THE ORGANIZATION OF WORK WITH INTEGRATED OFFICE SYSTEMS:

A CASE STUDY IN COMMERCIAL BANKING

Jon A. Turner

November 1985

Center for Research on Information Systems
Computer Applications and Information Systems Area
Graduate School of Business Administration
New York University

Table of Contents

1. Introduction

Although the use of computer and communications technology in offices has been proclaimed as *the* major change in work settings anticipated during the 1980's [Bikson 81, Mankin 78] and it is predicted that over 50% of the the total work force will be affected [Bair 78], relatively little is known about the consequences of its adoption. This paper describes an exploratory study of integrated office technology in a commercial bank, with particular emphasis on the resulting changes in structure and content of office work.

1.1. Background and Literature Review

It is sometimes argued, as routine office work is transferred to computer systems, that the remaining jobs will have increased content, involve greater opportunities for learning and require higher levels of skill than previously [Shepard 77, Connell 79]. Equally frequently it is suggested that use of this technology will result in deskilling of office jobs, for example, through increased specialization, or decreased autonomy and interaction with other workers [Braverman 74, Gregory 83]. Some point out that, with the introduction of technology, there is a tendency in capitalistic societies to reorganize work at lower levels of skill than before [Attewell 82]. Others note that effects are likely to be different for different job levels; routine clerical jobs will become deskilled while managerial jobs become enhanced, or the reverse. More recently it has been maintained that information technology is neutral; the values of its implementors and designers, and the social context in which it is employed determine the impacts on work organization [Olson 85, Kling 80]. This last theme suggests

the importance of *implementation* in determining outcomes.

There are various perspectives on implementation, each suggesting its own set of critical factors and issues. The most obvious is *technological and economic determinism*, where the character of the work is derived from the job to be done, the nature of the technology available and the structure of economic interests [Ginzberg 79]. A second approach stresses *contextual factors*: environmental, organizational and cultural [Lucas 81]. Another perspective, highlighting the *process of implementation*, focuses on political interests, 'turf' and the re-allocation of power among key actors [Keen 81, Markus 83]. A fourth theme sees *social systems* and their patterns of norms, information flow and control as being dominant [Kling 84].

Another interesting and somewhat related approach to implementation is provided by the *innovation* literature [Bikson 81]. The *R&D* model proposes an explicitly rational process leading from scientific inquiry to adoption and employment. Here, users needs are the goal of the innovation process. The *problem-solving* model has users needs as the starting point of the process. Innovation is seen as a problem-solving activity that "progresses from experienced and diagnosed needs, through information search and decision making, to trial and evaluation." Bikson concludes that innovation outcomes turn mainly on the "situational characteristics" of particular organizational contexts. Factors to be considered include: reason for adoption, involvement of key actors, incentives, adaptive planning, user participation, and training.

As Laudon [Laudon 85] observes, most explanations of
implementation rely on either *environmental* or *institutional*
models of organizational change. Environmental models consider
exogenous uncertainties and opportunities which organizations
must either cope with or take advantage of in order to survive.
Institutional models, in contrast, focus on endogenous factors,
which are partially under organizational control and are often
the result of past actions, for example, organizational culture,
the values of key stakeholders, or social structure. Laudon
believes that organizations are driven to adopt information
technology largely because of environmental factors. The extent
to which information technology is actually utilized and the
specific ways in which it is implemented is, however, determined
mostly by institutional factors.

These latter approaches have much in common. They conceive
of outcomes as resulting from the interplay between the
characteristics of the available technology, economic
considerations, contextual factors, political realities and
social pressures. It is this view of innovation that has been
adopted for this study.

One final theme needs mentioning. Most authors agree that
office information systems should improve productivity, through
reductions in cost or by improvements in worker
performance [Poppel 82]. Studies substantiating this notion,
however, are rare.

1.2. Approach to the Study

The general approach that has been taken in the study of office work is to describe what workers do in offices and then, based on the capabilities and characteristics of a particular technology, project the likely payoffs and consequences when they use that technology [Uhlig 79, Poppel 82]. The difficulty with this strategy is that it assumes work will be organized in the *same* manner as before and that workers will be performing the *same* tasks. This need not be the case. The most important consequences of using technology in offices come through changes in the context of work and how it is structured, and may be unexpected. For this reason, more exploratory studies are needed to identify variables of interest, to formulate more precisely questions for further investigation and to raise policy issues.

There have been relatively few studies of actual systems in real work settings. Those that have been made consist in either the evaluation of a specific product or the determination of how well the goals of an organization have been met [Matteis 79, Uhlig 79, Crawford 82]. These studies are often performed by the developers of the system themselves, raising questions of bias.

Some work has been done in evaluating the *individual* components of office systems, for example text editing [Card 83] or electronic mail [Crawford 82], treating them as though they were independent. Integrated office systems that provide a wide range of features, however, have not been studied in detail.

Communications and information technology have been applied

to the following office functions:

      * Internal mail
      * External mail
      * Text preparation
      * Filing
      * Information retrieval
      * Conferencing
      * Office applications, including scheduling, telephone and calendar management
      * Decision support
      * Access to operational application systems

An integrated office system, then, would consist of all, or at least a large number of the above functions.

While there is little agreement as to what the term *integration* constitutes, the suggestion is that it goes beyond multifunctionality to include:

* The use of the same name, semantics and method of invocation for common functions among the parts of a system. For example, the command for saving a file would be the same in the mail sub-system as in text preparation, and the functions would be identical.

* A product, worked on in one part of a system, is available in all others.

* It is relatively easy to move among the parts of a system without taking special action. For example, one can move between mail and text preparation sub-systems without being concerned about saving a file, exiting from one sub-system and entering another.

* Navigational information on status and location is provided.

* The system is open-ended so that new functions or sub-systems can be added easily.

Consequently, an integrated office system provides a common interface to a wide variety of office functions and is, potentially, a more complete tool than any of the component parts. Thus, the effects should be more pronounced than those associated with any one of the parts.

This study investigates the changes that have taken place in the Asia/Pacific Group of the Bankers Trust Company after the introduction of an integrated office system. Considerable attention is given to the *process* of implementation and to changes in outcomes.

2. Method

The boundary of the situation being studied includes one department of a major financial institution, consisting of about 2000 employees, and those portions of other departments (mostly certain members of the Technology and Operations departments) that were directly involved in the system implementation. Geographically, the department is dispersed world wide with headquarters of about 60 in New York City, sharing the same building as the Corporate Executive, and with well over 60% of its staff permanently assigned to field offices in major financial centers around the world, the majority of them in Asia. Staff are routinely rotated back to New York for training and re-assignment.

The unit of analysis for this study is the individual worker, although some conclusions are drawn about work group, departmental and organizational processes.

Semi-structured interviews, memoranda and observations were

the primary method of data gathering.

Respondents were selected from all levels of the department, ranging from clerical to department head, based upon their having participated in the implementation and their formal position in the organization. For purposes of verification, where possible, at least two subjects were selected from each work group and from each organizational role. Although the researcher was unable to travel abroad, a sufficient number of workers who had been in the field at the time of implementation were available in New York to not make this a limitation.

An open ended interview selection process was used. If, in the course of an interview, a person was mentioned as having played a key role in the implementation, that name was added to the list of interviewees. The more senior personnel were interviewed last to permit the identification of critical policy issues. Table 2-1 provides a summary of respondents by organizational level.

Interviews centered on five facets of work:

* *The process of implementation*. The events that occurred and the role that the respondent played.

* *The technical system*. The features used, purposes for which they were used and the respondent's attitudes about the system.

* *The job*. The tasks performed, how these had changed from before the system was implemented and the likely causes of these changes.

* *Interactions with others*. The ways in which

Table 2-1:   Interviewees by Organizational Level

Level	Interviewees [number]
Organization	Department Executive [1]
	Technology Department [3]
Group	Heads [2]
	Division Heads [1]
	Team Heads [2]
	Key Actors [2]
Individual	Officers [5]
	Support [4]
Total	[20]

interactions and relations with other workers, supervisors and principals had changed and the likely reasons for these changes.

* *Policy issues.* Attitudes about issues that have potential policy overtones for workers, the use of this technology, or the bank.

A copy of the interview protocol has been provided as Appendix I. Subjects were interviewed by the researcher, in sessions lasting from 30 to 60 minutes with the last portion devoted to unstructured items, either those that the respondent cared to raise or amplification of items that emerged during the interview. They were conducted from October 1984 through June 1985.

Informal feedback sessions were held with selected individuals and groups to assure that conclusions reached in the analysis were realistic.

