

Consortium Computing and Time Slicing in the Banking Sector: Databank Systems Ltd New Zealand

Janet Toland , Victoria University of Wellington, Wellington, New Zealand

Databank Systems was set up in 1967 by a consortium of New Zealand banks to share computing services. This was the first instance of computers being used to integrate the ledger accounts of all trading banks within a country, an innovation facilitated by the relatively small size of the country, the rising use of cheque facilities, and the realization that a joint effort would provide a more efficient service by enabling the pooling of resources to achieve scale from expensive computing technology. In 1972, Databank introduced time slicing, allowing nonbank customers to use spare capacity on the Databank system. This use of Databank outside the banking systems was controversial and the management of Databank was increasingly at odds with the Bankers Association. This article uses the example of Databank to address the tensions between consortium computing and the sale of spare time resources in banking.

Despite its conservative reputation, banking was the first commercial industry to make widespread use of computers.^{1–4} The main driver was the need to find more efficient bookkeeping practices due to the increased use of cheques,⁵ which led to a rapid growth in data volumes and associated labor shortages.² Banking has always been an information intensive industry⁶ with a long history of using technologies such as electronic calculators, adding and ledger posting machines. Therefore, the move to computerization was a natural progression. By the mid-1960s, computers were widely used in banking in Europe and the USA.⁷ In the U.K., the most labor-intensive processes were the first to be computerized. The use of computing technology did not change underlying business processes, but sped them up considerably.² Daily transactions from bank branches were punched onto paper tape, then sent to a computer center where master files were updated overnight and customer statements sent back to the branches in the morning. However, systems were still fairly limited and many transactions, such as cheques drawn at other branches,

were still handled manually. In the USA there were more radical developments such as the introduction of magnetic ink character recognition (MICR) systems for processing cheques, the result of a collaboration between Bank of America and Stanford Research Institute.^{3,8} Despite the fact that New Zealand was a small country, with a population of under three million and only five trading (commercial) banks, it was experiencing the same growing demand for banking services and had the second highest per capita cheque usage in the world.⁹

The New Zealand banking sector developed out of the British and Australian systems.¹⁰ Each of the trading banks had a Head Office in London, and their London-based reserves were central to the operation of the financial system. The banks' original role was to finance trade, especially in the agricultural sector. Until 1934, when the Reserve Bank was set up, there was no clear separation between the Australian and New Zealand monetary systems.¹⁰ After the Second World War, New Zealand followed a policy of "insulationism" aimed at maintaining full employment by insulating output and employment from external shocks.¹⁰ By 1958, most of the major Western European currencies shifted from the managed economic systems of the post-war period to a market economic system. New Zealand, however, did not make this change and became increasingly out of step with the rest of the world.¹⁰ Insulationism benefitted inefficient manufacturers but penalized

1058-6180 © 2020 IEEE

Digital Object Identifier 10.1109/MAHC.2020.3007065

Date of publication 6 July 2020; date of current version

30 June 2021.

farmers and consumers. The implications for the banking sector were increased regulation and barriers to competition. In the early 1960s, the activities of New Zealand's trading banks were heavily restricted by government regulations, for example, there was a set maximum interest that could be charged on an overdraft, and holdings of government securities were limited.¹¹ Trading banks were not allowed to compete directly with the Post Office Savings Bank or Building Societies and as a result their importance in the financial system decreased, falling from 63% of total deposits in 1934 to 22% in 1962.¹¹

Perhaps because, or in spite of this challenging situation, the trading banks in New Zealand adopted a collaborative approach to the introduction of computing; sharing their resources using consortium computing. Even though they were in competition with each other, they pooled their assets to buy computers together and cooperated to set up a company called Databank, which managed computing services for all five banks. Over the succeeding 25 years, Databank became the largest data processing company in the Southern Hemisphere and played a significant role in the New Zealand's economic development.¹² It is interesting to consider the effect that regulation may have had on the way computing was adopted by New Zealand trading banks. The literature suggests that regulation can mitigate competition by making markets less contestable, and that changes in regulation and the advent of new technologies can result in new competitive strategies, such as competitive collaboration.¹⁰ A degree of cooperation has been necessary in the banking sector ever since cheques first came into widespread use in the 18th century. Financial infrastructure in the form of the Clearing House was developed in the City of London to facilitate the process of exchanging the cheques deposited by customers with the issuing bank for cash.⁷ Bätz-Lazo has researched collaboration in both savings and commercial banks in the UK, Spain, and Mexico.^{13,14} He found that collaboration made sense in markets with only a small number of participants, as it enabled the sharing of both information and scarce resources. It was also used to overcome regulatory restrictions to greater market penetration. Collaboration was often driven by an external change, such as the introduction of a new technology. Bätz-Lazo's examples illustrate how banks in different environments have successfully used cooperation to implement a strategic vision. However, they also demonstrate the difficulties banks faced in maintaining a cooperative approach over the long term, especially when participants had different goals and expectations.^{13,14}

The introduction has given a brief overview of the early use of computing in the banking sector and background on the New Zealand banking system. The article now moves on to describe the establishment of Databank and the drivers behind the development of consortium computing. The next section details the operational environment of Databank, in particular the courier system that was developed to ensure even the most remote bank branch was connected to the system. The article then moves on to a discussion of Gordon Hogg's entrepreneurial management style and how Databank became regarded as "the" place to work. The penultimate section details the tensions that emerged as Hogg attempted to develop Databank into a computer services bureau despite the reluctance of the Board of Directors. The conclusion reflects on the outcomes and the impact of consortium computing on the banking sector, and the tensions that arose from cooperating in a competitive industry. The drivers behind the establishment of Databank, such as the heavily regulated banking environment, the unique way it developed in response to the local context and geography, the influence of the General Manager's strong personality and the tensions resulting from the differing goals and values of participants in the consortium are themes that will be explored throughout the article.

