



THE BRITISH COMPUTER SOCIETY
DEVELOPING COUNTRIES SPECIALIST GROUP

Use of Computers for
National Development

Banking and Finance

AN ANNOTATED BIBLIOGRAPHY

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Use of Computers for
National Development

Banking and Finance

An Annotated Bibliography

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FOREWORD

This bibliography has been prepared on the initiative of the Specialist Group for Developing Countries of the British Computer Society. Grateful acknowledgement is made of the assistance provided by the following organizations who generously sponsored the research to compile the bibliographies:

National Computing Centre;
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Additional details on sources of information and assistance or any of the topics listed in this bibliography can be obtained from the Specialists Group for Developing Countries.

The British Computer Society is the major representative body of the computer profession in the United Kingdom. It is the accepted national voice on such professional issues as standards and education, good practice and data banks. The Society has international links with many computer organizations. It is developing its ability to speak for wider areas of the profession through its boards, committees, branches and specialist groups.

The Specialist Group for Developing Countries was founded in 1976 with the objective of sharing the expertise in the practical applications of computing techniques developed in the United Kingdom, with appropriate allied bodies in developing nations. Increasingly the liaison of the Specialist Group is directed more widely than just to other computing professionals, and towards those directly engaged in national planning in developing countries. For this reason, the work of the Specialist Group is orientated to the applications rather than the technology of computing. The Specialist Group is actively engaged in publicizing achievements in the application of computing technology, relevant to the needs of developing nations. It participates in initiatives to encourage governments and aid agencies to facilitate the transfer of the benefits of properly applied technology to those countries most in need. In its own right the Specialist Group seeks to encourage indigenous achievements by fostering the spirit of co-operation between computing professionals by such means as education, study visits and the exchange of experience. The Specialist Group is pleased to assist in building relations in these fields and may be

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INTRODUCTION

The rapid emergence of developing countries as industrializing nations has important implications for much of the traditional service sector activity. In the banking and financial community this is very much the case, with an urgent need to provide a flexible and adaptive infrastructure which will support both industrial and commercial developments. Major financial resources are required to develop natural and human resources and it is clear that both the efficacy of the developed resource and the benefit to the nation will be strongly influenced by the skills of financial management employed to control development.

The growing complexity of many of these problems and the need to make effective use of scarce resources and skills suggest that the contribution of advanced technology may be important in the future. Given the rapid introduction of computers and related systems by the developed world, adoption of these techniques in the developing world becomes a matter of some urgency. At the same time it is important to ensure that systems which are introduced are appropriate to conditions in the developing country. Issues like awareness and skill in the field of computing and data processing will be important determinants of the type of system required and the modifications which might be necessary to those approaches employed in more highly developed nations. In this connection, a major consideration in development is always the use of indigenous resources wherever possible and the reduction of dependence on outside agencies as soon as possible: this bears strongly on the selection criteria for advanced systems.

One of the distinguishing features of development financial management is the scale and complexity of projects which may be undertaken. On the one side there often exists a sophisticated international financial/political network providing aid in various forms under various conditions; on the other there is a community with widely differing needs, varying degrees of financial experience and sophistication and geographically diffuse. The structure of finance, both 'soft' (in the sense of credit and other arrangements) and 'hard' (in the sense of equipment, offices etc.) will be strongly influenced by these two sides: once again this creates pressure for the use of advanced and flexible systems.

This bibliography identifies sources of further information about various aspects of the theme of computers and finance in developing

countries. Its content reflects the imbalance in applications: almost all published material describes sophisticated uses of computers in developed countries. Consequently, descriptions of typical systems in the developed world are also included which give an indication of what could be done.

It is clear from the literature that computers have had a major impact on the developed world's financial systems, and this trend is likely to accelerate as the possibilities of electronic funds transfer and similar concepts become a reality.

One of the difficulties facing developing countries lies in adapting these advanced techniques and technologies to their own circumstances. Hopefully this bibliography will help to identify areas and directions for the development of an 'appropriate' banking/financial technology which makes effective use of computers.