3. Study Setting

Bankers Trust Company, with approximately 45 billion dollars in total assets, ranks as the country's seventh largest commercial bank employing some 10,400 people, world-wide. Several years ago, Bankers Trust embarked on a strategy to shift the emphasis of their business from retail to *wholesale* financial services, prompting them to withdraw from certain businesses, such as retail banking, that did not fit this new image.

3.1. Corporate Strategy

In refining their wholesale financial services strategy, Bankers Trust made return on average common equity (ROE) their primary financial target, partially because it permits comparisons with non-bank financial companies. Bankers Trust's current goal is a ROE of $20 on each $100 of common equity [Bankers 84]. In 1984, the return was $16.20, up from $16.16 in 1983 [Bankers 84]. Stockholders equity increased to $2.1 billion, up from $1.6 billion in 1983 and 1.4 billion in 1982 [Bankers 84]. Since 1977, equity has grown by more than $1.3 billion, largely through high earnings performance, by judiciously taking advantage of capital market opportunities and through decisions consistent with their wholesale strategy. The continued growth in equity reflects the belief that capital strength is indispensable for successful competition in the wholesale financial services industry.

Along with the emphasis on equity has come an intense effort to control non-interest expense while maintaining a commitment to operating quality. Over the past six years, growth of operating expense has increased at an average annual rate of 11%, as

compared with 16% for a composite of the nine largest commercial banks in the United States. Several tactics have been responsible for maintaining this downward pressure on expenses, among them, the controlled application of technology, particularly in labor intensive areas, and the institution of an internal expense budgeting system. The latter links all expenses directly to related revenue streams, clarifying the selection of trade-offs when managing expense growth. Through this system, internal expenses between departments are billed directly to user departments, just as outside vendors would bill them. Consequently, ultimate accountability for expense control rests with income producing user groups, which have clear incentives to decrease unproductive expenses and to increase productive ones.

The third component of Bankers Trust's approach has been to manage credit exposure by pricing that compensates for the degree of risk taken. In 1983, the ratio of net charge-offs to average loans fell to .20%, down from .45% in 1982 [Bankers 83]. Moreover, the allowance for loan losses has increased and now stands at 1.5% of total loans [Bankers 84].

The ongoing refinement of Bankers Trust's wholesale strategy has led to a new sort of financial institution - a world-wide *merchant bank*, meeting customer needs with innovative, sophisticated and profitable services. The merchant banking strategy seeks to combine on-balance-sheet lending capabilities and breadth of non-credit services of a commercial bank with intermediary skills, flexibility and entrepreneurial spirit of an investment bank.

Trading strength and the ability to distribute securities and financial instruments are the cornerstone of merchant banking. Bankers Trust is one of the five largest primary U.S. government securities dealers, as well as one of the five leaders among bankers acceptance dealers. They also rank in the top six investment banks in the commercial paper field. Last year marked the emergence of BT Futures Corp, a separate entity offering its customers institutional hedging and trading techniques using futures and options on futures, in the interest rate, currency and precious metals markets.

3.2. Corporate Culture

In contrast to their innovative approach to competition in financial markets and their aggressive change in corporate direction, Bankers Trust remains a conservative company that will not take action unless it can see a clear benefit. It is a company that doesn't take a risk unless it is coupled with definable and appropriate rewards. While new blood has been brought in from Wall street and amply rewarded, the majority of the staff are bankers operating under the old rules. It is this conflict between risk taking and risk aversion that is reflected through out the company and gives it part of its schizophrenic character.

Individuals appear competent. Yet, the potential for the organization, taken as a whole, seems greater than what is achieved in practice. Much of what is done at middle and operational levels is not directed at accomplishing business goals. There seems to be an unusual amount of difficulty in translating goals, articulated from the top, into programs that

have the support of those in the middle and at the bottom. Individual workers often tend to be myopic; they have difficulty taking an organizational prospective.

3.3. International Department

The International Department (ID) was one of the three groups that made up the Banking Function, the other two being the U.S. Department (banking services for non-multinationals) and World Corporate (banking services for multinationals)[1]. ID was organized geographically, by regions, with four main groups: Asia/Pacific, Latin America/Canada, Europe, and Middle East/Africa. Also part of the department were four service groups: Trade Banking (letters of credit and collections), Syndication, IRMD (international risk management and credit reviews), and Individual Investment Management. For the most part, ID was organized with a regional manager, then a senior country officer with front office, back office and operations support. Although day to day direction came from ID, the organization structure was matrixed with service groups also reporting to their functional parent elsewhere in the company.

---

[1]Recently Bankers Trust reorganized, grouping together departments that have significant potential for improving return on equity and they intend to expand aggressively as part of their overall merchant banking strategy. The previous head of the International Department emerged as head of the Global Processing and Information Services Department (GOIS) which performs deposit services, funds transfer, trade payment and collection services on a world-wide basis.

3.4. The Asia/Pacific Group

As part of ID, the Asia/Pacific Group (approximately 300 staff) provided commercial banking services in Asia and the Far East[2]. The group was organized geographically including:

* North Division with headquarters in Hong Kong and offices in Korea, Taiwan, The Peoples Republic of China and the Philippines.

* South Division with headquarters in Singapore and representatives in Bombay, Jakarta, Bangkok and Colombo.

* Japan Division with headquarters and office in Tokyo.

* New York Division with headquarters in New York and consisting of five teams (desks): Japan, Korea, North, South and London. The purpose of these teams was to coordinate activities originating in New York with their respective field offices and to to link the field offices with the appropriate Operations groups in New York.

* Two subsidiaries, BTAL located in Sydney and TISCO in Bangkok.

* Group Credit and Controller staff functions.

The organization chart is shown in Figure 3-1.

---

[2]In the recent reorganization, the Asia/Pacific Group became part of the Latin America/Asia Pacific Department of the Commercial Banking Function. The old head of the Asia/Pacific Group has become the deputy head of the new Latin America/Asia Pacific Department.

Figure 3-1:   Organization Chart for the Asia/Pacific Group
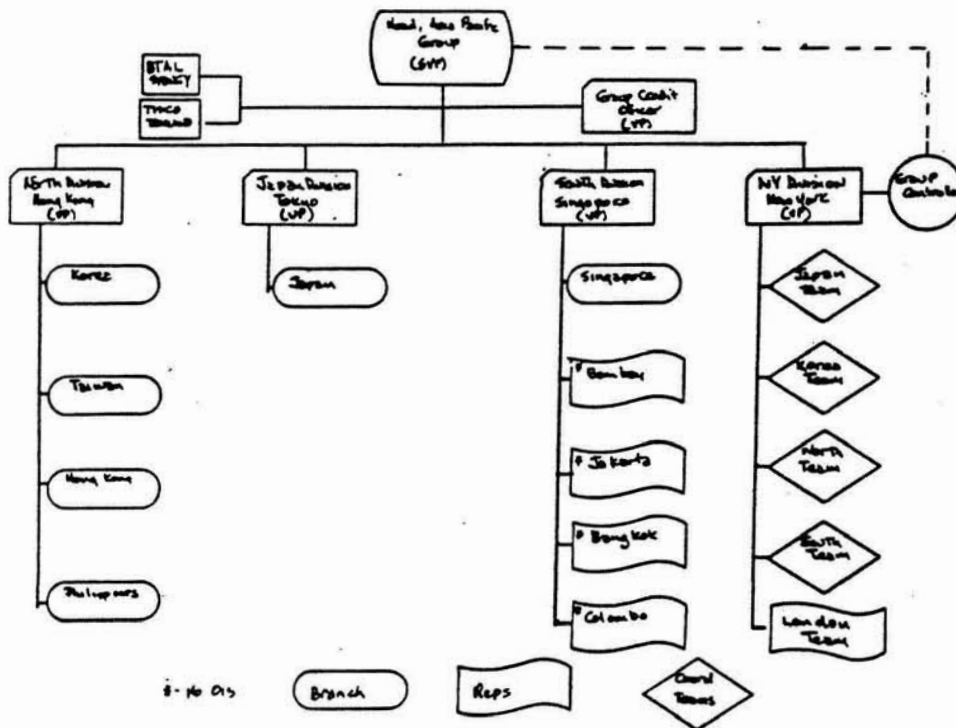
3.5. Technology Department

Most of the information systems personnel in the bank, roughly 800, were part of the Computer Systems Department (CSD) which consisted of a variety of groups developing and maintaining most of the bank's computer application systems or running their data centers[3]. CSD's reputation was going through the same type of negative image as were many centralized computer departments in large companies. It was viewed as a traditional COBOL shop; builders of large, transaction processing systems that were often

---

[3]Until recently, CSD reported to Banking Operations, but about a year and a half ago the name of the department was changed to the Technology Department (TD) and it now reports at the same level as the other major operating units (to the Executive Committee).

behind schedule, over budget and not particularly responsive to user needs. Yet, as with many similar departments, they were, in their own way, innovators. One of these groups, Information Management Services (IMS), built the system[4].

