimated at \$148,866.

Figure 2: Five-Year Costs

Equipment purchase	\$ 88,791
Maintenance ($\$10,505 \times 5$ years)	52,525
Programming ($1,550 \times 5$ years)	<u>7,550</u>
Total	\$148,866

Since the Burroughs L-4000 has been owned for ten years, the L-8000 for eight years, and the IBM System/32 for five years, the estimated total of \$148,866 probably understates actual system cost but it provides a reasonable basis for use in cost comparison in this study.

IV. Basic Applications to Consider for Computerization

A. Introduction

Even with ownership of three pieces of data processing equipment, the extent of automated data processing in Butler County is relatively low. This is understandable if for no other reason than the equipment currently being used. The Burroughs L-4000 and L-8000 and the IBM System/32 are out-dated machines with considerable limitations as to expansion or enhancement. They also represent generations of technology that do not permit multiple users, the performance of multiple functions or the integration of the principal functions and data bases of key county offices. Hence, what is done on the System/32 or the L machines in a given office must be manually processed or processed on a different machine in a different office. This leads to duplication of effort, redundance of filing and record keeping systems, and reduction of overall efficiency.

The current generation of data processing technology, including both micro- or minicomputers, permits and encourages functional and data base integration and allows for the performance of multiple functions by multiple users. For example, the county treasurer could create a motor vehicle registration file and allow access to this file (for inquiry purposes but not for purposes of entering or changing records) to the sheriff via a terminal in the that office. Similarly, the work of the register of deeds,

assessor, treasurer, and clerk could be integrated and streamlined using modern technology. This would involve the activities of tax assessment, tax roll preparation, tax billing and collection, tax disbursement, and financial accounting. In each of these cases, more than one person in more than one county office could perform a variety of functions simultaneously on the system and not interfere with the activities of others.

The type of system that should be considered by Butler County should be:

Transaction oriented--When a transaction such as updating the accounts receivable file is made by the county treasurer, the system accepts the transaction and automatically updates all affected ledgers and funds. This would, for example, permit automatic tax receipt distribution to the proper funds and accounts upon the entry of tax receipts into the system and would also provide for an audit trail of these transactions.

On-line--Computer terminals and printers in the various offices would be physically connected thus providing instant access to the system by all users.

Real-time--Processing on the system occurs at the time a user begins to work at a terminal. There would be no need to create punch cards or other input type documents to run through the system at a later time.

Multi-user and multi-programming--Several persons in different offices could perform different functions on the system at the same time.

The system should also allow users to undertake unique inquiries and generate unique reports using English-like commands.

With these system requirements in mind, the following functional areas should be considered for automation in Butler County using either a distributed network of micro-computers or a single multi-user, multi-programming mini-computer with terminals and printers in all relevant offices.

B. Application

1. County Clerk

- Integrated financial management system, including the following elements:

- general ledger accounting
- budgetary accounting
- vendor accounting
- accounts payable
- miscellaneous accounts receivable
- miscellaneous billings

- Payroll/personnel system
- Voter registration system
- Motor vehicle titles system
- Land transactions system (e.g., titles, deeds, etc.)

2. County Treasurer

- Integrated financial management system, including the following elements:
 - general ledger accounting
 - accounts receivable
- Tax billing and collection system, including the following elements:
 - tax roll and statement preparation
 - tax collection and reconciliation
 - tax distribution
 - delinquent tax list and statements
- Motor vehicle registration system
- Drivers' license system

3. County Assessor

- Real property file including the following categories of properties
 - rural
 - residential
 - commercial
 - exempt

(This file should contain all records on real property now maintained by the assessor. Its value would be to reduce substantially the person hours required to create, maintain, and change those records.)
- Motor vehicle tax assessments
- Personal property tax assessments

- Real property tax assessments
- Tax assessment valuation change notices

4. County Sheriff

a. Immediate

Access via a terminal in the sheriff's office of the motor vehicle registration file created by the county treasurer.

b. Future considerations

Criminal history file

Complaint cards

Want and warrant file

C. Estimated Software Cost

The estimated cost of application software (e.g., computer programming) for the functions in these four offices is \$50,000 to \$75,000.

V. Equipment Configuration and Estimated Cost

A. Microcomputer Alternative

This alternative proposes separate microcomputer based systems for the major county offices. These systems would be physically connected to one another to enable the offices to transfer and share information. However, each office would have and would control its own data base.

1. County Clerk

Three work stations (one at the counter for service to the public and two for use of staff in the clerk's office)

Ten MB hard disk system shared by the three work stations

One receipt printer at the counter

One 250 LPM printer

Estimated cost: \$25,000 - \$40,000

2. County Treasurer

Configuration identical to county clerk, except that the hard disk system will be increased to 25 MB.

Estimated cost: \$30,000 - \$45,000

3. County Assessor

Configuration identical to that of county treasurer.