The main sources for this article were the ANZ New Zealand archives, which held minutes of the meetings of the Board of Directors of Databank Systems Limited along with miscellaneous internal memoranda, and the National Library of New Zealand, which had a number of internal reports produced by Databank together with an oral history interview with Gordon Hogg. An article by Cardow and Wilson,¹² which focused on Gordon Hogg's entrepreneurial style was also a valuable source. There is a wealth of information available about Databank, as the company had a strong focus on public relations and established its own private library in 1979.¹⁵ From 1979 to 1994, it produced a series of magazines promoting the work of Databank as well as exploring future-focused issues like Eftpos and Videotex. There was a strong emphasis on education and the views of the General Manager, Gordon Hogg. From 1981 onward, a glossy annual report produced for staff gave an overview of the Company's financial situation and detailed staff achievements and awards. From the start of his appointment, General Manager Gordon Hogg was very active in the media, giving speeches and writing articles which all provided useful source material. These sources were supplemented with articles from trade and popular magazines. With such an



FIGURE 1. Databank Systems Ltd, building exterior, Willis St, Wellington. Winder, Duncan, 1919-1970: Architectural photographs. Ref: DW-2786-F. Alexander Turnbull Library, Wellington, New Zealand. /records/22707299.

abundance of material available, data collection and analysis proceeded side-by-side. Working within a set timeframe, key themes were identified and material collected and organized in such a way as to provide evidence for each theme and illustrate the tensions and operational challenges Databank faced.

ESTABLISHMENT OF DATABANK

Despite the country's geographic isolation, computing in New Zealand was well established by 1964 when there were over 30 computers across the country.¹⁶ The Bank of New Zealand (BNZ) were the first New Zealand bank to consider using a computer, appointing a "bright young man"¹² from their London office, Gordon Hogg, to investigate their potential.⁸ Hogg visited 40 English and American banks, and was quick to pick up on the potential of MICR technology.⁸ He also recognized that the lack of interbank integration was a key issue.¹² Due to the limited number of computers in New Zealand at the time and the fact that they were regarded as fallible, the sceptical board of the BNZ took some persuading. The catalyst was decimal currency conversion, which was due to take place in New Zealand in July 1967. Decimalization necessitated sweeping changes to accounting procedures and back office technologies, plus substantial investment in the replacement of accounting machines, adding

machines, ledger books, and customer statements.¹⁷ The capital to be spent on new decimal machines was instead spent on introducing computers.¹⁷ Conversion to decimal currency also acted as an impetus for change in the banking system in the UK, though there it came later in 1971.¹⁷

In December 1964, orders were placed for two IBM 360s to be located in the two major cities, Wellington and Auckland.⁸ The choice of IBM was in part a result of Hogg's connection with the U.K., where banks were also predominantly purchasing from IBM.¹⁷ In October 1966, the first branch of the BNZ had its accounts converted to a computer system and by decimal currency day on July 10, 1967 100 branches were computerized. The system was based on MICR, which enabled source documents such as cheques and deposit forms to be read by reader sorters. Another innovation was the use of one account number to identify each bank customer regardless of how many accounts they held.¹⁸

National Bank of New Zealand (NBNZ) was also considering developing a computer system and had gone so far as to place a provisional order for their own computer systems, when discussions took place about the possibility of a consortium approach. According to one source, the initial approach came from BNZ⁸ who decided to offer the use of their basic system in a joint bank processing venture. However, according to other sources the discussions were



FIGURE 2. Databank computers. Databank computers, and, flat dwellers in Vivian Street, Wellington, 1971. Westra Ans. Ref: AW-0391. Alexander Turnbull Library, Wellington, New Zealand. /records/37134988.

initiated by NBNZ.¹⁹ Although the potential financial benefits to both participants were substantial, there was still strong resistance to a cooperative processing enterprise. Though a minimum level of cooperation is necessary in banking to agree rules for clearing, reconciliation, and settlement, there was concern about the inhibiting effect membership of the consortium would have on an individual bank's ability to compete effectively.⁹ However, the discussions addressed these concerns and an agreement to operate as a consortium was reached.²⁰ Cooperation was also in the national interest; the Department of Trade and Industry had agreed to import licenses for two computers each for BNZ and NBNZ and by combining their resources they were able to achieve national coverage by locating the NBNZ computers in the two main cities of the South Island, Christchurch, and Dunedin, to complement the BNZ computers, which were in the two main cities of the North Island.¹⁹ In late 1967, the banking consortium known as Databank Systems Limited was formed when NBNZ agreed to join up with BNZ and cancelled its own order for computers, instead ordering two further IBM 360s. By using the

same computer and combining their computer installations, very substantial savings in development, capital, and operational costs were made.¹⁹ For a smaller investment, wider coverage and a more efficient use of resources was achieved.²⁰