4. Asia/Pacific Group's Business Problem

Almost all of the Asia/Pacific Group's communication, both between New York and the field, and among field offices took place over BITS, the Bankers Trust International TELEX System. TELEX was used because of the need for a hard copy record of the communication on both ends and because time differences restricted greatly the concurrent availability of parties for telephone conversations during the normal business day.

TELEX preparation involved a principal dictating a message to a secretary or giving her handwritten copy. The secretary would then type the message and give it back to the principal for correction. This process was repeated until an error free message was created. The secretary then prepared a TELEX tape for *each* recipient. Copy from each of these tapes was given to the principal for approval after which the secretary actually sat down at the TELEX and transmitted each message.

Not only did this process consume a lot of a principal's and the secretary's time, but it was inefficient, error prone and it

---

[4]The IMS Division has been reorganized and is now called Bankers Trust Information Services (BTIS). The system is no longer their responsibility, but instead has been placed under a new entity, in TD, Corporate Information and Communications Systems.

discouraged sending messages and information copies, just the
behavior opposite of what was desired when putting together a
complicated deal where timing and coordination were critical.
Frequently, secretaries were required to work overtime just to
send messages and principals arranged their daily schedules to
insure there would be sufficient time to send messages before the
end of the day.

Another task involved the need to generate long (15-20 page)
loan proposals that had to be sent between Tokyo, Hong Kong, New
York and London several times during their preparation.

While it is not clear that the problem was perceived in
exactly these terms at its inception, almost everyone believes
now that this was the primary reason for going forward with the
system[5].

5. Office Information System (OIS)

The possibility of using computer and communications
technology to overcome the communications problem in ID, in
general, and for the Asia/Pacific Group, in particular, did not
escape the heads of the departments. ID was profitable and its
head, a forceful executive, with lots of ideas and a willingness
to put money behind them, was interested in things that might

---

[5]Many more functions were included in the system than can be
explained solely on the basis of improving communications.
Clearly, then, some players intended that the system be used for
purposes other than communication, for example, to improve the
quality of information available, or to alter the content of
jobs, or to change the location of where work was performed, etc.

make them more profitable. He realized the opportunities presented by computer and communications technology and decided to take advantage of them. The wholesale banking strategy rested on cultivating relationships with the most profitable clients, devoting a great deal of effort, for example, to lending and deposit taking. Key to this were representatives in the field being able to craft new and exciting products for their clients and obtaining close support from Operations units and Executive Management, in New York, that would have to approve a deal. Technology could also become a symbol of BT's new, aggressive posture.

The head of the Asia/Pacific group knew that poor communications was compromising his people's performance and his ability to control them. As he put it later:

> If you are charged with the responsibility for managing a business that covers fifteen countries, the problems of coordination and communication are of real concern and very crucial to your success. OIS provides us with just the kind of communications link we need to tie together our operation.

There were fewer *champions* within CSD. A study had shown that *Office Automation* should be investigated in detail and the head of IMS was looking for a customer, within the bank, to pilot test an office system. ID showed the most interest of the potential user departments within the bank. There had been several attempts at office systems in the past, but none of them had sufficient support to be funded. There was general awareness in CSD t at the bank was not taking advantage of new technology and might be left behind.

5.1. Design Objectives and Implementation Strategy

Initially, it was thought that communicating word processors in each location could handle the job. But the head of ID felt this was too limited an approach. From the beginning, Office Information System (OIS) was intended to be *integrated*, providing a variety of functions, for example, internal and external mail coupled with text preparation, to solve the communications problem, and to access the banks application systems as a way of delivering information directly to people in the field without having to go through middlemen. As conceived, the system would be a vital tool for the working level, but less essential for senior management[6]. In order to ensure that the system worked before being given to users in ID, IMS would *pre*-pilot test the system in its own department.

The concern over controlling expenses meant that the pilot had to be tied to clear cut goals and success factors. For example, the purpose of the pilot was:

to demonstrate that the system is:

* A means for increasing hard-dollar revenue
* A catalyst for behavioral change
* A means of improving internal and external communications
* Financially justifiable in terms of cost savings
* Technologically effective

---

[6]One of the original proposals was that the system should be used by only the head of ID and the 8 senior managers reporting to him - essentially an executive support system. This plan was discarded in favor of the approach described, which was much more broadly based, providing support to staff at *all* levels - operatives to executives.

The category of `behavioral change' requires explanation. The culture at the bank made it particularly difficult to alter people's behavior. There were no easy mechanisms for making people aware of the need for change[7]. For example, if TELEXs were sent out in the afternoon, then it was almost impossible to change this pattern short of a directive from top management. It was realized by some of the players in ID (but not all) that OIS could be used as a vehicle for "discarding some of the bad habits formed over time."

More specific goals in customer service, for example, were "respond to 30% of customer Money Transfer Inquiries from Bankers Trust field locations on the same day that the inquiry is made without reference to Money Transfer Research in new York." Another goal was to "remove Asia/Pacific Group's New York division Customer Service Officer (CSO) from all routine customer inquiries coming from the field."

To accomplish this, OIS was to provide a direct line to the setup and inquiry functions of the Historic Research system (HR). A CSO in an overseas office would be able to respond to customer requests for information on the same day they were made by using their OIS terminal to view full details of the transaction. If desired, a research process could be initiated immediately with HR routing the request to a researcher, thereby shortening the process by two days.

_____

[7]Schein [Schein 70] refers to this preparatory stage as 'unfreezing'.

Other goals included implementing ID's "close to the
customer" strategy and building a data base to assist
Relationship Managers in identifying customer needs, in
developing and monitoring market plans, and in permitting Product
Managers to assess requirements/applicability across units. The
time required to complete a loan proposal requiring group level
approval was to be reduced by 50% (the current process took 10
days). The overall time required to complete inter-office
communication was to be reduced by 30 minutes (from 40 to 10
minutes). Finally, the OIS pilot test was to reduce the amount
of time marketing personnel spend on administrative matters by
15%, eliminate 25% of New York based CSO's problem solving work
load and replace it by customer contact, and reduce secretarial
workload allowing improvements in their officer coverage ratio[8]
from .33 to .25, or a 33% improvement.

Just prior to the pilot test, a three month average of BITS
traffic going in and out of New York was 159 messages per day and
this was growing at about 10% per year. One of the notions was
that OIS would be a substitute for BITS and this traffic would
decrease.

## 5.2. System Description

IMS wanted to build the system out of proven technology.
After a through evaluation of the available products they
selected Digital Equipment Corporation's (DEC) *All-in-One* Office
Menu System, which was in prototype testing at the time. The

---

[8]Officer coverage ratio is the number of secretaries in a group
divided by the number of officers (principals) in the group.

system runs on VAXs under VMS and includes word processing;
electronic mail; document processing; desk management, with
calendar and calculation; and forms development in one integrated
package. The system consists of three components: a flow control
facility to allow a VT-100 terminal to select options from a menu
to move from one application to another, an application interface
providing menu access to an application, and a forms development
capability for adding new applications. One of the reasons for
selecting All-in-One was the communications architecture of the
VAX.

