ABSTRACT

The Economic Development function in local governments has become more important in municipal administration during this decade. The administrations now have a powerful tool that will assist them in planning their economic development strategies.

The City of Ottawa's Economic Development staff make use of a municipal economic database and analysis system ("OTEDS") to help them in their daily operations. Development of this system involved: SAS/AF software and the Screen Control Language (SCL throughout this paper); numerous statistical procedures; report writing and calls to different subsystems written in dBASE III + or SAS software.

We shall discuss problems encountered during the development phase, and the solutions which were looked at will also be presented.

Finally, staff training and implementation scenarios are discussed, with particular attention given to the choice of SCL as the main development tool.

INTRODUCTION

The City of Ottawa's Department of Economic Development has, as one of its goals, to monitor the local economy and issue, from time to time, various reports on the state of economic affairs. It has been decided to develop a turnkey system that would enable timely analysis of various indicators pertaining to municipal economic performance: building permits, labour force data, inflation, retail sales, etc.

This system, the Municipal Economic Database and Statistical System ("OTEDS"), performs statistical analysis, report writing, on-screen display functions and simple data management tasks. Staff using the OTEDS are not necessarily economists or statisticians; their expertise may be tourism, urban planning, senior management, clerical, etc. One of the first design goals identified during the preliminary analysis phase was thus to build a system which would be completely menu-driven. A second goal identified in the early stages was to allow the user the possibility of creating customized reports by making choices on a terminal screen. Finally, statistical analysis, ranging from elementary to complex, was a major requirement specified by staff in the Department.

These reasons warranted SAS software as the main development tool, with 2 of OTEDS's subsystems written in dBASE III + (another system, being implemented now, was written with the SCL and made extensive use of PROC FSEDIT and PROC FSBROWSE). The Department chose SAS software because of the variety of statistical procedures available in the software and the excellent report writing capabilities.

More specifically, OTEDS is written primarily with Screen Control Language, and the menus, help screens and program screens are designed under SAS/AF and SAS/FSP software.

OTEDS is comprised of four major functions:

- data selection
- analysis and reporting
- maintenance
- modelling

Although the system is mainly menu-driven, some functions (regression, municipal modelling, etc.) require intermediate-level knowledge of statistics and economics on the user's behalf. As for the output generated by OTEDS, it can be directed to a printer, to the screen or to a file in the case of temporary file creation.

MAJOR FUNCTIONS

The data selection group of functions allows the user to select files and variables that will be used in subsequent analysis routines during a session.

Data collected by external sources and used in OTEDS are: Consumer Price Index, Retail Trade, Housing and Construction, Labour Force Survey, federal government contracting. Two subsystems within OTEDS can be invoked: DIS / OLS, a municipal property-based mainframe system giving complete details relating to a property (zoning, square footage, assessment values, height, parking spaces, etc.); and OBOSS, a Departmental PC-based series of programs developed
in-house which provides an array of management functions such as displays and reports dealing with federal government contracts awarded to Ottawa-area companies. This system was designed to monitor the total worth of contracts since the two major industry groups in Ottawa (based on employment by industry figures) are public administration and community, business and personal services. Written entirely in dBASE III +, OBOSS only provides raw data in the form of .dbf files to OTEDS.

DIS / OLS (Development Information System / Office and Land System) is a subsystem that can be called up within OTEDS, and the input data for these programs is downloaded from the corporate mainframe using ADR's PC Datacom. Once downloaded, the individual property records are read into a SAS dataset and become part of a standalone microcomputer application (also written with SCL).

From all of the above functions, a dataset is always identified for the following parts of an OTEDS session, which would usually involve data analysis. Identification of the dataset is done with one of the many available list commands. Typically, the user would:

a) with one of the built-in DIRLIST commands, select a dataset
b) add new data to the dataset via the OTEDS Update facility (this is a series of FSEDIT functions)
c) choose the REGRESSION option from OTEDS's Main Menu
d) type variable names and a time period for the regression run
e) execute the command
f) view the results in the OUTPUT window
g) send the output to the printer

The dataset name and the dsid were stored in the macro symbol table during the data selection phase. When the user entered OTEDS's REGRESSION facility, the INIT label of the corresponding SCL program included two macro functions, SYMGET and SYMGETN.

Pressing the PF2 key would then display a list of variable names from the opened dataset, which the user would select from. The job would then be SUBMITTED to SAS for execution.

As demonstrated in the preceding example, the user does not have to write one line of code to execute the request.

Data entry can also be performed in OTEDS, although most of the input data is downloaded directly from Statistics Canada's main database, CANSIM. Manual data entry in OTEDS, the UPDATE facility, is part of the maintenance group of functions including archiving data to a tape backup unit and performing match/merge operations based on time periods.

A final group includes two programs in the design phase, a municipal econometric model and a provincial model.

OUTPUT

When invoking OTEDS, the user has the following options available in terms of output: write temporary files to disk to be used at a later date; perform screen display functions; serve as a front-end processor for the many Departmental systems; generate laser-printed reports, etc.

Before logging on to an OTEDS session, a user would usually know exactly what form the output would be in. It may then be necessary to perform tasks such as downloading soft fonts to the laser printer or placing a tape cartridge in the external tape backup unit.

Screen displays are generated by the numerous menu-driven choices the user can select, and extensive validation is performed such that error/warning messages are displayed should a choice or an entry be invalid.

Most of the printed output will likely end up in a Departmental report, either in a marketing type of brochure or used as background material to a business development report. On occasion, the data used in OTEDS will serve as input for the Quarterly Information Report presented to the City of Ottawa Economic Affairs Committee. For these reports, a file was set up with Hewlett-Packard's PCLPAK utility, in order to incorporate the various print settings (font name, orientation, copies, etc.).