ON-LINE INFORMATION SYSTEMS

1. Bells, S. New Zealand leads in banking systems. Comput. Wkly. (GB) 8 (688), 22 (10 Jan. 1980).

One of the largest private data processing operations in the world is run as a cooperative venture by New Zealand's banking industry. It is the only system that serves a country's entire banking community and it is still growing. This article reports on the progress and plans of this project. (no refs.)

2. Bergmann, T. Some aspects of the STI system operation within the Czechoslovak Trading Bank Inc. Cesk. Inf. Teor. and Praxe (Czechoslovakia) 21 (4), 112-114 (1979). In Czech.

The Czechoslovak Trading Bank (CSOB-CTB) is an institution for Czechoslovak external economic relations. A partial analysis of STI systems information use as well as of specific information use is presented with a reference to some bank functions. A brief typology of users takes notice also of corporate users. Selected information services the activity and the organizational framework of the STI unit (ZIS VTEI) are all briefly described. (3 refs.)

3. Fort, Z. Link between automated information systems and management information systems. Mech. Autom. Adm. (Czechoslovakia) 20 (8), 294-295 (1980). In Czech.

Discusses the development of automated management systems in the field of financial data processing in insurance companies or banks. The characteristic features of the automated information systems are described and the vertical and horizontal integrity of the information processing within this system is graphically illustrated. It is concluded that the process of building automated information systems influences directly the process of building automated management systems. The analogy between the automated information system in insurance companies or other financial data processing institutions and complex automation of technological processes in production is considered.

4. Logan, D.J. and Miranda, J.B. Mini-managed ATM network streamlines bank's operations. Comput. Data (Canada) 4 (11), 44-45 (Nov. 1979).

Surrounded by IBM 303X, 370 and Amdahl processors, a powerful minicomputer system is the newest on-line banking addition to the Bank of Montreal's computing complex in Toronto. The dedicated purpose of the system is to manage the bank's growing network of automatic teller machines (ATMs). (no refs.)

5. Lonneker, W. Data processing systems for financial institutions. Buerotechnik (Germany) 28 (3), 186, 189, 192-193 (March 1980). In German.

The article is a general review of internationally available equipment for computer terminals in banks and financial institutions generally. (no refs.)

6. Neumann, S. and Segev, E. A case study of user evaluation of information characteristics for systems improvement. Inf. and Manage. (Netherlands) 2 (6), 271-278 (Dec. 1979).

Reports on a case study of user evaluation of information characteristics as a basis for the improvement of an information system. Branch-managers of a large bank were asked to evaluate the output of the system according to four information characteristics: accuracy, content, frequency and recency. The findings of this study indicate that the users at the bank had a holistic perception of their information, and that content was a dominant characteristic which spilled over other characteristics.

7. Oakes, D. Demand is mounting for on-line services (Canadian banking). (IBM Canada Ltd., Toronto, Canada.)

The introduction of daily interest rates and convenience banking has spurred activities in on-line systems. The author describes some early systems and predicts what can be expected in the future. (no refs.)

8. Sekiguchi, M. Interbank on-line systems meet consumer needs in Japan. AEU (Japan) 141-144, 146-147 (Aug. 1980).

The interbank on-line system being used in Japan today is described in terms of seven topics: the need for interbank on-line networks, the history of interbank networks, the development of interbank exchange systems, the development of interbank cashing service systems, shared on-line systems for regional institutions, technical conditions and future prospects. (no refs.)

9. Glusac, D.V. Analysis and computation of reliability of on-line real-time system of Beogradska bank. Telekomunikacije (Yugoslavia) 27 (2), 15-18 (1978). In Slovenian.

A simple mathematical approach is used which is applicable to other similar systems. The basic objective of the reliability computation and analysis is to aid the installation of redundancy facilities in order to ensure a swift and efficient maintenance service. (3 refs.)

10. Koyama, K., Shoboji, K. and Isobe, M. On-line banking system on Hitachi computer system, HITAC M series. Hitachi Rev. (Japan) 27 (3), 289-294 (Aug. 1978).