Figure 5-1 shows the equipment configuration. Two

Figure 5-1: OIS Equipment Configuration
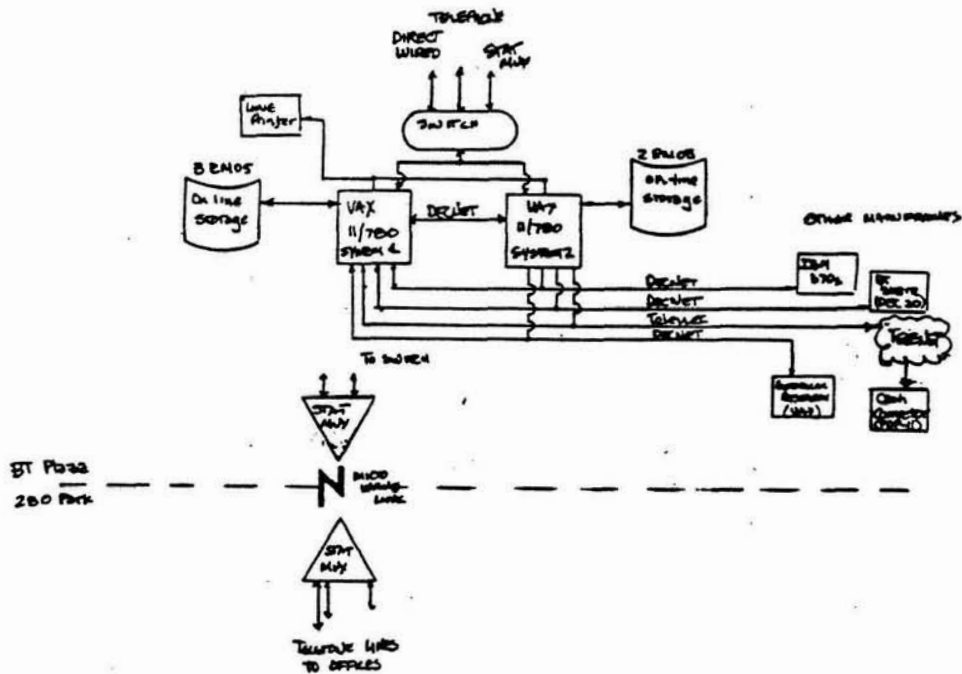
VAX-11/780s, located at BT Plaza, running VMS are connected with
a highspeed communications link (DECNET). One system had three
spindles of disk storage (256MB each) while the other system had

two. Both systems are DECNETed to BTShare, the time sharing system, and run 3270 and 3780 emulation to connect to the bank's IBM-370 computers. There is a DECNET link to another VAX running the Historical Research system and a Telenet line to a PDP-11 running the Cash Connector system. A 72 line statistical multiplexor (STAT MUX) tied to a micro-wave link is used to connect the equipment at BT Plaza to 280 Park Avenue, where ID is located, and dial-up access allows other non-DEC terminals, such as MICOMs and hard copy devices, to communicate with the system. OIS runs on one of the VAXs while the other is used for back-up or development. Terminal transmission speeds are 9600 baud at BT Plaza, 2400 baud at 280 Park Avenue, and 1200 baud over BTNet overseas and dial-up. A Teltone MODEM is used to split the phone line in an office into voice and data reducing installation cost greatly.

Functionally, OIS consisted of:

* **Electronic Mail (EM)**: Creating, editing, reading, sending, answering, forwarding, and return receipt. Mailing lists and BITS outbound. Electronic filing and retrieval.

* **Word Processing (WP)**: Creating and editing.

* **Administrative Office Aids**: Spelling checker, file folder, waste basket, reports, and change password. Tickler, calendar, spreadsheet, graphics, datatrieve, autodialer, phone directory, and calculator.

* **Access to Other Systems**: BTShare, Cash Connector (transactions for each customer), Commercial Loan, Historical Research, WIS File Cabinet, TSO, Financial Asset Inventory System (FAIS), and Automated Competitor Intelligence System (ACIS).

Not all of these functions are currently implemented. BT has enhanced All-in-One by adding various features including output queues, usage statistics, database reorganization, file folder features, guest privileges, and a pc option.

5.3. Implementation Schedule

Planning for OIS started in the spring of 1982. Equipment was installed in New York during the summer and the pre-pilot started with IMS. Equipment was installed in the field, beginning in November and lasting through the beginning of 1983. At that time pilot testing commenced.

The identification of goals and success criteria for the pilot occurred during the winter of 1983 and evaluation continued through 1983 and into the beginning of 1984. In June 1984, a decision was made to use a scaled back version of the system that emphasized EM and reduced cost for all of ID. During 1984, usage began to expand, unofficially, beyond ID, and this continued until 1985, when the system was expanded, officially, bank wide. There are some 200 users in Asia/Pacific now out of 800 users bank wide.

5.4. Cost

OIS cost about 1.6 million dollars, per year, without international telecommunications. This includes equipment, software development and support. When the system was scaled back in functionality (June 1984), costs were reduced to about 950K per year. With the expansion of OIS, bank wide, costs have

risen to about 1.4 million per year[9]

6. How OIS is Used

OIS is used in different ways, in ID, by different types of employees, depending upon whether they are located in the field or in New York. Part of the philosophy behind the system is that *everyone* will prepare, send and receive their own messages.

In the field, OIS is used mostly for communications and for word processing. Officers read their mail first thing in the morning and prepare their own replies. They may check the system 3-4 times additionally during the day. When people from New York are traveling, they tend to use the system heavily from field locations. The reduced number of terminals overseas, however, limits access to the system and people have to wait often for a terminal. Speed of the lines and the need for certain of the Operations offices in New York to be open in order to use on-line files restricts the usefulness of the connection to the application systems. Many people don't know or have forgotten how to use features other than EM and WP.

Secretaries make extensive use of WP and EM. Larger documents are prepared off-line on DECMates, listed out for proofing, corrections are entered and then the documents are transmitted over OIS. The low speed lines and high transmission costs restrict use of the system interactively.

---

[9]Currently, the average monthly cost per user is about $145, based on 800 users.

In New York, almost everyone in Asia/Pacific has their own VDT terminal which, along with the higher speed lines, encourages use. People send and receive their own mail (there is considerably higher traffic rates in New York because of the greater connectivity and bandwidth) and also does much of their own document preparation. Officers and support staff make extensive use of connections to other systems, directly accessing the Commercial Loan, Cash Connector and Historical Research systems instead of contacting the respective operations offices on the phone. Secretaries have a VDT terminal next to their desks (along with their typewriter) and there are hooded draft and letter quality printers scattered about the offices, usually in the center of a room. Occasionally, two secretaries will share a terminal which will be placed mid-way between their desks.

An active officer in New York might be continuously logged in to the system, receiving 10-15 messages a day and transmitting 7-10. Meetings may take place around a terminal while someone pages through a document or a list on the screen. Some of the officers use OIS to gain access to BTShare where they execute an analytic procedure they have written and route the output back to the terminal or to a printer. A spread sheet function is used for preparing plans; it can be down loaded to a pc or work on a pc can up loaded into OIS.

A person is charged for the functions used. Basic OIS, which includes EM and WP, is billed at about $100 per month. Extended features, including advanced office aids and access to other systems (BTShare, TSO, and the bank's operational systems)

costs another $40, for a total of $140. A department decides what features of the system an employee is entitled to use and IMS charges the department accordingly.

7. What has Changed

7.1. Job Content and Skill Level

The content of secretaries jobs have clearly improved, in terms of the variety of the work and the level of skills required, although their grade level or relative compensation have not changed. It used to be that a secretary would send 40 TELEXs a day. This meant spending 2-3 hours in the TELEX room and many more hours in preparation. Now principals send most of their own messages. Because not all offices have OIS, some TELEXs still have to be sent, but this is much easier with OIS's ability to send outgoing TELEX messages. The message is drafted in OIS (often by the principal) and then sent out as a TELEX.

The secretaries typing load has been reduced, consisting mainly of larger manuscripts now. This has freed time for other activities: some customer contact, some research, and better service to their principals. The WP has permitted creating more "professional" looking work. Some secretaries feel also that the total amount of paper has decreased, especially with the Electronic Filing Cabinet. Many principals, however, still request hard copy from the system to take home, carry with them

on trips, or just to put in their own files[10]. Many feel that
the paper files have not decreased in size.

The secretaries are very positive about the system. They
feel that they have acquired new skills and that they are more
productive than before. There are fewer interruptions and they
are better able to concentrate on their work. They feel more "in
touch" with their principal's work and they actively seek to
solve problems. As one secretary put it, "you don't have to wait
for the paper to come to you, you just pull it up on the system."
They are proud that management has seen fit to invest in better
tools for them; it makes them feel important. Many have
decorated or personalized their terminals and one of the
secretaries sends messages over the system in the form of
Christmas trees at holiday time.

Another way the system has benefited secretaries is by
opening a new career path. One secretary, who showed an unusual
interest in and skill with the system, was promoted to be the
local system "expert" who provided consultation and teaching to

---

[10]It appears that certain people are much more willing than
others to give up their hard copy records. Speculating, one
might expect this to be a function of how secure an individual
felt in his position and how easy it was for them to build a
cognitive model of their work when they used the system.

others in the Asia/Pacific Group's New York headquarters[11]. She has transferred to TD and now mans the OIS *Help* desk, world wide, from her location in Asia/Pacific. This transfer did result in a positive grade and salary change and the incumbent believes that she has many more career options now than she had before. She likes her role because it permits her to meet and talk with many different people. It gives her an opportunity to teach something (rather than being taught).

