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CURRENT AND POTENTIAL APPLICATION OF MICROCOMPUTERS
IN BANKING -- SURVEY RESULTS

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CURRENT AND POTENTIAL APPLICATION OF MICROCOMPUTERS
IN BANKING: SURVEY RESULT

Microcomputers have tremendous potential applications in practically all aspects of banking. In the past two years, many banking institutions have utilized microcomputers as tools in asset liability management, loan management, and investment management to improve bank-customer relationship and as a counseling and consulting vehicle.¹ A recent study on microcomputers in banking divided the potential areas of applications into six broad categories, and analyzed each area for its suitability in implementation for banks of various sizes.² These areas include (1) strategic management, (2) specific functional management, (3) bank operations, (4) bank consulting services, (5) bank marketing, and (6) bank communication including both external and internal communications. Due to the low price tag of most microcomputer and the increasing availability of user-friendly, menu-driven softwares for banking applications, the authors concluded that microcomputers would have great potentials in improving operating efficiency, lowering costs, and increasing fee income if the technology is properly utilized.

Such conclusions about potential application have not, heretofore, been tested. There are skeptics who say the number of banks currently using or working to use microcomputers is relatively small. Some writers identify specific areas for actual or potential microcomputer application without testing in which areas applications are widely used. For these reasons, the present study empirically investigates the extent to which banks are using microcomputers and in what areas are microcomputers being applied or are planned to be applied in the near future.

METHODOLOGY

The data for this study were obtained via a survey of bankers who were taking an elective course in microcomputers at the Southwestern Graduate School of Banking at Southern Methodist University, Dallas, Texas in June, 1983. For each of the potential areas of application in banking, they were asked to indicate the extent to which their banks are currently using or are contemplating using microcomputers in their organizations. To gauge the commitment in using microcomputers in the future, the survey instructed the bankers to indicate the time frame of the commitment by checking one of two boxes: (i) anticipated and (ii) desired. Anticipated represented those applications that the organization has already planned for within the next six (6) months. Desired represented those applications the organization would like to have in the future.

Respondents were also asked to state the asset size of their banks, the microcomputers employed, and to check off items describing the user characteristics. Bankers from fifty seven different banks responded to the survey. The survey results are discussed below.

SURVEY RESULTS

Bank and User Characteristics

Table 1 provides a summary of the respondent bank's characteristics. Majority of the sample banks are small to medium size banks with asset size of less than \$1 billion (80.7%). Banks with assets more than \$1 billion represent only 19.3%. The brand names used in these banks are diverse and include IBM, Apple, Osborne, TRS 80, Victor, Hewlett-Packard, and Monroe. At the time of the survey there did not seem to be any significant dominance of any particular machinery in the banking industry. In fact, respondent banks often use

several different brand names in the same organization. This result is not surprising for two reasons: (1) the markets for hardware are very diversified in the past few years, and more importantly, (2) hardware prices are relatively low and purchase decisions are more dominated by the availability of application softwares and the expertise and familiarity of the users on particular softwares.

<Insert Table 1 here>

The reported user characteristics provided interesting data for analysis. When the respondents were asked to check off identity of the users, 11.4% (of total responses) checked the president, 35.09% the vice presidents, 13.16% the managers, 26.32% clerical staff and only 14.04% checked data processing professional. This result indicates that managerial personnel (president, vice president, and managers) are utilizing this powerful tool, most likely as a decision tool. The user friendly, menu driven features of microcomputer softwares facilitate the involvement of decision makers in direct usage. Many bankers we talked with on other occasions have told us they wrote their own application programs for various applications. The ease of use of the microcomputer is further substantiated by the computer programming background of the users. Fifty percent of the users have no previous programming experience, 46.15% have minimal experience. Only 1.92% of the users regard themselves as competent programmer and 1.92% indicated that they were professional.

Areas of Applications

The respondent banks were asked to check off one of 3 columns in each of the potential areas of applications indicating whether the banks (i) were currently using the microcomputer for that application (Current), (ii) had

already planned to use it within the next six (6) months (Anticipate), or (iii) would desire to use it in the future (Desire). For ease of exposition, we divided the application areas with its corresponding survey results into 8 different categories (A) Strategic Management, (B) Loan Portfolio Management, (C) Investment Portfolio Management, (D) Deposit Accounts Management, (E) Bank Operations (F) Bank Consulting Services (G) Bank Marketing, (H) Bank Communication and Miscellaneous.