Japan's total on-line banking systems have now entered the age of practical applications, while keeping up with ever-growing demands for rationalization of clerical work and support of branch office activities on a greater scale. The Computer System HITAC M Series is a family of Hitachi computer systems equipped with many

features and facilities. Its high performance hardware, intelligent banking terminals as well as mainframes and software facilitate the construction of a total on-line banking system. (no refs.)

11. Abe, Y. A Japanese on-line banking system. Datamation (USA) 23 (9), 89-94, 96-97 (Sept. 1977).

In February 1977, the new on-line system centred around three super-scale computers went into operation. The new on-line system was named 'HOPS', an acronym derived from 'Heart On-line Processing System'. The heart is the trademark and symbol of the Dia-Ichi Kangyo Bank and it represents the motto 'the bank with a heart'. It took three years and 3200 man-months to develop the HOPS system. The problems encountered are outlined in this paper. (no refs.)

12. Imae, K. Total on-line banking system. Inf. Process. Soc. Jpn (Joho Shori) (Japan) 18 (6), 579-586 (1977). In Japanese. (no refs.)

13. Srinivasan, T.V. and Sweet, B.R. A new approach to on-line banking hardware forecast. Modelling and Simulation, vol. 7, Pt II, pp. 713-716. Pittsburgh, Pa., USA, 26-27 April 1976.

Proposes a new approach to the modelling and simulation of on-line banking systems, which makes it feasible to forecast the volumes of account file activity and computer hardware requirements for on-line systems implementation. The simulated results provide an effective tool in hardware and manpower planning for current and future on-line system projects. (15 refs.)

14. Shoboji, K. and Ueda, Y. Software packages for on-line banking system. Hitachi Rev. (Japan) 26 (10), 357 (Nov. 1977).

On-line banking systems, which have been developed along different lines, are now about to enter a new period of evolution. To meet demand, Hitachi Ltd have developed a software package for banks - the Hitachi Banking Application Control System (HIBACS) as a member of the Hitachi Computer System HITAC M series, which is the nucleus of an on-line integrated banking system. (no refs.)

15. Tanimoto, K. and Ueda, N. The second-stage on-line banking system of the Tokai Bank Ltd - System 100. Hitachi Rev. (Japan) 26 (6), 209-212 (June 1977).

Describes considerations given especially in developing the System 100 and introduced the outline of the computer system and the branch office terminal system. (no refs.)

16. de Blanche, E. and Oppenheim, P. UBS/IBM 3600 communication network. Systems (S. Africa) 6 (8), 12-14 (Aug. 1976).

Shortly after IBM announced its 3600 Finance Communication System in June 1973, the United Building Society ordered this new equipment to replace and expand its existing network which, at that stage, consisted of approximately 220 IBM 1060, 2740 and 2970 terminals. Today, with well over 650 workstations on-line, UBS have the largest IBM 3600 System as well as one of the most

sophisticated real-time Building Society systems in the world.
(no refs.)

17. The VIDEOTON VT 1005 small computer system. Mech. Autom. Adm. (Czechoslovakia) 16 (9), 369 (1976). In Czech.

Describes briefly two variations of the VT 1005 computer: the VT70 bank terminal with a series of peripheral equipment which can operate in on-line or off-line mode; and the VT50 small business computer with microprogramming control unit for administrative data processing. The modular operating systems enable simple operation. The effectiveness of the equipment is accomplished by unification of the basic and technical software. (no refs.)

18. Darvas, I. and Makar, F. The modern teleprocessing network of the Czechoslovak National Bank. Inf. Elektron. (Hungary) 11 (4), 308-313 (1976). In Hungarian.

Conditions for the realization of modern data transmission networks came to maturity in Hungary too. More and more companies and institutes intend the establishment of data transmission networks. The article presents a basis for this task by introducing one of the most developed systems realized in the Comecon countries. (no refs.)

19. Kalista, V. A network for data acquisition and transmission in the Czechoslovak State Bank. Mech. Autom. Adm. (Czechoslovakia) 15 (8), 293-298 (1975). In Czech.

Describes the principle, realization and experiences with a network employing 287 T-100 terminals connected either directly or by means of fully duplex telegraphic lines to one of the 15 regional programmable minicomputer-controlled concentrators. These systems are connected directly or by means of 11 fully duplex telephone lines with two main centres in Prague and Bratislava. (no refs.)