Management appears not to have anticipated the change in work mix for the secretaries and there has been little direction as to how their role should evolve. Each secretary has been left on their own to work this out as best they can. In Tokyo, for example, one of the secretaries got heavily involved in administrative work, while in New York there has been relatively little change in the content of the secretaries job (with the exception of reduced TELEX preparation and transmission).

Some managers feel that the system helps them establish priorities in their work. For example, by looking at who sent messages and their subjects (using the "scan" function) the important messages can be selected first. Another manager

---

[11]Part of the implementation strategy for the project was to have a 'coordinator' at each location who would serve as a contact person and be available for special assistance to the remainder of the workers at the site. These were mostly officers, selected on the basis of their being the most qualified to do the job (and a willingness to serve in the role). They received no change in grade or salary, but did receive somewhat more detailed training.

believes he is better aware of "what is going on in Asia." There is more of a tendency now to inform people because it is a lot easier to send a carbon copy.

7.2. Structural Arrangements

Although there have been no major changes in structure or social support, the system has facilitated social interaction among levels. Since the secretaries were often trained in the first group, they became the most knowledgable and experienced users on the system. If a person missed the formal training session the easiest way for them to learn about the system was to be taught by junior officers that had become skilled or by secretaries. As a result, the system became a vehicle for interaction among the staff; it served to break down some of the barriers that exist, particularly in the field.

7.3. Communication

As shown in Table 7-1, TELEX outgoing messages decreased after OIS was installed. In the three months prior to OIS, BITS traffic for the Asia/Pacific group averaged 159 messages per day (with a s.d. of 7.6). In the same period a year later, BITS message traffic averaged 69 messages per day (s.d.= 4.9), a decrease of 57%. Prior to this, BITS traffic for the group had been growing at about 10% a year. This suggests that part of OIS traffic substituted for BITS.

Principals believe that the system has cut down on the number of telephone calls and distributed memos, especially in New York. Messages on the system tend to be brief; frequently one or two screens. People feel more productive. They try one

Table 7-1:   Asia/Pacific Group Daily Message Traffic

Month		BITS	X	s.d.	OIS
1982	Sep	168 -			--
	Oct	152 |	159	7.5	--
	Nov	158 -			--
	Dec	135			48
1983	Jan	153			98
	Feb	125			99
	Mar	120			98
	Apr	101			98
	May	106			83
	Jun	102			77
	Jul	70			63
	Aug	73			102
	Sep	71 -			123
	Oct	66 |	69	4.9	102
	Nov	60 -			133

Note: BITS outgoing messages have been adjusted by a factor
of 1.4 to make them comparable to the way OIS messages are counted.

---

phone call (probably because it is faster than typing the message
and they don't have to interrupt what they are doing to sign-on
to the system) and, if they aren't able to get their party, they
send a message over the system knowing it will be read by the end
of the day. The new tool provides them with alternatives that
permit accomplishing sub-goals. Some reports are distributed
over the system instead of being sent around as hard copy ("you
don't have to use the 'pouch' as much now"). For example, the
Monthly Profitability System (MPS) used in planning took several
days to distribute. Now it is loaded into OIS and delivered by
EM. Most people agree that more information is available now and
it is easier to obtain than before OIS. Part of this undoubtedly

results from the ease of sending copies over OIS. Some analyses are prepared on a Rainbow or IBM pc and then up-loaded into OIS for distribution.

Several people observed that the English of employees, where English was not their native tongue, improved after they began creating and reading their own messages using OIS.

The amount of trivial messages have also increased, however, and much of the communication is between officers on the same level, for example, among junior officers, rather than among levels that would enhance information flow up and down the hierarchy. And, for certain people, the system has served as an excuse not to get get out in the field to find out what is really going on, or to meet with customers. As one officer said, "it is easy to become mesmerized by the screen." There is concern on the part of some operatives that management will see everything "through the machine" and will not get out in the field to make their presence felt.

Another put the concern about content this way, "when you are out of the office a lot of messages build up and that is when you can really see the trivia. So many people send messages I don't need to see." Some officers feel that the system has contributed to their "overload." Another observed that there is a tendency to "bullshit" and that the truth is usually a little less than appears on the screen.

Several principals noted that there is a tendency to be more "casual" on the system. People say things on the system they might not put in a memo. They are more relaxed and may interject

a few jokes or put in samples of conversation with a customer.
Memos, at Bankers Trust, seem to be more formal than in many
other organizations; they are associated with reports.

Several managers felt that the return receipt feature is
useful because it becomes harder for people to say they didn't
receive a document.

Almost everyone agreed that in times of great pressure or
emergency, people revert to their old methods of doing work.
They tend to pick up the phone and they may not read their EM for
several days. It becomes a "pain" to log in and people get up so
they can "physically" do something. With urgent items there
appears to be comfort in having "paper copy."

7.4. Work Location

As a result of the system some work has shifted to the field
with resulting efficiencies. It used to be that everything was
sent to New York for entry into the bank's operational systems.
Now some of the data entry is done from the field offices. The
reduction in transmittal time makes these systems more current,
the error detection/correction cycle is shortened and the work
does not "bunch up" in New York as it did before. Also, source
documents do not have to be transported and it reduces copying.

Other, more subtle, changes have taken place. In the past,
an officer from the field would call the New York CSO who would
work with Operations, downtown, to resolve the problem and then
communicate with the field. Now. people in the field work
directly with Operations and there is less of a need for the
CSOs.

There appear to have been few changes in where the "big" things are handled. The field still makes all of the deals and key decisions; approvals come from New York.

7.5. Supervision and Performance Measures

Supervisors say they feel more comfortable moving people because the system is a common element in all of the Asia/Pacific offices. The system has resulted in some standardization (of equipment and procedures) making staff more interchangeable. Some workers believe that the system contributes positively to supervision because it is easier to communicate with their supervisor and to keep them informed of what they are doing by sending copies of their work. People appear to be positive about having their work more "visible" to a supervisor. Possibly, this is because some workers are located remotely from their supervisors and believe that they don't really know what they are doing. The supervisors do not believe that the system has made it easier to supervise, except that they do feel better informed about what is going on in the bank.

7.6. Power

In some respects the system has raised the importance of the secretaries, due to their familiarity with it. As the system became an accepted "tool" serving a recognized, useful purpose, those people most knowledgable about it were swept along into more prominent roles. Whether this is lasting or not remains to be shown. To the extent association with the system, in this environment, is viewed as improving one's stature as a banker, the effect should be positive. If the system is perceived as a technological "toy", then association could be detrimental. It

is not clear that the "key" players have moved forward as a
result of their role in advocating the system and in its
implementation.

7.7. Employment Levels

The number of secretaries has decreased, for example, from
11 in the New York office to 7 now. There have been smaller
reductions in the field. Principals now believe they need less
secretarial support, partially because the secretary to principal
ratio has decreased. There have been no employment changes at
the CSO, principal, or management levels in Asia/Pacific as a
result of the system. Several new positions have been created in
IMS to support the system and to staff the 'help' function.

7.8. Performance and Cost

Although it is difficult to quantify, the feeling is that
there has been an increase in individual productivity and more
communication with customers. The bank's competitiveness has
increased. A one day turn-around on approvals for certain
proposals has made the bank more responsive to their customers.
As one officer put it, "we're definitely going in the right
direction on the bottom line." Communications has really
improved within the bank and there is more "connectivity."
Another said, "it is worth the effort and the cost in ease and
efficiency."

Another manager pointed out that the system permits him more
time flexibility. He can now do work from his home or hotel room
and he doesn't have to spend as much time on the telephone. It
is now possible to send others the outline of a report and then

converse with them over the details. Documents can be exchanged back and forth between Hong Kong and New York with each person editing and adding to them. This is done quite frequently.

OIS has not had as much of an effect as was anticipated on either quantifiable performance measures or the "bottom line." Application systems were not sufficiently accessible from the field to permit an assessment of labor or cost savings in restructuring work flow. "Relationship" management[12], as a concept, never caught on, largely because it required forms to be filled out and "call" reports to be filed by field personnel. While OIS would have made controlling and maintaining this data easier than manual methods, not going forward with the relationship management idea removed one of the reasons for the "extended function" portion of the system.

While the time to complete a loan proposal was reduced, this did not necessarily contribute to making more or better loans. Marketing personnel have not reduced the time they spend on administrative matters and CSOs still handle most of the contact with the field. While the *potential* to alter these relations has been shown, the implications have not been fully evaluated or changes institutionalized.