In 1968, the other three trading banks in the country, Australia and New Zealand Banking Group (ANZ), The Bank of New South Wales (BNSW), and The Commercial Bank of Australia (CBA) made the decision to join Databank buying shares in the Company. Databank Systems Limited was set up as a private company with a share capital of NZ\$20,000 to provide a general bank accounting and record package service for each of the member banks.¹² The shareholders were the five trading banks, with BNZ holding 40%, NBNZ 20%, ANZ 20%, BNSW 10%, and CBA 10%. A Board of Directors was set up, with representatives from the five participating banks plus Gordon Hogg as General Manager of Databank. The Board met monthly to discuss the operation of Databank and agree the annual budget. Databank's financial objective was to "provide processing to the banks as cost effectively as possible against agreed annual budgets."²¹ The annual budget was prepared

based on anticipated costs for the coming year and was agreed by the Board. By its fourth year of operation, (1972) Databank was reporting a healthy return of NZ\$49,974 to shareholders, and a transaction revenue of NZ\$103.7 million.¹²

By August 1968, Databank was operating from three cities in the North Island; Auckland, Wellington, and Hamilton and one in the South Island; Christchurch. By 1969, two further centers were opened, one in the North Island at Palmerston North and one in the South Island located in Dunedin. By November 1969, every branch of the five trading banks in the country had been converted to computer processing.²⁰ Any concerns that competition would be compromised by a common approach to data processing were quickly dispelled by the expansion of banking services in all participating banks.⁹ The introduction of the Databank system meant that staff were released from former routine functions like ledger posting and calculating interest, and were now able to provide a more personal service to customers.²² Databank revolutionized banking within New Zealand and also introduced a consortium approach. Similar examples of consortium computing can be found in savings banks, which have a long history of cooperation—one instance being Nordisk Spardata, a cross-country collaboration between Swedish, Danish, Finnish, and Norwegian savings banks in the late 1960s to develop an online terminal.²³ There is also some evidence that Building Societies shared use of computing bureaus.² However, the consortium approach was unusual for a trading bank. The highly regulated banking sector in New Zealand left the trading banks with few options to increase their shrinking share of the financial market. The new technology of computing offered an opportunity and due to the Government's policy of insulationism and restrictions on import licenses of overseas technology, the only practical way the banks could make use of this was through collaboration.

DELIVERING THE DATA

For the Databank system to work a reliable link was needed between bank branches and computer centers. The New Zealand banks used a batch update system similar to the one that had been operating in the U.K. since 1961.¹⁷ In the U.K. system, updates to customer accounts were delivered in bundles by hand or over telephone lines from bank branches throughout the day and then processed together in the evening when all entries had been received. In the morning, printed account ledgers and statements were sent out to branch staff.

Challenging geography and the thinly spread distribution of New Zealand's population presented considerable problems in getting large volumes of data to a centralized point for computer processing. In 1966, the New Zealand Post and Telegraph did not have the facilities to handle vast volumes of time-critical data, and so a system of direct delivery by courier and return with output evolved. Couriers working to a strict timetable picked up input from each branch daily after it closed and delivered the documents to the computer centers. Output reports and sorted bank vouchers were returned before the bank opened for business the next day.²⁰ The courier system consisted of mainly of cars, while air services were used in two remote areas.²⁴

Courier delivery outside the main centers of Auckland and Wellington would have been uneconomical for one bank alone, but was affordable when the five banks combined through the Databank consortium. In the U.K., with a denser population, there was no requirement for a courier system and each bank looked after their own network.¹⁷ However, smaller branches and those in rural centers were not computerized. For example in 1966, Barclays Bank in the U.K. had 2300 branches but had only computerized 100 of its busiest London branches.¹⁷ By comparison in the Databank system every bank branch in the country, even those in very remote areas, was computerized.

In 1977, 30 couriers were operating in the North Island and 18 in the South Island travelling a total of 13 400 km per day with the longest route being over 640 km return. The couriers followed fixed routes and timetables. A driver set out from the center at 5AM to deliver the output then waited at the end point of the route during the day before setting out again at 3.30 PM for the return run to the center.

An article in a 1986 Databank Systems Newsletter describes a day in the life of Peter Broom, employed by New Zealand Couriers, Ltd., who looked after the "paperchase" from Databank's Tauranga Computer Centre to trading bank branches north of the city in the remote Coromandel peninsula, driving for 2000 km per week.²⁵ Couriers travelled a network that linked trading bank branches in large cities, tiny towns, and remote country back blocks to the Databank network. They picked up banking paperwork such as cheques, deposit slips, direct credit schedules, Bankcard, and Visa vouchers from trading bank branches and delivered them to the nearest Databank network center. The "paper" transactions were entered into the Databank system overnight and the processed "paper" taken back to the bank branches the following day. Reporter Alison Sims spent the day with Peter, who

had an early start to the day loading up his car with green canvas bags of processed paperwork at 5 AM. He deposited the green bags at the different bank branches in lock up bins. At 8.30 AM, Peter reaches his last stop the BNZ branch in Whitianga and has seven hours to kill until he returns to the BNZ at 3.30 PM to begin the return journey. Luckily, for Peter it is reported that he is fond of Whitianga "it's a home away from home... I can always fill the day. As long as you have got hobbies, its a pretty good lifestyle. It is after 6 PM when Peter's day finishes when he calls into Databank's Tauranga center to drop off the banking paperwork for overnight processing and after a total of 7 h on the road his working day is over. Peter was part of a human chain in an industry linked in all other respects by sophisticated computer and telecommunications technology.²⁵

In the mid-1970s, the courier system was also used by Secondary Schools to teach computer skills. Around 200 schools taught programming using batch processing methods. They would prepare their code for an outside computer, send it off, then wait a couple of days until the output was ready for collection.²⁶ The Databank computer system was offered to schools for free by the banks and enabled schools to use it as a computer bureau. As Databank couriers visited every branch of every bank at least once a day, even the remotest school could have a 24 h turnaround.²⁶

The courier system proved to be extremely suitable as the link between bank branches and computer centers, and the development of telecommunications did not immediately change the need to shift large volumes of documents physically, even though it was considered as early as 1970.²⁰ The material realities of the early days of computing meant that technology still required extensive human support. However, the combination was a successful example of the adaptation of technology to meet the needs of the local culture. In the New Zealand banking system, as in many international examples, new technology did not lead to radical change but was used to make existing business practices more efficient.