20. Fejfar, J. and Trojan, S. Building a network for data collection and transmission within the framework of the Czechoslovak Bank. Acta Polytech III (Czechoslovakia) no. 5 pp. 99-102 (1973). In Czech.

Describes a data processing system with centres in Prague and Bratislava. Data acquired in individual districts by means of teleprinters are transmitted on-line to regional centre data concentrators. The system uses the Varian 620/L-100 computer. (1 ref.)

21. Akiyama, M., Eguchi, H. and Arima, S. The data communication system for Universal Cashing Service. 2nd USA-Japan Computer Conference Proceedings, Tokyo, Japan, 26-28 Aug. 1975, pp. 285-289. AFIPS, Montvale, N.J., USA (1975).

This is the data communication system for Universal Cashing Service in which any bank customers are able to withdraw cash by making use of commonly used cash dispensers installed in public places. In this system, an inquiry message for payment originating from a cash dispenser is switched at the Central Computer Centre (CCC) to the computer centre of the bank concerned in which the necessary processing for deposit ledgers is carried out in real-time. Computers used

by deposit systems of bankers are of wide variety; therefore, technical and operational interfaces were established between the CCC and those computer centres. Through the standardization of the interfaces, many connections among the different kinds of existing systems became possible, and a commonly used real-time system was realized in a great scale. Technical problems such as response time due to the complicated networks, recovery methods for failures etc. were all solved for the development of this system. (no refs.)

22. Sugiura, N., Yamamoto, M., Hamachi, M. and Hayashi, T. Mini-computer based data communication facilities in the banking systems. World Telecommunication Forum Technical Symposium, Geneva, Switzerland, 6-8 Oct. 1975, p. 3.3.6/1-7. Internat. Telecommunication Union Geneva, Switzerland (1975).

Being transaction-oriented business, financing business is suitable for computerization. For this reason, computers have been introduced to this field since early times and banking systems have led the technological developments of on-line data processing systems. Minicomputers play an important role as data communication facilities in such a banking system. The authors developed many minicomputer based data communication systems for a total banking system, and have already provided many banks with these systems. These systems are developed under a consistent philosophy of Communication Network Facilities (CNF) in on-line computer systems. The article discusses technical aspects and future trends of these systems, and it is intended to introduce CNF and its software tools. SONET, APDG. (2 refs.)

23. Agnew, J. On-line savings systems: moving up to electronic funds transfer. Canadian Datasyst. (Canada) 6 (9), 56-59 (1974).

Looks at status of on-line banking systems and the possibilities of EFT in the future. (no refs.)

24. Ohrenstein, F. State Bank of Czechoslovakia communications network. Commun. Int. (GB) 2 (3), 38, 40 (March 1975).

Describes the design and operation of the Czechoslovakian State Bank data acquisition and transmission network consisting of two separate subnetworks connected by a high speed asynchronous leased line: the Prague network with twelve remote concentrators controlling a total of 92 branches with 220 terminals; and the Bratislava network with two remote concentrators controlling a total of 39 branches with 82 terminals. The network employs a total of nineteen Varian computers. (no refs.)

DOCUMENT HANDLING; NETWORKS; DATA CAPTURE

25. Cupa, P. Automated acquisition of input data in the Czechoslovak Insurance Office. Mech. Autom. Adm. (Czechoslovakia) 19 (11). 419-421 (1979). In Czech.

Discusses the experiences with the adoption of the automatic multi-keyboard data acquisition equipment (Redifon Seecheck recorder) as the input media for insurance data processing. This equipment has replaced the previously used punched card equipment. The organization of the Czechoslovak insurance data processing centres is briefly described.

26. Kato, E. Realising high reliability in Japanese banking systems. J. Inf. Process. (Japan) 2 (1), 10-24 (1979).

Describes how reliability is being realized in the four critical areas of data integrity, system capacity, error recovery, and system security. All examples are based on actual systems using Fujitsu products. (8 refs.)

27. Lado, Z. Computerised documents for bank financial clearing. Informatyka (Poland) 14 (8-9), 4-5 (Aug-Sept 1979). In Polish.