The head of Asia/Pacific attributes some portion of the improvement in performance of his division between 1984 and the

_____

[12]Relationship management was a strategy to improve the data the bank had on key clients. Its goal was to permit some forward planning on the relationship with clients, rather than to have these come about by chance.

prior year (a 35% increase in revenue and a 60% increase in after tax income) to OIS, but it is difficult to apportion the amount. Most of the contribution appears to have been in improved communication and coordination among departments.

OIS is a sophisticated system that will not be fully cost justified on EM alone, unless the complete bank is served. Other features, particularly access to application systems, must also be used. This implies fundamental changes to work processes, operational procedures and systems. This will take considerable additional investment of time and money.

8. Implementation of OIS

For the implementation of OIS, IMS hired a person, who had experience in bringing up a similar system for another financial institution, to play a key role in the project. They also retained a consultant well known in Office Systems to assist them in identifying potential problems and to aid in planning the implementation. The two stage pilot test, first with IMS itself and then with Asia/Pacific, gave them ample opportunity to debug the communications equipment, software and to configure the system. In a way, this approach could be considered a form of 'prototyping.'

A well respected member of Asia/Pacific, who had been involved in the initial feasibility study, was selected as the user representative on the implementation team. He devoted full time to the project during the pilot phase.

The original concept was that four officers would share a terminal in the field. This didn't work well and the feeling now

is that a terminal should be placed in each office. Another part of the concept was that there would be one-on-one training, behind closed doors, to facilitate learning without embarrassing the person involved. One of the tactics used by IMS in implementing OIS was to designate an on-site person as the resident OIS "expert" in each office. This person received more intensive training and became a "friendly" source of information for the remainder of the area.

While there was some "cultural" resistance to the system in the field, at the more senior levels, this was only in the short run and disappeared as soon as it became apparent the "boss" was using the system. The Japanese and Koreans were most resistant, while the Chinese took to it easily. As one officer put it, "it helped if you could type." The culture in New York was never a problem. As one senior executive said, "bank culture was that 'real' men don't type. In this situation, the power of technology overcame the culture of the bank."

Special care was taken to have documentation prepared and to provide training sessions on the equipment. While this was effective in getting people to learn the system and overcoming apprehension, some, especially after they had experience using the system, felt it was "overkill" by the people in New York. The staging of people using the system (transfers, not being selected for the first part of the pilot, initial skepticism, etc.) meant that a good portion of the staff were trained by their colleagues, rather than in the formal sessions. The simplicity of the system and its self-help features made it easy for many of the staff to learn on their own.

The system has been quite stable and available. One weekend a number of messages were lost, but outside of this the system has performed well. If trouble does arise, the local experts are notified and they go around to the remainder of the staff to let them know what is happening. The main system is heavily loaded now and people are beginning to complain about the slow response time.

The difficulties experienced have been with the telecommunications portion of the system, particularly overseas. There have been problems getting lines in Japan and with the Telecommunications Authority in Singapore, where the parameters of the system were changed without notification. A direct line from Korea to New York was put in and that improved things. Some of the difficulties were "jurisdictional" within the company, particularly between the project and the Communications Department.

8.1. Expectations

Many managers think the system is "great." Their expectations were predicated on their prior experience. The system was sold to Asia/Pacific as having a large number of features and since electronic computers operate "at the speed of light" their expectations were high. In practice, in the field, it operated more slowly than they expected (largely because of communications difficulties). This affected the attractiveness of some of the features, for example, connections to the application systems.

Some other managers did not have positive expectations for

the system initially. The value of the system did not become
apparent to them for 6 months. At first, they used the system
through intermediaries, but this proved much less efficient than
when they used it themselves and this practice has disappeared.
These managers are generally satisfied now.

8.2. Reasons for Outcomes

One of the major reasons for the implementation success was
top management support. The heads of ID and the head of
Asia/Pacific used the system. As one middle level manager put
it, "when you called (the head of ID) his secretary would say,
'I'll have him call you back.' But he was too busy. If you
wanted to get a message to him, you had to send it over the
system. At least I knew he would read it by the end of the day."

Another manager observed, "Those people who use it
frequently have lots good to say for the machine; infrequent
users are generally against it."

8.3. Suggestions for Improvement

Most people feel it would be extremely helpful if incoming
TELEXs could be received through the system. Then they would be
dealing with one device for all of their written communication.

One of the most important benefits of the system is access
to the various application systems, for example the Historical
Record of Money Transfers, Commercial Loans or Collections.
People at the operational level, particularly, believe these
should be expanded and approached in a serious manner if the bank
is to gain some of the *real* benefits from office technology –
those that occur from changes in the allocation of tasks among

workers and in the location of where tasks are performed.

Use of leased lines and satellite communications could increase bandwidth and make the system much more usable in the field. This would also decrease the primary source of errors. Improvements in performance overseas could be obtained if there were local processors (VAX/11-725s or microVAXs) in major regions, for example, London and Tokyo. This would reduce traffic on the relatively slow transoceanic links. It would also be beneficial to upgrade the capacity and reliability of all of the telecommunications links outside of the U.S., especially those that rely on Telenet. Of course, considerable additional investment would be required.

The secretaries observe that the printers are noisy and disturbing. Most locations have some form of sound suppression enclosure for the printers. Several people were knowledgable enough to observe that in future configurations, consideration should be given to laser/xerographic or ink jet technology printers.

One officer noted that it would be useful to search files for a character string (full text search), rather than just strings in the "subject" field.

9. Interpretation of Events

This study is consistent with Laudon's [Laudon 85] model of implementation and Bikson's [Bikson 81] set of situational characteristics that influence innovation. The original reasons for deciding to implement the system were environmental; the desire to improve world-wide communications in ID and to put

together more competitive deals. The factors that governed the success or failure of the implementation were institutional. Probably the most important was the visible and unwavering support of top management, at least through out the pilot. Key actors were involved from the beginning and provided their backing. They also manipulated incentives by making it easier for their staffs to communicate with them over the system than by other means and making it clear that everyone was to enter and receive their own messages.

Another contributing factor was the involvement of users in the feasibility study and in the actual implementation. Having a respected and dedicated officer from ID playing a key role in the implementation resulted in the surfacing of real needs and proper weight being given to them during design[13].

These factors alone, while critical, are not sufficient to guarantee success. If unwise technical decisions are made or decisions based upon inaccurate technical information, then the implementation is likely to be compromised. The careful technical planning, the scope of the system and its integration, the open-ended nature of the architecture that permitted the addition and deletion of applications and features, and the choice of a reliable mini-computer with a variety of options for distributed processing all contributed to the successful pilot.

---

[13]The user manager of the pilot was the head of ID. This role was delegated to a committee of five, one representative each from ID, Asia/Pacific, Middle East/Africa, Auditing and CSD.

Environments, however, have a tendency to be dynamic.
Changing times and markets resulted in shifts in ID's business.
Instead of stressing lending and deposit taking, more emphasis is
being given to non-credit services and intermediary roles. Just
how OIS fits in with these new endeavors is not clear. This has
resulted in re-thinking the scope of the system.

10. Policy Issues Raised by the Study

This study raises a number of questions concerning
organizational policy with regard to office automation.

10.1. Issues

One major issue raised by OIS is planning for the evolution
of jobs when there is likely to be significant change or
replacement. Thought should be given, in advance, as to how
these jobs should change, for example, identifying new tasks to
be assumed, providing adequate training and supervision rather
than allowing this to unfold based on the pragmatics of the
situation.

Another issue is what becomes of those secretaries that are
displaced through improvements in productivity. If the number is
small then decreasing staff size through attrition is probably
sufficient. If a larger number were involved, then, some formal
program of retraining and absorption elsewhere in the company, or
dismissal would have to be initiated.

Another issue concerns the company's policy towards work at
home. OIS allows one to work remotely, by taking a portable
terminal home or to a hotel room when traveling. This raises
questions about the need to actually be in the office at all and,

at the other extreme, the possibly of exploitation. Will those workers that choose not to work at home be penalized? There is no indication that, either these issues were considered or, that there was pressure to work, after hours, without compensation.

Security is a potential issue. Although most users were not concerned about privacy or security violations, pointing out that they currently use open TELEXs and telephones and that OIS is certainly more secure than these, IMS is aware of the potential for abuse. Care (and the auditors) dictated that none of the operational files could be updated from the field. But the potential for accessing confidential information remains.