DATABANK—"THE" PLACE TO WORK

When Databank was founded in 1967, it had a staff of 84. It grew to be one of the largest employers in the country with 1000 staff in 1977²⁰ and 1557 employees when it was sold in 1994.¹² By 1977, it was processing an average of one and a half million bank transactions per day and servicing over a thousand computer

programs. The number of bank master file records was over ten million.²⁰

Databank was always regarded as a good place to work and was known for paying the highest wages in the banking industry.¹² In 1976, senior analysts were being paid NZ\$27,000 at a time when the average New Zealand wage was NZ\$5,340. Perks were also good, for instance, the top two tiers of management were provided with eight and six cylinder cars.¹² The justification for this was the scarcity of experienced computer staff and the difficulty of attracting them to New Zealand.

In particular the expenses of the General Manager, Gordon Hogg, often came under scrutiny mainly due to his high media profile and flamboyant personal style. He established Wellington's first US-style corporate office, complete with sauna, bar, private dining room and floor to ceiling marble.^{27, 28} Another benefit enjoyed by senior Databank staff was overseas travel. For example, in 1979 Hogg left Wellington on 10th May for an eight week trip abroad, taking in Los Angeles, San Francisco, Minneapolis, Chicago, Detroit, Boston, New York, London, Copenhagen, Amsterdam, Zurich, and Hong Kong.²⁹ Hogg aimed to undertake a major international tour every two years with the objective of attending presentations of all the major machine companies, as well as keeping in touch with the competitive banking world of the United States and Europe.²⁹ In a 1971 memo, the Chief Accountant of the ANZ commented rather waspishly that Mr Hogg had been out of the country for several months in the past year.³⁰

Gordon Hogg was much in demand as a guest speaker and gained national prominence as a management expert.¹² His charisma was seen by many as a critical element of the early success of Databank.³¹ He was described by his colleagues as a man who had a vision and someone who people wanted to follow.¹² However, Hogg's entrepreneurial style was not appreciated by everyone, and from 1972 onwards he began to have issues with Databank's Board of Directors, in particular, Sir John Mowbray of the NBNZ. Many of these disagreements centered around bureau computing and will be covered in the following section.¹² In a 1972 memo, one of the Databank Board of Directors, Dr Lau, made the point that there was unhappiness with the Company's management as: "The Company is completely dominated by a man who is dominated by self-interest and personal ambition, lacks balanced judgment, lacks a sense of responsibility, and accountability".³² A leader who can conceptualize and implement a strategic vision is not necessarily the best person to keep the vision going and reconcile ongoing tensions.

BUREAU COMPUTING

With an economy dominated by agriculture and small business, the New Zealand government was initially the major user of computing. As time-sharing developed in the mid-1960s, computing became more affordable for smaller New Zealand companies who could hire computing time from service bureaus.³³ Between 1964 and 1971, around 30 independent computing bureaus were established, by the late 1970s around 70% of New Zealand companies' first use of computers was through bureaus.³⁴

Initially Databank's main objectives were as follows:

- 1) to automate bank services;
- 2) to provide trading banks with a management information system;
- 3) to provide bureau services for parties other than banks.¹⁸

By 1970, the first two objectives had been successfully achieved and Databank, and in particular Gordon Hogg, were keen to start work on the third objective and to promote their services to outside organizations. However, this proved to be controversial, and met with resistance from the banks, who preferred Databank to stay low profile. The idea of Databank expanding its services outside the banking system was not popular with the Bankers Association, which was increasingly at odds with Hogg's innovative approach.¹² They were concerned that customers would feel their personal information had been compromised if they became aware it was being processed by an organization separate from their own bank.³⁵ ANZ's Chief Accountant expressed the view that the policy for Databank should be for them to be handed as much business as computer capacity permitted, but not to let the public and in particular, politicians realize the extent of this type of business as it could easily result in adverse political reaction.³⁶ However even in these early years, Databank was already operating to a limited extent in some customer service areas by selling computer processing time to organizations with internal overloading on their own equipment.²⁰ It had also developed the Data Utility Complex (DUX) accounting and analysis package to provide basic accounting services to Chartered Accountants.²⁰

There was ongoing tension between Databank and the individual banks in defining their respective roles over the promotion of the new services developed by Databank. The banks were uncomfortable with Databank selling services in its own right. In June 1970, the Board of Directors sent a memo to the General

Manager expressing concern that allowing Databank to make direct approaches to bank customers could create conflict through the organization selling services that should instead have been sold by the individual banks.³⁷ It was recommended that if Databank was to approach customers directly to discuss time sharing or bureau services then the individual bank concerned should be kept informed.³⁸