(A) Strategic Management

Table 2 summarizes the survey result in this category. Asset liability management and interest rate sensitivity analysis including gap analysis are the two areas of most concern. Over 40% of the respondent banks indicated that they were using some forms of software for these applications. Practically all the remaining respondents indicated that they had either planned for this application in the next six (6) months or would like to have these applications in the future. One interesting fact was revealed in the analysis. The percentage of respondents indicating applications of interest rate sensitivity analysis exceeds 100%. Closer scrutiny revealed that three (3) respondents had built an in-house rate sensitivity program but would desire to have a more sophisticated version in the future. Discussion with bankers in the microcomputer conference reveals that this practice is not at all uncommon.³ Initially, some bankers designed their own application using an easy to use electronic spreadsheet such as VISICALC. As their experience with microcomputers grew, they would purchase a more sophisticated and comprehensive package from a software vendor.

<Insert Table 2 here>

Tax planning and cashflow analysis were also important areas of applications. More than one third of the respondents indicated that they were currently using microcomputers in these areas. A significant percentage of the remaining respondents either had planned for or desired to use a microcomputer in these areas.

Responses to questions about the more sophisticated tools for strategic planning, such as mathematical programming and hedging by using options and financial futures, reveals that only about 17% were using microcomputers for these purposes. While about 30% would like to or had planned for such applications, the remaining (over 50%) had not indicated any intentions in the future. This result is not at all surprising as these techniques require personnel who have extensive training in these areas.

(B) Loan Portfolio Management

The survey result in Table 3 reveals the diversity of application of the micro in loan portfolio management. Among the eight (8) areas tabulated, credit analysis, customer profitability analysis, calculation of cost of funds, and default account collection, were the most cited areas of current applications. More than 31% of the respondents indicated that they were using the microcomputer for credit analysis for commercial accounts and about 25% indicated the usage of microcomputers for credit analysis for consumer accounts. About 25% of the respondents used micro for customer profitability analysis. More than one third indicated that they were currently using micros for calculation of costs of funds and 28% indicated they were using microcomputers for default account collection efforts. The remaining four areas of applications (credit scoring, loan pricing, performance evaluation, and credit analysis training) did not receive as high a priority as current applications.

<Insert Table 3 here>

A close examination of the Anticipate and Desired columns reveal that the respondents are very interested in future application in all areas. In particular, only 12.28% of the respondents were using microcomputer for commercial accounts loan pricing, 26.32% indicated that they had planned for such a system within the next six (6) months and a whopping 42% desired to have such capability in the future. Such strong interest in desired future applications are also apparent in areas including credit scoring model (28%), loan pricing for consumer (30%), customer profitability analysis (33.3%), calculation of cost of funds (29.8%), and credit analysis training (26.3%).

The loan portfolio application area with the largest proportion of non-responses is credit analysis training (58% non-response) indicating that this area may be less appropriate for microcomputer applications than other areas. However, 26% of the respondents indicated their desire in application for the future.

(C) Investment Portfolio Management

While current interest in using microcomputers in the management of investment portfolio is not as strong as those in the strategic management areas, there appears to be a strong desire for application in certain areas in the future (see Table 4). The most applied areas currently include bond investment strategy using simulation (19.3%), bond yield calculation (29.8%), bond swap strategy (19.3%), and bond coupon tabulation and clipping (24.6%). The three areas which most respondents desired to have in the future also include bond simulation (33.3%), bond yield calculation (24.5%) and bond swap strategy (31.6%). Using microcomputers to identify arbitrage opportunities seemed to receive the least attention by respondents.

<Insert Table 4 here>

(D) Deposit Accounts Management

Similar to the investment category, strong interest was indicated by the respondents in using the microcomputer in deposit account management (see Table 5). The two areas most used currently include pricing (26.3%) and account analysis and forecast (29.8%). Microcomputers were also used in individualized IRA analysis for customers, (19.3%), deposit rates inquiry (24.5%), and signature recognition for cashing checks (12.3%). Strong interest was indicated for future usage in nearly all areas.

<Insert Table 5 here>

(E) Bank Operations

Among the three (3) areas of applications indicated, check pick-up scheduling was the most popular area in this category (see Table 6). However, very few banks indicated a desire for future applications in this area. Using a microcomputer to keep track of bank personnel information, however, received a better score for future application. Overall, it seems that the bank operation category did not have a high priority for those respondent banks. This low priority may be due to the extensive use of mainframes in this area.