There are also questions of technology transfer. If one configures an office system in the U.S. with the latest technology, how much of this can be taken abroad? Then, the interference of the Telecommunications Authority in Singapore was a concern. Trans-border data flow became an issue in Taiwan and it is the reason the system is not installed there. Local regulations prohibit the transfer of financial data out of the country. The project team was told that the government would require an armed soldier standing next to the terminal when it was in use.

Finally, it is not clear what group, at BT, looks at the information needs of the *whole* bank. TD tracks the technology, develops application systems as targets of opportunity and does some bank-wide information system architectural planning, although this latter activity is mostly for the purpose of coordinating systems rather than assessing executives information

needs.

10.2. Paradoxes

The current status of OIS is, to a certain extent, in equilibrium. The pilot has been clearly a success. Communication in the Asia/Pacific group has improved greatly. There is strong user acceptance in the field and in New York. Technically and functionally, the system works well. Yet, some of the bottom line benefits that were anticipated, for example, in closing more deals, have not been achieved. The system was "streamlined" after completion of the pilot, as an expense savings, by reducing functionality so it could accommodate more users on EM, for example, by cutting back on some of the administrative office aids and the access to application systems, and by reducing the support staff, and then adopted by ID.

The real payoffs may well come from having the system widely used in the bank, so that it serves as a *single* interface to all written material, and this has not occurred. Communications, especially overseas has been a problem, which limits the usefulness of the system. At certain times the system is heavily loaded which affects performance and user satisfaction. It is costly to run and separate pricing of services encourages discontinuing those that become non-profitable, shrinking the coverage and making the system less attractive.

The integration of the bank's applications into OIS has been somewhat half-hearted. In one case the interface to an Operations area has been via a terminal located in the corner of an office rather than into the main intake stream. If the

terminal operator happens to be out that day, messages may not be read and and the work requested is not performed. Thus, if an answer does not come back in a reasonable amount of time, a follow-up phone call is made, although this defeats the purpose of the system. In another case, the application is only available during working hours in New York (because files are being updated by a batch system at other times). This limits greatly the usefulness of the particular application in the field. Sometimes support for an application is withdrawn without a lot of notice (for example, access to the "downtown" reports on-line) and people are back to contacting the Operations area directly. This confuses them and reduces their incentive to learn how to use these interfaces and systems.

The difficulty appears to be that each interface costs money and there has to be strong support and funding from the user community before the systems work, programming and procedural changes can be made to create a truly integrated operation. This is a good example of how the bank's overall strategy of controlling non-interest operating expenses and internal expense budgeting operate to their disadvantage. By not funding the infra-structure directly, the bank has not positioned itself to take advantage of office technology in improving operations.

An argument could be made that, for a bank stressing "origination" and "distribution", i.e., investment banking, the main benefits of OIS are instantaneous communication world-wide, and in this the system has been extremely successful. This constrained view of OIS, however, seems shortsighted, as it does not explore the potential offered by the technology for improving

operational efficiencies (by reducing non-interest or non-risk expenses), or for gaining a competitive edge, by, for example, allowing direct communication with clients. It is not that the bank should use technology for its own sake, but, rather, that the bank is acting inconsistently by not being as aggressive in this area as they are in marketing their services.

While the feasibility of OIS has been shown by the pilot, the project was in a state of limbo from June 1983 to June 1984, at which time it was adopted for all of ID, but with reduced functionality and cost (compared with the pilot in Asia/Pacific). During this period there was considerable soul searching by management, as to whether to go for the full system or one with reduced functionality, stressing EM. Several large transaction processing systems were in difficulty at this time (cost over-run and schedule slippage) compromising the credibility of CSD and IMS. In addition, the head of ID was unwilling to risk the visibility and organizational upheaval associated with the full-function system.

There are those who felt this was the wrong decision. That the system shouldn't have been cut back at this point when real benefits were just beginning to be achieved. As one person put it, "we are in the *dark ages* in our use of technology compared to other commercial banks and financial institutions. The *real* conflict is between the young turks, the high flyers and the bankers, between uptown and downtown, between the front and the back office."

The costs to gain benefits beyond those of improved

communication are substantial. It implies a commitment to use the system, bank wide, as the primary vehicle for written communication and information flow. This involves considerable expenditures for equipment and support, and overcoming resistance in many areas of the bank. It means confronting the conflict between the flyers and bankers and breaking down the barrier between the front and back offices. This level of commitment is a difficult step for a company that has been successful by carefully controlling expenses and by not taking unnecessary risks.

Technology is only one component of a business strategy. ID is facing a different environment and performing different activities now, than they were in June 1982, when the pilot started. While the potential of OIS may not have been explored, fully, in terms of changes to the content and location of work, organizational structure and bottom-line outcomes, executive management is in agreement that they couldn't do what they are doing today without OIS, unless they hired a lot more people. In this regard, the system has clearly been a success.

10.3. Postscript

Since the time the study was performed, BT has decided to offer OIS bank-wide. The responsibility for the system was shifted from IMS to a newly formed group, Corporate Information/Communication Unit, run from London. The number of users on the system has increased and is currently (June 1985) close to 800. Modifications to the bank's application systems to support access by OIS have been made slowly, but steadily, so that many can now be accessed around the clock. OIS is now

accepted as the bank's primary office system.

Significantly, the executive management of Asia/Pacific is moving from New York to Hong Kong, a move consistent with the bank's philosophy that businesses should be managed locally. OIS has definitely contributed to achieving this business goal. It is a tribute to OIS that the top people in Asia/Pacific feel comfortable enough communicating with *their* management over the system that they are willing to leave New York and the proximity to power.

11. Comparisons with Prior Research

The results of this study are reasonably consistent with those found by other researchers. Hammer's [Hammer 85] investigation of CitiMail at CitiBank found, similar to this study, that the ability to communicate across time zones by sending messages out in the afternoon and finding replies waiting in the morning was the primary reason for adoption of the system. Address lists were constructed of people within CitiBank dealing with a particular client and then used to communicate internal information pertaining to that client. Thus, CitiMail facilitated communication that cut across organizational and geographic boundaries. While the initial motivation for starting the system was improved international communication, as the system matured, the pattern shifted to emphasize local communication.

Support by senior management was also instrumental in staff acceptance of the system. Considerable resistance to changing established communications patterns was encountered. In order to

provide incentives, executive management at CitiBank went so far as to use the system to announce key information and important organizational changes several hours before some of the material was released to the press or made public. They believe that the system had an important cultural benefit in exposing many staff to computer use, thus reducing their resistance to electronic banking. Unexpectedly, considerable resistance was found to the use of the 'return receipt' feature. Some staff refused to read messages marked with return receipt (they deleted them without reading) because they felt this was an invasion of their privacy.

Hammer found that users tended, on the average, to log on to the system twice a day and that a session lasted about 15 minutes. An average of seven messages were sent per day and ten messages received[14]. This represented more communication than was received by memo, but less than by telephone. Hammer observed that messages tended to be limited to one screen with an average length of 8 lines (for a sample of 500 messages) and that they contained one or two simple ideas. He also noted that the messages were less formal than written memos and that the sender's personality was often evident. Contrary to the OIS study, Hammer did not find substantial substitution of EM for either TELEX or telephone traffic, although there was some reduction in the rate of their growth.

Mountgomery et al. [Mountgomery 83] suggest that time zone

---

[14]This ratio of 1.4 messages received to messages sent was also found in the BT OIS and BITS traffic suggesting that it may be a constant factor.

problems and difficulties in coordination may lead companies to experiment with computer based message systems, although this study did not consider specifically the TELEX problem. Time zone and communications difficulties were two of the main reasons for initiation of the OIS pilot in ID.

Crawford [Crawford 82] found that a pilot group's reaction to EM to be "almost universally favorable." He noted that users were impressed by the speed and efficiency of non-simultaneous communication, and its effectiveness in "broadcasting" information to a number of people at the same time. He observed that managers felt they were able to accomplish tasks they could not otherwise have done, particularly in information exchange and distribution. Similar findings occurred in this study.

This study did not find clerical workers with a more specialized and centralized job, as suggested by Olson [Olson 82]. To the contrary, clerical workers appeared to have acquired new tasks with more variety and higher level skills than before. Not only was much unnecessary work eliminated, but some of the routine work (for example, typing) was transferred to others.

Poppel [Poppel 82] predicts that the use of Office Automation technology will have considerable impact on the tasks that managers perform and their bottom line performance. The findings of this study suggest that these effects may be considerably less than suspected. Although the form of tasks changed, their content really didn't, nor was there a strong bottom line influence.