There were also continuing concerns about Databank's rapidly increasing expenditure. This was felt to be due in part to the company taking on nonbank work, for example, by selling time on the new IBM 360 to be installed in Auckland, and current costing systems not being able to identify whether the outlay on nonbank work was being recouped. Despite this, lack of clarity Databank was continuing to expand its operations by taking on more technical staff. The Board of Directors were opposed to this and requested a halt on any further recruitment until they could be provided with a breakdown of expenditure to clearly identify what was being spent on bank work and nonbank work.³⁹ At the November 1970 meeting of the Board of Directors, a decision was made to defer taking on additional staff for work in nonbank areas until there was a clear distinction between expenses on bank work and customer work with separate cost and revenue accounts for each area.⁴⁰ The Directors also noted that they were reluctant to see Databank establish itself in the public eye as an operation that was separate and distinct from the banks.⁴⁰

At the end of 1970, Mr Smillie, Research Director of the New Zealand Bankers' Association wrote a memo in an attempt to reconcile the views of the General Manager with those of the Board of Directors.⁴¹ He acknowledged that there were conflicting views and stated that he would attempt to be impartial. He noted that the data processing industry was growing fast and that New Zealand, because of its unique Databank setup, was well positioned to have a greater stake in this area by expanding its activities beyond banking. At the same time, he recognized that data processing was a highly competitive industry and that other New Zealand computer bureau companies were already emerging. He commended the forward thinking of the General Manager, Gordon Hogg, who was keen to expand Databank and acquire further data processing business. However, he did sound a note of caution as this expansion would require investment in expensive equipment and research before any revenue could be earned.

Smillie noted that the banks themselves were not so keen on moving into the bureau business, and felt bank work should be given absolute priority. Recently

substantial investment decisions had to be made and as costs had been rising, the Board has been more questioning of the General Manager's activities. The first goal of Databank, computer processing of clearings, and account-keeping was complete and the Company was now pursuing a subsidiary objective; data processing for outside organizations. The General Manager envisaged that in a few years this work would far exceed that of the bank customers, however, the banks themselves had yet to fully accept this proposition. Hence, there was a need to define the areas of processing open to Databank, and alter the structure of the organization to have two broad divisions, one to service banks, and another for nonbank customers. Smillie also suggested introducing outside Directors onto the Board and making shares available to the public, in order to address any concerns about the banks acting as a cartel. This would also give greater autonomy and flexibility to the nonbank division and improve its competitive ability with other computer bureaux.⁴¹

In response to this, the ANZ Chief Accountant wrote a memo agreeing that while there was a need for periodic review of the operation of Databank Systems and that the Company and the individual banks were often pulling in different directions, his view that bank work should continue to be the first priority was unchanged. The only reason for taking on bureau work should be if it was needed to justify the expense of buying larger computers. If that meant the bank work placed limits on the bureau work that could be taken on, then this should be accepted by Databank. He pointed out that though making profits from outside work to subsidize bank processing work was possible, at the moment it seemed the opposite was happening and that marginal costing for bureau work meant that the banks were actually carrying the overheads for Databank. Though there was no doubt that there was a considerable amount of computer processing work available it was not yet proven that it could operate on a profitable basis. There was a need to be careful about drawing too much attention to Databank's association with the trading banks. The fact that the Board of Directors sought compromise and questioned some of the General Manager's activities was seen as positive and Mr Hogg needed to be prepared to accept that he had to work within policy guidelines. If Mr Smillie's proposal was accepted it would diminish the control the banks had over Databank, which would be a negative outcome. He agreed with the notion of requiring the Company to operate separate

divisions and fully account for both bank and non-bank work and pointed out that moves were already in place to make this happen.³⁰

In summary notes to the Chief Accountant, the General Managers Assistant for the NBNZ, B. C. Chittenden outlined the situation. If Databank changed from a behind the scenes organization to a recognized computer processing organization, there was a risk of questions of secrecy and monopoly being raised by the bank's opponents. Databank was already spreading limited resources too thinly and should not aim to generate widespread enquiries before they could handle them. If they lacked the staff resources to do all they promised the reaction would be against the banks which introduced the customer to them.⁴²

At the time, a mainframe computer was an expensive resource and in order to make it affordable, the Board of Directors were open to the idea of selling off spare processing power to other organizations. However, they were wary of any more radical change in their business model, such as going into bureau work writing and maintaining computer systems for other organizations, and their preference was to restrict Databank to selling processing time.

An approach in 1971, from the Totaliser Agency Board (TAB), the government owned agency for betting on horse and dog racing, to Databank is a good illustration of the tensions between the Company and the Board of Directors. The TAB wanted to replace their clerical operation for receiving bets and paying dividends with online terminals at each TAB office. To do this, they would need to communicate from every office terminal to the computer center and back. At the same time, Databank was looking at linking all six of its computer centers and a partnership with the TAB would make this more affordable. Linking the centers would cost NZ\$468,000 if Databank did this on its own, but only NZ\$168,000 with the TAB as a partner. At a meeting of the Board of Directors on 20th May 1971, Mr Hogg made the case that the requirements of the trading banks and the TAB were complementary. The TAB proposal would not affect bank peak-time work as the main pressure for bank work was midnight to 5 AM, when file updating was taking place, while TAB processing would take place during the daytime.⁴³ In a memo that followed the meeting, it was noted that this proposal had taken the Board by surprise, as they had not been involved in any initial discussions and there was concern that there would need to be a substantial outlay of funds before any revenue came in from TAB. There was a decision that there would not be any approval of this proposal without further investigation.⁴⁴ A follow-up meeting was called on 28th