Discusses computerized documents of bank financial clearing between enterprises, issued in 1978 by the National Bank of Poland. The great significance of format and content standardization of these documents for their quantity and the need for speeding up the clearings is emphasized. (no refs.)

28. Meata, N.K., Miska, V.K. and Vua, A.K. A feasibility study of the pilot teleprocessing network for Indian banks. Electron. Inf. and Plann. (India) 6 (10), 807-826 (July 1979).

Teleprocessing of data through computer networks has come to stay as a realistic system which is offering important benefits for event oriented/commercial applications. In this report, a techno-economic analysis of a pilot banking network has been carried out. A pilot network with four computing modules at Delhi, Bombay, Calcutta and Madras or star-configured module, with 10 city concentrators (computing modules) at metropolitan cities has been considered initially. (27 refs.)

29. Otsuki, S., Fujita, Y. and Tabata, M. New data communication system for nationwide banking activities. Jpn Telecommun. Rev. (Japan) 22 (1), 62-66 (Jan. 1980).

The data communication system for nation-wide banking activities

(ZENGIN system) began operating in April 1973. However, the amount of transaction data processed through the system went on increasing and it became necessary to replace the system with a new one. A new system was developed which had processing capacity of five times the previous system, and was put into operation on 13 February 1979. This system is capable of handling 3.4 million exchange messages per day. Its network covers all private banking organs and their branch offices throughout the country. An outline of the new system and the new technology is introduced in this paper. (no refs.)

30. Drummond, P.N. Society for Worldwide Interbank Financial Telecommunication. Intclcon 79 Exposition Proceedings, Dallas, Texas, USA, 26 Feb. - 2 March 1979, p. 64. Horizon House Internat., Dedham, MA, USA (1979).

The SWIFT network has been in operation since 9 May 1977 four years after the foundation of the company in May 1973 by 240 of the largest European and North American banks. The culmination of a range of studies, the system enables member banks to transmit between themselves international payments, statements and other transactions associated with international banking. The use of the network is more convenient and reliable than past methods of communications (mail, telex and cable), and enables the banks to offer a better service to their customers. Over 500 banks with almost 1000 branches are currently connected to the system. (no refs.)

31. Haklar, L. The financial information system. Inf. Elatron. (Hungary) 14 (2), 69-75 (1979). In Hungarian.

The financial information system is an important tool for the control and follow up of financial affairs and money circulation. The concepts of the financial information system are outlined. The main objectives, the focal points, the system model, the main types of input and output, the system structure with its information circles as well as the concept of computer techniques are described. After introducing the hardware the tendencies and possibilities of development are dealt with. (3 refs.)

32. Hick, B. Bank data switching goes all electronic. Can. Electron. Eng. (Canada) 23 (2), 46, 49-50 (Feb. 1979).

Describes the organization of the Canadian banking system characterized by a relatively small number of banks, each having a large number of branch offices. The EDP facility has the capacity of 360 data communication lines and 3600 terminals (1979). The switching problem has been solved by the installation of four Front End Switches with a maximum capacity of 512 incoming lines. This arrangement simplifies troubleshooting and assures high reliability of the system. (no refs.)

33. Houen, C. An interrelated processing network architecture: I. Inf. and Manage. (Netherlands) 1 (1), 27-33 (Nov. 1977).

Described the evolution of an architecture for a multi-centre processing network providing banking service production and delivery for the 1500 branch Royal Bank of Canada. The author provides

background on the Bank and its operations, current systems and future requirements. (no refs.)

34. Newmans, S. International messages are moving SWIFTly. Telecommunications (USA) 13 (2), 75-77, 99 (Feb. 1979).

Nearly six years ago, The Society for Worldwide Interbank Financial Telecommunication (SWIFT) was born to manage and operate an international message-switching system. Today, the service is indispensable to 575 users on two continents in processing ever complex banking transactions. The author, a SWIFT director, looks at the activities preceding and following the establishment of the system, which, on a given day, transmits more than 100 000 messages. (no refs.)