12. Conclusion

A current theme is that of the 'technological imperative' – firms adopt a technology and all sorts of 'good' changes result. This study demonstrates the contingent nature and complexity of innovation in organizations. In this case, a clear business need, top management support, a good technological solution, a successful pilot and the best intentions of all parties still did not lead to immediate, unqualified acceptance. The project lay suspended for a year before a decision was made to move forward with a scaled-down version of OIS. It was only after it became obvious that the system contributed to the strategic objectives of decentralization and re-structuring that it gained momentum. Even then, although communications among individuals were greatly improved and new 'tools' became available, there was relatively little change in the content of jobs or in overall performance as a result of OIS.

Part of the reason for this was the clash of objectives among the different players. Part was the difficulty of translating goals into programs. Part was simply the inertia of large organizations, where the energy behind an idea eventually becomes dissipated and the idea languishes. Part was also that overall outcomes are the product of many factors. Technology, in general, affects only a small number of them.

This study suggests that one must be cautious in predicting the consequences technology will have for workers. There are many possibilities and one is tempted, based on individual values and the potential inherent in a technology, to sketch an enormously broad contour in almost any direction. The trajectory

actually taken, however, is influenced by business objectives, economics and the situational factors that compose an implementation. Consequently, it is likely to fall far short of what is possible. People and their organizations are just terribly hard to change.

I. I

Interview Protocol

I.1. Goals

The interviews are intended to reveal information about:

* *Job Content*: The tasks a person performs in the course of a normal day. The responsibilities a person has. The authority a person has. The extent a person has control over the choice of work methods and pacing. The pressure and work load of the job.

* *Structural Arrangements*: Formal organizational structure. Who one works with. Who one gains assistance from and the ease of obtaining it. Who one communicates with in OIS.

* *Power*: Recent shifts in power.

* *Skill*: Changes in skill level. Recent education or training programs.

* *Performance*: Performance metrics for major work products. Productivity. Quality of work products. New products. Competition. Industry position.

* *Attitudes about OIS*: Likes and dislikes. Functional adequacy. Improvements or changes. Attitudes about technology.

* *Implementation*: Opinions about the implementation process. Role played in implementation. Reasons for success or failure.

I.2. Questions

    1.   What is your job at the bank?
    2.   When did you begin using OIS?
    3.   What do you use OIS for?
    4.   About how much time do you spend using OIS in a typical day?
    5.   What role, if any, did you play in the implementation of OIS?

6. What do you like best about OIS?
7. What do you like least about OIS?
8. Has OIS met your expectations?
9. Were you trained in OIS?
10. What do you do when you encounter problems in your job?
11. What do you do when you encounter problems with OIS?
12. What types of problems do you encounter with OIS?
13. What would you change about OIS?
14. Should OIS be used elsewhere in the bank?
15. Is OIS worth it? (in terms of the cost and the effort to use it.)
16. Are you concerned about the security of OIS?
17. How has your job changed over the last several years? (what you do and how you do it.)
18. How has the work of your colleagues changed?
19. Have there been any shifts in the number of workers in your group?
20. What shifts, if any, have taken place in where things are done, especially between the field and the home office?
21. Has your access to information or the amount of time required to obtained information been altered?
22. Has the number of reports or computer output you receive changed?
23. How is your performance measured?
24. Have there been any changes in the the number or quality of the products you produce?
25. Has there been any change in the amount of control over the way you do your job?
26. Has there been any change in your work load?

II. II

Glossary

ACIS	- Automated Competitor Intelligence System
BITS	- Bankers Trust International TELEX System
BT	- Bankers Trust Company
BTAL	- Bankers Trust subsidiary located in Australia
BTNet	- Bankers Trust private telecommunications network
BTShare	- Bankers Trust internal timesharing system
CSD	- Computer Systems Department
CSO	- Customer Service Officer
DEC	- Digital Equipment Corporation
DECNET	- Telecommunications software for DEC computers
EM	- Electronic Mail
FAIS	- Financial Asset Inventory System
HR	- Historical Research System
ID	- International Department
IMS	- Information Management Services
IRMD	- International Risk Management and Credit Review
MPS	- Monthly Profitability System
OIS	- Office Information System
ROE	- Return on average common equity
TD	- Technology Department
TISCO	- Bankers Trust subsidiary located in Bangkok
TSO	- IBM time shared operating system
VAX	- DEC computer
VDT	- Video display terminal
VMS	- DEC operating system for VAX computers
WP	- Word processing

References

[Attewell 82] P. Attewell. *The de-skilling controversy.*
Research Report, Department of Sociology, State University of New
York at Stony Brook, Stony Brook, 1982.

[Bair 78]   J. H. Bair. Productivity assessment of office
information systems. *Trends and Applications: 1978 Distributed
Processing.* National Bureau of Standards, Gaithersburg, MD,
1978.

[Bankers 83]   Bankers Trust Corporation. *Annual Report.*
Technical Report, Bankers Trust Corporation, New York, NY, 1983.

[Bankers 84]   Bankers Trust Corporation. *Annual Report.*
Technical Report, Bankers Trust Corporation, New York, NY, 1984.

[Bikson 81]   T. K. Bikson, B. A. Gutek and D. A. Mankin.
*Implementation of information technology in office settings:
Review of the relevant literature.* Research Report R-3104-NSF,
The Rand Corporation, Santa Monica, CA, 1981.

[Braverman 74] H. Braverman. *Labor and Monopoly Capital: The
Degradation of Work in the Twentieth Century.* Monthly Review,
New York, 1974.

[Card 83]   S. K. Card, T. P. Moran and A. Newell. *The
Psychology of Human-Computer Interaction.* Lawrence Erlbaum
Associates, Hillsdale, NJ, 1983.

[Connell 79]   J. J. Connell. The office of the future. *J. of
Systems Management* 30(2):6-10, 1979.

[Crawford 82] A. B. Crawford, Jr. Corporate electronic mail - a
communication-intensive application of information technology.
MIS Quarterly 6(3):1-13, 1982.

[Ginzberg 79] M. J. Ginzberg. Improving MIS project selection.
Omega 7(6):527-537, 1979.

[Gregory 83]   J. Gregory and K. Nussbaum. Race against time:
Automation of the office. *Office: Technology and People* 1(2&3),
1983.

[Hammer 85]   M. Hammer. *Intra-company electronic mail: Its impacts on manager's working methods*. Technical Report, NYU Graduate School of Business Administration, New York, NY, 1985. unpublished study available from Prof. J. Turner.

[Keen 81]   P. G. W. Keen. Information systems and organizational change. *Comm. of the ACM* 24(1):24-32, 1981.

[Kling 80]   R. Kling. Social analyses of computing: Theoretical perspectives in recent empirical research. *ACM Computing Surveys* 26(11):61-111, 1980.

[Kling 84]   R. Kling and S. Iacono. The control of information systems after implementation. *Comm. of the ACM* 27(12):1218-1226, 1984.

[Laudon 85]   K. Laudon. Environmental and institutional models of system development: The case of natural criminal history system. *Comm. of the ACM* , 1985. in press.

[Lucas 81]   H. C. Lucas, Jr. *Implementation*. Columbia University Press, New York, NY, 1981.

[Mankin 78]   D. Mankin. *Toward a Post-Industrial Psychology*. John Wiley and Sons, New York, NY, 1978.

[Markus 83]   M. L. Markus. Power, politics and MIS implementation. *Comm. of the ACM* 26(6):430-443, 1983.

[Matteis 79]   R. J. Matteis. The new back office focuses on customer service. *Harvard Business Review* :146-159, Mar.-Apr., 1979.

[Mountgomery 83]
          I. Mountgomery and I. Benbasat. Cost/benefit analysis of computer based message systems. *MIS Quarterly* 7(1):1-14, 1983.

[Olson 82]   M. H. Olson. New information technology and organization culture. *MIS Quarterly* 6(SI):71-92, 1982.

[Olson 85]   M. H. Olson. *Impact of information technology on work organization: A positive view*. Research Report GBA#85-92, New York University, Center for Research in Information Systems, New York, NY, 1985.

[Poppel 82]   H. L. Poppel. Who needs the office of the future?
Harvard Business Review :146-155, Nov.-Dec., 1982.

[Schein 70]   E. H. Schein. *Organizational Psychology.*
Prentice-Hall, Englewood Cliffs, NJ, 1970.

[Shepard 77]   J. M. Shepard. Technology, alienation, and job
satisfaction. *Annual Review of Sociology* 3:1-21, 1977.

[Uhlig 79]   R. P. Uhlig, D. J. Farber and J. H. Bair. *The
Office of the Future.* North-Holland, Amsterdam, 1979.