<Insert Table 6 here>

(F) Bank Consulting Services

From the summary tabulation in Table 7, it is apparent that the majority of the respondent banks are not currently using the microcomputer as a consulting tool. For example, only 5.26% of the respondents are using the microcomputer to help the business customer or consumer. However, the statistics under the desire column indicates that there is strong interest and recognition of this tool as a fee generating vehicle in the future. As deregulation

continues and competition among institutions increases, it is highly likely that this category of application will become more important.

<Insert Table 7 here>

(G) Bank Marketing

Microcomputers can be a useful tool in bank marketing. For example, with individualized retirement account analysis software available, questions by potential customers regarding their future cashflow from the account can be analyzed and demonstrated to the customers immediately. Microcomputers have also been used in the lobby for customer inquiry. Banks can also use the microcomputers to control video presentations. The survey result in Table 8 indicated that such applications are not widely used currently, but quite a number of banks did recognize and desire such application in the future.

<Insert Table 8 here>

(H) Bank Communication and Miscellaneous

The final category of the applications include using microcomputers as a communication device and in other miscellaneous areas. With the exception of using the microcomputer to access Federal Reserve Services, as a word processor, and for safe deposit box accounting, current applications in these areas are minimal. Furthermore, the desire for using microcomputers in these areas are also much less than other categories. These statistics may reflect the fact that communication software (which is needed to interface with mainframe computers) is not fully developed currently. As the availability of these softwares are widely available inexpensively, one would expect an increase in application in these areas.

<Insert Table 9 here>

Summary and Conclusions

In this paper, we have empirically examined the extent to which banks are using microcomputers and in what areas microcomputers are being applied or planned to be used in the near future. We verified that microcomputers were used in nearly all of the fifty-seven banks surveyed. In addition, we found many of the surveyed banks used microcomputers in many of the potential areas for application.

Areas of particularly extensive current application included strategic management (particularly asset/liability management, cash flow analysis, and interest rate sensitivity analysis), loan portfolio management (with emphasis on credit analysis, customer profitability analysis, cost of funds and default account collection), word processing, and deposit account analysis (particularly pricing and account analysis and forecast). Areas in which applications were anticipated by numerous banks included interest rate sensitivity, and loan pricing, customer profitability analysis. Areas of extensive desired future usage included most categories of strategic management, investment and bond swap strategies, most areas of deposit account management, and most consulting service areas. The area with the lowest current, anticipated, and desired usage was bank operation. Based on current, anticipated, and desired usage and the position of bankers using microcomputers, we conclude microcomputers are being used by upper-level bank management for decision making. Future growth in usage appears likely to continue in this vein.

NOTES

¹For documentation of some applications in these areas, see Robert H. Long, "Applications of Micro Technology in Banking's New World." Journal of Retail Banking (June 1982), pp. 31-36. Also see Timothy S. Copeland "Aspects to Consider in Developing a Loan Pricing Microcomputer Model," The Magazine of Bank Administration (August 1983) pp.

²Chun H. Lam and George H. Hempel, "Microcomputers in the Banking Industry," Proceedings of the Conference on Bank Structure and Competition, The Federal Reserve Bank of Chicago, 1983.

³Microscape 1983, a microcomputer conference sponsored by Bank Administration Institute in Chicago, August, 1983.

Table 1

Bank and User Characteristics
 number of respondent banks n = 57

1. Bank Asset Size

less than \$1 billion	80.7%
larger than \$1 billion	19.3%

2. User Characteristics

(i) User(s) of microcomputers

President	11.4%
Vice President	35.09%
Managers	13.16%
Clerical Staff	26.32%
Data Processing Professional	14.04%

(ii) Computer programming background

None	50%
Minimal	46.15%
Competent	1.92%
Professional	1.92%

Table 2

Application of Microcomputers in Strategic Management
(all numbers are expressed as percentages of the 57 respondent banks)

	<u>Current</u>	<u>Anticipate</u>	<u>Desire</u>
1. Asset Liability Management Financial statement projections and analysis	43.86%	20.69%	24.56%
2. Interest rate sensitivity including gapping analysis	43.86	28.07	24.56*
3. Tax planning for management of the bank	33.33	22.81	33.33
4. Cash flow analysis for liquidity and reserve management	38.60	17.54	28.07
5. Optimization Approach using mathematical programming techniques	17.54	7.01	24.56
6. Hedging strategy using options and financial futures	17.54	3.51	26.32

*Includes 3 cases in which banks were currently using microcomputer in rate sensitivity analysis but would also desire a more comprehensive model from vendors in the future.