Estimated cost: \$30,000 to \$45,000

4. County Sheriff

One terminal and dot matrix printer (90 CPS)

Estimated cost: \$2,500 - \$3,500

5. Estimated Cost

Figure 3: Microcomputer Option

	<u>Low</u>	<u>High</u>
Clerk	\$ 25,000	\$ 40,000
Treasurer	30,000	45,000
Assessor	30,000	45,000
Sheriff	2,500	3,500
	<hr/>	<hr/>
	\$ 87,500	\$133,500
Software	\$ 50,000	\$ 75,000
	<hr/>	<hr/>
Total	\$137,500	\$208,500

B. Minicomputer Alternative

This alternative would involve a centralized minicomputer with terminals and printers in each major county office. Although the county's data base would be centralized on this system, each office (e.g., clerk, treasurer, assessor) would have complete control over its own files and records.

1. County Clerk

Three terminals

One receipt printer

One 250 LPM printer

Estimated cost: \$14,600 to \$24,000

2. County Treasurer

Same as county clerk

3. County Assessor

Same as county clerk

4. County Sheriff

One terminal

One dot matrix (90 CPS) printer

Estimated cost: \$1,600 to \$3,100

5. Central Computer²

256 to 384 KB CPU

60 to 90 MB disk drive

Estimated cost: \$35,000 to \$65,000

6. Estimated CostFigure 4: Minicomputer Option

	<u>Low</u>	<u>High</u>
Clerk	\$ 14,600	\$ 24,000
Treasurer	14,600	24,000
Assessor	14,600	24,000
Sheriff	1,600	3,100
Central computer	<u>35,000</u>	<u>65,000</u>
	\$ 80,400	\$140,100
Software	<u>\$ 50,000</u>	<u>\$ 75,000</u>
Grand Total	<u>\$130,400</u>	<u>\$215,100</u>

VI. Alternative Methods of Acquiring Computer TechnologyA. Basic Alternatives

Butler County can acquire the required computer technology by three basic alternative methods. This is so whether the county chooses a micro- or minicomputer based system. These alternatives are:

* Rely on outside service bureaus for data processing. These agencies can be used to provide either "batch" or "on-line" data processing services;

* Acquire in-house computer hardware and hire technically qualified programmer-analyst staff to develop application software (programming) for the system; or

* Acquire a fully programmed and supported system, including both in-house computer hardware and custom modified application software, to meet the county requirements. Such a system would be operated by existing county personnel.

B. Evaluation of Alternatives

1. Service Bureaus

a. Advantages

- Software and hardware are owned and maintained by service bureau.
- A highly qualified staff is available in certain functional areas.
- The transition to automation from current operations would be relatively easy.

b. Disadvantages

- Communication breakdowns and attendant costs can occur.
- Communication costs can be high, especially if an on-line service bureau is used.
- Available expertise at the service bureau is limited should the county wish to initiate more sophisticated data processing systems and capabilities.
- Scheduling difficulties may occur.
- No known service bureaus offering county government data processing systems and support exist in Nebraska.
- Service bureau software may not provide much flexibility.
- The opportunity for expansion is limited and may involve high costs.

- The physical location of a service bureau may be a limitation.

2. In-house Hardware/In-house Software Development

This alternative is not deemed acceptable for the following reasons:

- The length of time required to create the required software would be excessive.
- The personnel and cost requirements of in-house software development and support are excessive.
- The limited availability of qualified programmer/analysts with experience in county government means that the county would have difficulty hiring and retaining a staff with qualified programmers.

This alternative would take too long, cost too much, and involve too much risk for a small local government to implement a data processing system.

3. Fully Programmed and Supported System

a. Advantages

- The county owns and controls its own system.
- Considerable expansion capability exists--both of hardware and application software elements.
- The software is tested and reliable and modified by the vendor to meet the county's specific requirements.
- The system can be operated easily by existing personnel.

- It provides for a relatively easy transition from current methods and systems to more modern technologies and capabilities.
- The vendor is fully responsible for system installation and performance per the county's specifications for the life of the system.

b. Disadvantages

- Certain problems are associated with ownership and control of a computer system, including failure, and use scheduling.
- Unanticipated vendor problems can occur.
- Personnel issues involving both training of personnel and personnel fear of or opposition to a system can exist.
- If the system has multiple users (e.g., several city departments), potential management, use, and scheduling problems can arise.

C. Recommendation

This study recommends that a Request for Proposal (RFP) be developed to solicit proposals from vendors offering fully programmed and supported systems based on either micro- or minicomputer technology. Disadvantages far outweigh advantages for both the service bureau and in-house alternatives. Hence, consideration of system development or acquisition using these alternatives is not recommended.

FOOTNOTES

¹The Butler County clerk is also the county register of deeds and election commissioner.

²CPU and disk capacities will vary according to equipment brands and operating and application software requirements. The specifications provided here are examples only and are intended for use in providing cost estimates for a system to meet the county's needs.



Center for Applied Urban Research
Peter Kiewit Conference Center
1313 Farnam on the Mall
Omaha, Nebraska 68182
Telephone: 402/554-2764



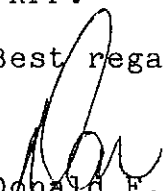
October 17, 1983

Mr. D. E. Struebing
Butler County Clerk
County Courthouse
David City, NE 68632

Dear Dean:

Enclosed is the "Proposed Butler County Contract" that should be attached to the RFP as Appendix B. The total package (RFP, Appendix A, and Appendix B) should be sent to the vendors on the list we sent last week and also to any vendors that request a copy of the RFP.

Best regards,


Donald F. Norris
Senior Research Associate

DFN:jc

Enclosure