35. Robinson, D. Development and initial operating experience of the SWIFT system. Evolutions in Computer Communications, Kyoto, Japan, 26-29 Sept. 1978, p. 115-119. North-Holland, Amsterdam, Netherlands (1978).

This paper covers the development of the International Banking Payment System known as SWIFT from its original conception through to the first car's operational experience. The background to its development, the selection of the type of network, the vendors and interfaces with users of the system are all described and an appreciation is given of the problems of developing a system of considerable complexity covering many countries. (no refs.)

36. Sato, T. and Arase, H. Integrated data communication banking system for shared use. Jpn Telecommun. Rev. (Japan), 21 (1), 67-70, (Jan. 1979).

The system described is composed of a DIPS centre, standard banking terminals at each branch office, and 1200 bit/s data transmission lines between them. This system also has a remote batch service with substantial data collection and distribution function facilities. (no refs.)

37. Sakaguchi, W., Ohmae, Y. and Ogawa, J. Data communication system for postal banking service. Jpn Telecommun. Rev. (Japan) 21 (2), 158-161 (April 1979).

This data communication system for postal banking service is a huge system, unique anywhere in the world. It includes many terminals installed in about 20 000 post offices throughout Japan. These terminals are connected by communications lines with nine computer centres, which are intercommunicated mutually through an exchange centre. The first computer centre in Tokyo has been in operation since August 1978 and the nation-wide system is scheduled for complete operation in 1983. This paper describes an outline of the new data communication system. (no refs.)

38. Schaeffer, R. New opportunities in the SWIFT network for the mini-computer manufacturer. Commun. Int. (GB) 5 (10), 40, 42 (Oct. 1978).

The banking world has been aware of the need for reliable and secure communications for an appreciable time. SWIFT (Society for

Worldwide Interbank Financial Telecommunications), came into being to satisfy these requirements with the necessary equipment being provided by a number of suppliers. This article is one vendor's view of the role of minicomputers in SWIFT and in other areas of banking. (6 refs.)

39. The beginnings of Swift. Datalink (GB), pp. 12-13 (19 Feb. 1979).

One of the most ambitious telecommunications projects so far was the setting-up of the international banking network SWIFT. The article outlines its long and shaky development. (no refs.)

40. SWIFT gets off the ground. Datalink (GB), pp. 12-13 (5 March 1979).

Describes how international banks are linking their computers. The author traces the early problems that bedevilled the SWIFT network, and the acceptance of it by growing numbers of mainframe manufacturers. (no refs.)

41. Yoshino, Y. and Fujita, Y. New data communication system for nationwide banking activities and development of its software. Evolutions in Computer Communications, Kyoto, Japan, 26-29 Sept. 1978, pp. 467-472. North-Holland, Amsterdam, Netherlands (1978).

The Data Communication System for Nationwide Banking Activities has been operating since 1973; however, the limit of operation was estimated from the viewpoint of the expected life span of the system, so that the existing system was planned to be replaced by the new system, whose scale will be quintuple that of the current system. The new system is now under installation and will be put into service in February 1979. The paper introduces an outline of the new system, as well as the software system applying structured programming technique. (no refs.)

42. Minutaglio, R. SWIFT: automating international payment messages. Burroughs Clearing House (USA) 62 (4), 14-15 (Jan. 1978).

The addition of the US and Canada to active membership in the Society for Worldwide Interbank Financial Telecommunication (SWIFT) has added some 10 000 messages a day to a system that daily places some 40 000 messages through SWIFT switches. Over half of the 500 member banks in 15 countries are not participating in the system that, by 1979, is expected to stretch to other European countries and to Japan. The SWIFT organization is the product of some ten years of studies aimed at providing an improved international payments system. (no refs.)

43. Reuterskiold, C. Around the world with financial interest. Syst. Int. (GB) 5 (9), 53-54 (Nov. 1977).

It was not long before national systems were set up imposing rigid standards upon the banks. The first steps with SWIFT were initiated by 68 banks from countries including Belgium, France, Germany, Italy, Netherlands, UK and the United States. They set up a study known as MSP (Message Switching Project) and the Steering Committee of MSP commissioned Logica, the UK-based consulting firm,