Table 3

Application of Microcomputer in Loan Portfolio Management
(all numbers are in percentages of respondents)

	<u>Current</u>	<u>Anticipate</u>	<u>Desire</u>
1. Credit analysis for commercial accounts	31.58	19.30	28.07
consumer accounts	24.56	10.53	19.30
2. Credit analysis using credit models	12.28	7.02	28.07
3. Loan pricing for commercial accounts	12.28	26.32	42.11
consumer accounts	12.28	15.79	29.83
4. Customer profitability analysis	24.56	26.31	33.33
5. Calculation of cost of funds	36.84	14.04	29.83
6. Default account collection	28.07	3.5	15.79
7. Performance evaluation	21.05	5.26	24.56
8. Credit analysis training	10.53	5.26	26.32

Table 4

Application of Microcomputer in Investment Portfolio Management
 (all numbers are expressed as percentages of the 57 respondent banks)

	<u>Current</u>	<u>Anticipate</u>	<u>Desire</u>
1. Bond buy, sell hold strategy using simulation	19.30	8.77	33.33
2. Bond yield calculation	29.83	7.02	24.56
3. Bond swap strategy	19.30	8.77	31.58
4. Bond coupon tabulation and clipping	24.56	5.26	10.53
5. Repurchase agreement analysis	17.54	1.75	15.79
6. Repurchase agreement securities monitoring	15.79	3.50	15.79
7. Identify arbitrage opportunities	10.53	5.26	15.79

Table 5

Application of Microcomputer in Deposit Accounts Management
 (all numbers are expressed as percentage of the 57 respondent banks)

	<u>Current</u>	<u>Anticipate</u>	<u>Desire</u>
1. Deposit accounts pricing	26.32	10.53	31.58
2. Individualized IRA analysis for (potential) customers	19.30	12.28	29.83
3. Deposit accounts analysis and forecast	29.83	5.26	26.32
4. Deposit accounts balance inquiry system	42.11	1.75	22.81
5. Deposit rates (C.D., MMA) inquiry system	24.56	3.50	24.56
6. Signature recognition for cashing checks	12.28	5.26	21.05

Table 6

Application of Microcomputer in Bank Operations
(all numbers are expressed as percentages of the 57 respondent banks)

	<u>Current</u>	<u>Anticipate</u>	<u>Desire</u>
1. Scheduling of check pick up from branches	21.05	0	3.5
2. Employee work scheduling	8.77	5.26	12.28
3. Bank personnel information system	17.54	7.02	21.05

Table 7

Application of Microcomputer in Consulting Services
(all numbers are expressed as percentages of the 57 respondent banks)

	<u>Current</u>	<u>Anticipate</u>	<u>Desire</u>
1. Cash management (lock-box and disbursement program)	14.04	1.75	19.30
2. Financial planning for business	5.26	10.53	35.09
3. Financial planning for consumers	5.26	5.26	28.07
4. Investment and financing advice	5.26	8.77	31.58
5. Trust service and estate planning	12.28	3.50	22.81

Table 8

Application of Microcomputer in Bank Marketing
(all numbers are expressed as percentages of the 57 respondent banks)

	<u>Current</u>	<u>Anticipate</u>	<u>Desire</u>
1. Individualize IRA analysis	15.79	10.53	31.58
2. Direct inquiry via microcomputers in lobby	5.26	5.26	26.32
3. Microcomputer-controlled video presentation	1.75	5.26	22.81

Table 9

Application of Microcomputer in Communication
and Miscellaneous Activities
(all numbers are expressed as percentages of the 57 respondent banks)

	<u>Current</u>	<u>Anticipate</u>	<u>Desire</u>
1. Electronic Mail (memos to branches or subsidiary)	8.77	3.50	21.05
2. Market information sent to branches or subsidiary	10.53	1.75	14.04
3. Access national data bases	7.02	8.77	14.04
4. Access Fed Line Services (of the Fed)	26.32	7.02	15.79
5. Home banking services	3.50	3.50	19.30
6. Word processing	49.12	12.28	19.30
7. Safe deposit box accounting	19.30	14.04	24.56

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