May to discuss a further proposition from TAB, suggesting the use of processing time only, this required an urgent decision. However, there was still resistance to this bid and the issue of a lack of a clear division between expenditure on bank and nonbank work was raised again. It was also agreed that there was a need for a detailed feasibility study in respect of the TAB work showing that there would be an immediate profit to Databank Systems.⁴⁵

Following the November 1971 meeting of the Board, a memo was sent noting that as regards to the TAB proposal, the Board was opposed in principle to Databank committing itself to software work for outsiders, and it was agreed that no tender would be put in for the work proposed, however, the General Manager was still keen to put in a bid based on hardware only.⁴⁶ In a follow up memo, it was reiterated that the TAB proposal should be vetoed, as Databank had no mandate from the shareholders for the sort of activity proposed. There were also high risks involved in the venture and as a bank they should not subscribe the capital to support it: "A considerable degree of public odium could fall on Databank and the banks in the event of unsatisfactory operation of the TAB system."⁴⁷

A report was commissioned from PA Management Consultants⁴⁸ in order to assist the member banks in their evaluation of future planning for Databank. One of the four aspects the consultants were asked to consider was an evaluation of customer services focusing on their current worth, future market profitability, and impact on bank processing. The report specifically recommended that the development of advanced systems, such as the TAB proposal, should not be pursued unless they were individually approved as research and development projects of prime importance to the future development of banking services. The reasons given were the demonstrated lack of profitability and absence of detailed market research, together with the unrecovered development costs of currently committed packages such as DUX. The recommendation was to keep only block time users and sell responsibility processing or bureau work. Block time users should also not be tied in to the Databank system in order to minimize the risk of compromising future computing capacity. DUX should be given six months to demonstrate that it can be made profitable.⁴⁸

A letter written by Dr. Lau to the Chairman of the Board of Directors reports on discussions that had taken place since the receipt of the report from PA Management Consultants.⁴⁸ Dr Lau noted that in his view, Databank should not engage in any external

activities other than selling block time. He was also against continuing with the DUX package, but was prepared to give this a bit more time to see if it could become profitable. In what is clearly a dig at Gordon Hogg, he also notes that Databank does not need "ambitious go-getters with expansionist ideas" but rather "good steady qualified men."⁴⁹

A memo reporting on a Directors meeting early in 1972 noted that the recommendations of the consultant's report had been implemented and that future customer services contracts were to be limited to 1) the sale of block computer time and 2) DUX contracts for existing public accountant users. After 12 months, the DUX programme would be reviewed and a decision taken whether to continue it or not. Other contracts would also be scrutinized and either made profitable by increasing charges or terminated after appropriate notice. The Company was to be split into two separate divisions for bank and nonbank work and a separate budget prepared for each.⁵⁰

There was continuing concern about rising staff costs due to taking on nonbanking work in a highly competitive field. In a memo written in March 1972, Mr Andrews pointed out that the bureau market in New Zealand was dominated by the big machine manufacturers IBM, ICL, and Electronic Data Systems and was also particularly sensitive to changes in the economic climate. Participation in this field would require intensive marketing, good sales, and an adequate costing and pricing system and it is doubtful whether Databank could at present supply these.⁵¹ The ANZ Chief Accountant also noted that it was a generally established fact that conversion to electronic data processing techniques involved companies in initial losses and that in times of recession, such moves were strenuously avoided by potential users.⁵² He pointed out that Databank marketing efforts to date have achieved considerably less than the revenue anticipated. Details of contracts entered into to date are known only to the General Manager and his staff, with no details reported to member banks or the Board.⁵²

Though these differences of opinion continued to play out over the next 16 years, Databank remained successful, and while it continued to generate considerable returns Hogg's management style was tolerated. Through the network that was established, the New Zealand banking system claimed it was well placed globally to take advantage of advances in fund transfer technology.²² More than two million bank customer accounts were serviced by Databank in March 1974 and transactions continued to grow rapidly.²² Databank did develop bureau services, though not of the scale originally envisaged by Hogg: by 1977 they

had built applications for building societies, payroll systems, retail organizations, and law firms.²⁰ By the early 1980s, nonbanking work accounted for around 8% of Databank's total business and when the Company was eventually sold in 1994 it had reached 25%.³¹

CONCLUSION

The Databank consortium was facilitated by the relatively small population of New Zealand, high and rising usage of cheque facilities and the realization that a joint effort would provide a more economical and efficient service than any individual bank could.¹⁸ This pooling of resources enabled the banks to achieve scale from expensive computing technology.¹² Reflecting back on 17 years of Databank's operations, the Deputy General Manager, Ian Archibald, commented that by cooperating on basic processing systems, staff were freed up to intensify competition in developing and marketing the products which these systems support. Introducing computerization using a cooperative approach gave New Zealand an efficient and modern payment system which was praised worldwide.⁸

A strong strategic vision is essential to setting up a new venture, but often different skills are required to maintain operations in the long term, especially in a consortium arrangement when the different goals and expectations of members begin to emerge. In the late 1960s, the New Zealand trading banks were in a difficult situation and their market share was shrinking due to tight regulation. Computing provided an opportunity, and Gordon Hogg had the personality to convince the banks that operating as a consortium was the best way to take advantage of this new technology.