MENU STRUCTURE

Consisting mainly of MENU, HELP and PROGRAM entries, OTEDS allows the user to make selections (such as 1, 2 or 3) from menus, or typing in a variable name on a program screen (such as 'GDP' on the macro indicators screen). Certain HELP entries are called up if the user types an invalid selection on a screen, as opposed to just seeing an error / warning message below the command line of the entry.

There is a HELP entry for every MENU and PROGRAM entry in OTEDS, and the user is always presented with examples of correct choices/entries in these HELP entries.

The data selection menu choices bring up a second level of MENU entries, from which the user chooses CPI, housing, labour force or retail trade. After a valid choice, the user is presented with a window containing the appropriate files, and one file can be selected from these lists of files.

The file selected will then be stored in the macro symbol table (with SYMPUT and SYMPUTN routines, included in the TERM label section of the data selection PROGRAMS), all the while being transparent to the user. Transparency was a major issue in the preliminary design phases of OTEDS, and the menu structure developed reflects the interactivity required for such a system.
A user moves down the stream of menus if a selection is valid, and can move back up one level in the OTEDS menu structure by typing END on the command line of any HELP, MENU or PROGRAM entry. Typing END on the command line of OTEDS Main Menu will bring the user back to DOS.

EXTERNAL CALLS

Some selections in OTEDS involve calling other systems that were developed earlier, or involve calling systems that can run as standalone applications, i.e. outside of OTEDS. Some of these calls adopt the form

```
call system("...some DOS command....");
```

or even, as is the case with the UPDATE facility

```
call facil('CPFLCANCPI','CPFLCANCPI.MAIN.SCREEN');
```

Another form, less frequent however, of external calls is

```
submit;
  x "...some DOS command....";
endsubmit;
```

THE CASE FOR SCL

The preliminary analysis phase for OTEDS concluded that SAS software would be the prime development tool, with reliance on the macro processing features combined with the Display Manager System. With the release of version 6.03 of the SAS System for Personal Computers, the Department decided to convert the application to a friendlier environment, the Screen Control Language with SAS/AF software.

Early tests indicated that processing time was high with all the WINDOW and DISPLAY statements, and macro processing was too slow for our purpose. The entry type structure of SAS/AF software, used in conjunction with SCL, provided greater flexibility for user interaction. We also noticed that development time was cut down by one-third to one half the time it took to set up the routines with the macro facility and the Display Manager System.

IMPLEMENTATION

OTEDS resides on the following:

- Wyse p386 running at 16 MHz, with 2 MB of expanded memory
- Sperry PC / IT, running at 10 MHz, with 2 MB of expanded memory
- Sperry PC / IT, running at 10 MHz
- Epson Equity II +, running at 10 MHz

There are two printers attached to the PCs, a Hewlett-Packard LaserJet Series II and an HP DeskJet.

Since most of the users are not systems-related people, nor are they economists or statisticians, their backgrounds do not, for the most part, include training with PCs. Staff were taught the basic DOS commands, as well as learning how to operate the hardware. One employee had some exposure to SAS software, such that the employee was taught the basic DOS commands, as well as learning how to operate the hardware. One employee had some exposure to SAS software, such that the employee was taught the basic DOS commands, as well as learning how to operate the hardware. One employee had some exposure to SAS software, such that the employee was taught the basic DOS commands, as well as learning how to operate the hardware. One employee had some exposure to SAS software, such that the employee was taught the basic DOS commands, as well as learning how to operate the hardware. One employee had some exposure to SAS software, such that the employee was taught the basic DOS commands, as well as learning how to operate the hardware. One employee had some exposure to SAS software, such that the employee was taught the basic DOS commands, as well as learning how to operate the hardware.

CONCLUSION

The system described here demonstrates the flexibility and ease of use that our Department obtained by using the Screen Control Language. For the user, the system performs regression analysis, analysis of variance, prints 2 to n-way frequency tables, etc., and the user need not worry once during a session about writing a single line of code. For the developer, and for maintenance purposes, OTEDS is simple and easy to code, structure, test and debug, cutting down on usually costly development time.

ACKNOWLEDGEMENTS

I would like to thank Eric McSweeney, Director of Business Development, for his support in this project. Mitchell Cogan and André Levesque, Economic Development Officers, provided useful comments for this paper. Hichem Ouardani participated in the coding and testing phases.

REFERENCES


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PC Datacom is a trademark of Applied Data Research Inc.

CANSIM is an official mark of Statistics Canada

APPENDIX 3

ODIUS SCREEN SAMPLES

This is ODICS Main menu, from which you are asked to enter a selection between 1 and 49.

ODICS Main Menu

Select Option ---

🟢 điện - City of Ottawa Municipal Economic Database System

Data Selection

1 Price Indices

2 Comprehensive

3 Labour Force

4 Retail Trade

5 Macro Indicators

6 Contracting

7 Maintenance

8 Update Files

9 Archive

Type 'END' on the command line to exit.

Enter your selection on the command line, or '?' for help.

ODICS Main Menu

Select Option ---

This is ODICS Main menu, from which you are asked to enter a selection between 1 and 49.

Data selection choices allow you to specify the type of data you want to analyse (options 1-4). Option 1 allows you to select the Department of Economic Development's Office / Land Inventory database. Options 2, 3 and 4 allow you to select the Department's contract or maintenance database. Entering a selection from these choices allows you to view the data in a format that is convenient for your needs.

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APPENDIX 2

PROGRAMS AND SOURCE

FILE UPDATE FACILITY

Command ----

Select a data type: Please make one selection(s):

- Customer price index
- Housing/salaries
- Retail trade
- Type B 20 on the command line as

init:

else do:

else:

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