However, diplomacy was required to achieve a balance between cooperation and competition, especially when participants had different values. When Databank was setup, the benefits of cooperation quickly became clear to all participants. However, when the Company tried to expand its operations outside the banking sector, diplomatic relations became strained. In the early 1970s, mainframe computers were an expensive resource and the banks were open to the idea of renting out spare capacity to outside organizations. However, they were much more wary of computer service bureau work, which would link them with organizations outside the banking sector. Part of the reason for this was accounting and making sure outside organizations paid a fair price for the resources they were using, but the reasons went deeper than this. If Gordon Hogg had been allowed to develop bureau work to the extent that he wanted, the banks could have lost their control over Databank. There

was also the question of their image and not wanting to be associated with risky ventures. The banks had taken a bold and unusual step by cooperating but were not prepared to extend this cooperative approach to organizations beyond their own sector. This resulted in ongoing disagreements between the entrepreneurial General Manager, who saw the opportunities bureau computing could offer and the cautious and risk averse banking sector.

Databank was successful during its early years, as the banks were in a period of weak competition and strong cooperation. At the time it was established, there was limited competition as banking was highly regulated. However by the time the Company was sold in 1994, this situation had reversed. New Zealand's policy of insulationism resulted in negative effects on the economy and radical change was required. In 1984, a neoliberal economic approach was adopted and banks were now competing strongly for customers, cooperation was weak and competition was high.¹² The enigmatic Gordon Hogg retired as a manager in 1988, following recommendations that Databank be restructured, and the company was sold to the Texas-based company EDS in 1994 for an estimated NZ\$100 million.³¹

ACKNOWLEDGMENTS

Many thanks to Joanna Newman, Manager of the New Zealand archives of the ANZ bank for her assistance in locating materials and checking accuracy. Thanks also to staff in the National Library of New Zealand and to the anonymous reviewers.

REFERENCES

1. B. Bátiz-Lazo, *Cash and Dash: How ATMs and Computers Changed Banking*. Oxford, U.K.: Oxford Univ. Press, 2018.
2. B. Bátiz-Lazo and P. Wardley, "Banking on change: Information systems and technologies in UK high street banking, 1919–1969," *Financial History Rev.*, vol. 14, no. 2, pp. 177–205, 2007.
3. A. W. Fisher and J. L. McKenney, "The development of the ERMA banking system: Lessons from history," *IEEE Ann. History Comput.*, vol. 15, no. 1, pp. 44–57, 1993.
4. H. Neukom, "Early use of computers in Swiss banks," *IEEE Ann. History Comput.*, vol. 26, no. 3, pp. 50–59, 2004.
5. D. L. Stearns, *Electronic Value Exchange: Origins of the VISA Electronic Payment System*. Berlin, Germany: Springer Science & Business Media, 2011.

6. M. Campbell-Kelly, "Mechanisation and computers in banking: A foreword," *Account., Bus. Financial History*, vol. 14, no. 3, pp. 233–234, 2004.
7. M. Campbell-Kelly and W. Aspray, *Computer a History of the Information Machine*. New York, NY, USA: Basic Books, 1996.
8. I. H. Archibald, "Computers and banking," in *Looking Back to Tomorrow*, W. R. Williams, ed., Wellington, New Zealand: New Zealand Computer Society, 1985.
9. Databank Systems Limited, *Computing a Nation*. 1980, Wellington, New Zealand.
10. J. Singleton and G. Verhoef, "Regulation, deregulation, and internationalisation in South African and New Zealand banking," *Bus. History*, vol. 52, no. 4, pp. 536–563, 2010.
11. J. Singleton, *Innovation and Independence: The Reserve Bank of New Zealand*. Auckland, New Zealand: Auckland Univ. Press, 2013, pp. 1973–2002.
12. A. Cardow and W. R. Wilson, Databank Systems Ltd: Gordon Hogg: A study in internal entrepreneurship, *Social Sci. Res. Netw.*, 2012.
13. B. Bâtiz-Lazo, "Strategic alliances and competitive edge: insights from Spanish and UK banking histories," *Bus. History*, vol. 46, no. 1, pp. 23–56, 2004.
14. B. Bâtiz-Lazo and G. A. D. Angel, "Competitive collaboration and market contestability: Cases in Mexican and UK banking, 1945–1975," *Account., Bus. Financial History*, vol. 13, no. 3, pp. 339–368, 2003.
15. Anon, "The databank library: A mine of DP information," in *Databank Systems Newsletter*, 1986, p. 8.
16. R. A. Cumming, "Computers on the New Zealand scene," *New Zealand Econ. Taxpayer*, vol. 26, no. 9, pp. 419–421, 1964.
17. I. Martin, "Too far ahead of its time: Barclay, burroughs, and real-time banking," *IEEE Ann. History Comput.*, vol. 34, no. 2, pp. 5–19, Feb. 2012.
18. Australia and New Zealand Banking Group Limited, "Processing New Zealand's financial transactions," *ANZ Quart. Surv.*, 1975, p. 7–9.
19. C. Matthews and D. Tripe, "Bank computing in a changing economic environment: The IBIS project in New Zealand," *Account., Bus. Financial History*, vol. 14, no. 3, pp. 301–305, 2004.
20. Databank Systems Limited, *Databank Systems Limited*, Wellington, New Zealand, 1977.
21. Databank Systems Limited, *Report to Staff*, Wellington, New Zealand, 1981.
22. Australia and New Zealand Banking Group Limited, "Processing New Zealand's financial transactions," *ANZ Quart. Surv.*, pp. 7–9, 1975.
23. J. C. Maixé-Altés, "ICT the Nordic way and European retail banking," in *Proc. IFIP Conf. History Nordic Comput.*, 2014, Cham, Switzerland: Springer.
24. Databank Systems Limited, *Direct Delivery of Input to Computer Centres*, 1977.
25. A. Sims, "Cross-country paperchase by databank courier," *Databank Syst. Limited Newsletter*, 1986, pp. 6–7.
26. R. J. Spence, "Computer in the classroom," *Delta Fourteen*, 1974.
27. A. Cardow, W. Wilson, and B. Manson, "Banker predicted cashless society," in *Stuff.co.nz.*, 2018.
28. Staff Reporter, "Databank's Gordon Hogg was Nation's first Technocrat," in *MSCNewsWire.*, 2018.
29. Anon, *General Manager Goes Abroad*, in *Data day: The official magazine of Databank Systems Limited*, 1979, Databank Systems Limited.
30. Chief Accountant, *Databank Systems Ltd Mr Smillie's memorandum of 8/12/70*, B. C. Chittenden, Ed., ANZ New Zealand Archives, 1971.
31. Anon, "Training seminar in Hong Kong," in *Dataday: The official magazine of Databank Systems Ltd.*, Databank Systems Limited, 1979.
32. D. King, "Boss Hogg represented Databank at its peak," in *Computerworld*, 2001, IDG.
33. G. A. Lau, "Memo re: Databank systems limited," 1972, ANZ New Zealand Archives.
34. G. H. J. Hogg, "The use of computers in New Zealand," *Canterbury Chamber of Commerce Economic Bulletin*, no. 520, 1968.
35. A. M. Beardsmore, "The computer bureau's important role in N.Z.," *New Zealand Company Director Executive*, vol. 10, no. 110, pp. 28–33, 1977.
36. Public Relations Officer, *Memo. 1970*, ANZ New Zealand Archives.
37. Chief Accountant, *Databank Systems Limited Directors Meeting 11/11/70*, Mr Chittenden, Ed., ANZ New Zealand Archives, 1970.
38. J. A. Bolitho, "Re: Databank utility complex promotion of services," *Memorandum to General Management*, Ed., ANZ New Zealand Archives, 1970.
39. Chief Accountant, *Letter to the General Manager, Databank Systems Limited*, ANZ New Zealand Archives, 1970.
40. General Manager's Assistant, *Databank Systems Ltd, Meeting of Directors 16/9/70*, ANZ New Zealand Archives, 1970.
41. B. J. Clarke, "The accountant privacy and the computer," *Accountants' J.*, vol. 51, no. 7, pp. 282–285, 1973.
42. M. Smillie, *Memorandum to the Chairman, Databank Systems Limited*, ANZ New Zealand Bank Archives, 1970.
43. B. C. Chittenden, Summary Notes, Chief Accountant, Ed., ANZ New Zealand Archives, 1971.
44. Chief Accountant, *Databank Board Meeting 28/5/71*, B. C. Chittenden, Ed., ANZ New Zealand Archives, 1971.

45. B. C. Chittenden, *Memorandum: Databank Systems Limited Meeting of Directors*, ANZ New Zealand Archives, 1971.
46. General Manager's Assistant, *Databank Systems Ltd*, Mr. Pullar, Ed., 1971.
47. *Memorandum re: Databank Systems Limited Meeting of Directors*, ANZ New Zealand Archives, 1971.
48. *Databank Systems Limited, Memorandum to the Directors no 181*, B. C. Chittenden, Ed., ANZ New Zealand Archives, 1971.
49. PA Management Consultants Ltd, *Report on Databank Systems Limited*, 1971.
50. G. A. Lau, "Personal correspondence," D.S.L The Chairman of Directors, Ed., ANZ New Zealand Bank Archives, 1971.
51. Anon, *Databank Systems Limited, Our 615*, L. The Manager, Ed., ANZ New Zealand Archives, 1972.
52. M. Andrews, *Confidential Memorandum: Databank Systems Limited Annual Budget for Year Ended 31/3/1972*, B. C. Chittenden, Ed., ANZ New Zealand Archives, 1972.
53. Chief Accountant, *Databank Systems Ltd - Annual Budget for Year Ended 31/3/72*, Chittenden and Andrews, Eds. ANZ New Zealand Archives, 1972.

JANET TOLAND is currently an Associate Professor in the School of Information Management, Te Herenga Waka, Victoria University of Wellington, Wellington, New Zealand. Her research work is in the history of information systems. She has a particular interest in social and ethical issues. She is currently the Historian for the Association of Information Systems. Contact her at Janet.Toland@vuw.ac.nz.

Computing in Science & Engineering

The computational and data-centric problems faced by scientists and engineers transcend disciplines. There is a need to share knowledge of algorithms, software, and architectures, and to transmit lessons-learned to a broad scientific audience. *Computing in Science & Engineering (CiSE)* is a cross-disciplinary, international publication that meets this need by presenting contributions of high interest and educational value from a variety of fields, including physics, biology, chemistry, and astronomy. *CiSE* emphasizes innovative applications in cutting-edge techniques. *CiSE* publishes peer-reviewed research articles, as well as departments spanning news and analyses, topical reviews, tutorials, case studies, and more.

Read *CiSE* today! www.computer.org/cise

