Beyond the Globalization of Information Technology: The Life of an Organization and the Role of Information Technology

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ABSTRACT

The globalization of an information system in a major international bank is analyzed in order to explore the role of information technology in terms of organizational effectiveness. Our study shows that the globalization process *revealed and intensified pre-existing issues* such as the balance between local autonomy and global control in the bank. Information technology is autonomy and global control in the bank. Information technology is identified as a facilitator in formulating and revealing different groups' organizational theories-in-use — theories of action constructed from an organization's actual behavior. These organizational theories-in-use were used by members of the organization to compare with their understanding of organizational theory-in-use in order to identify issues, which in turn, led to discussions for a solution. This process set the stage for organizational learning centered on error-detection and error-correction.

INTRODUCTION

This research examines the role of information technology in the globalization process of an information system in a major international bank. We started our research with a general assumption that we need to critically review the commonly held assumption that information technology always solves rather than defines problems. Then we asked the following question: How did information technology change the quality of the organizational process during the globalization process? In particular, we investigated the role an information system played in autonomous groups in a bank where the information system was deployed to integrate working procedures and to standardize services and products.

To analyze the changes, we traced changes in the bank's decision-making process and the evolutionary process of development and implementation of the information system which were related to the globalization process. In analyzing these changes, we first identified the incongruities between intended goals and actual results from deployment of the information system. Second, we explained how the bank's members responded to — and acted upon — the differences and incongruities between intended and actual results of the deployment of an information system during the implementation process.

In this article, we first review research related to this topic in order to make a link between our research and existing literature. Second, we explain how we conducted this research so that it can be tested publicly and applied to other research efforts and practices. Third, we reconstruct and explain the bank's experience in globalizing its information systems. Fourth, we analyze the role of information technology in the globalization process in light of the above inquiry. Finally, we summarize the findings and identify new directions for future research.

The contribution this study makes to research and practice are four-fold: (1) it increases our understanding of the dynamics of the globalization process of information technology from an integrated perspective which includes both information technology and organizational learning; (2) it provides the basis for a research method for analyzing complex processes at the level of theory-in-use instead of merely that of espoused theory; (3) it supplies a framework for linking information technology and organizational change; and (4) it suggests a foundation on which realistic as well as innovative strategies for utilizing information technology for organizational learning can be formulated.

Information Technology and Organization

The deployment of information technology in an organization has been generally viewed as "problematic" despite the initial hopes for a smooth and successful operation. Research findings on information technology and organizational changes are dichotomous largely due to researchers' disciplinary and methodological bases [14, 21]. In the con-

text of utilizing information technology for organizational change, we introduce two important schools of thought that complement each other: the strategy-oriented school and the process-oriented school.

The strategy-oriented school focuses on how managers ought to take advantage of information technology for corporate strategy [22, 24] for managing organizational interdependencies [20,25], for designing the planning process and for building partnerships [10,11], and for setting strategic electronic integration [27]. This school of research provides timely insights into issues that are critically important for corporations competing in a rapidly changing environment. Its research emphasizes a stream-lined top-down strategy for setting the direction of an organization. As a result, organizational intervention — which can correct errors — cannot be easily introduced. In the real setting of organizations, most knowledge regarding errors tends to evolve after strategies have been set, often during the implementation process and often at the periphery instead of the center.

The process-oriented school looks into the inner workings of an organization in order to find out how it achieves its organizational goals. In an effort to come to terms with the complexity of an organization's inner workings, numerous authors have described how decisions are made and implemented. For Lindblom [19], decision-making in an organization is seen as a "muddling through" process; Allison [1], however, sees an organization as having a group of actors with conflicting objectives, values, and priorities. For Bardach [3], a "fixer" is seen as needed to overcome the implementation games in an organization. And Wildavsky [29] views implementation as a transformation process of decision-making. These perspectives describe different facets of what an organization is; how its decision-making process works; how its decisions are carried out; how the implementation of a decided course of action is transformed; and how a fixer could re-steer the course of implementation toward an originally planned course. They tend to view the decision-making process as if it starts and ends through various static steps. However, the actual behavior of an organization resembles a complex dynamic system which includes loop-like feedback [6] processes.

In the context of our study, both perspectives indicate (1) the difficulties in linking the utilization of information technology and the improvement of organizational effectiveness; and (2) the inevitable incongruity between intended goals and implemented results in organizations. These difficulties call not for replacement of the above perspectives, but for the addition of organizational intervention focusing on the organizational capacity for learning — the capacity which can enable an organization itself to learn from the experience of error and adapt to the rapidly changing internal and external environment. This is the lever that permits us to introduce the organizational learning perspective [2,4,5,6,7,17] for an in-depth analysis of the experiences of globalization of a major international bank's information system.

Background Concepts

We first introduce several concepts that have been established by researchers using an organizational learning perspective [2,4,5,6,7,17]. Organizational learning refers to the error-detection and error-correction process at an organizational level. Argyris and Schön distinguish organizational learning from individual learning as follows:

> Organizational learning occurs when individuals (as agents of an organization), acting from their images and maps, detect a match or mismatch of outcome to expectation which confirms or disconfirms organizational theory-in-use. In the case of disconfirmation, individuals move from error-detection to error-correction. Error-correction takes an inquiry. The learning agents discover sources of error, invent new strategies based on new assumptions, and generalize the results of new actions. Encoding learning agents' discoveries, inventions, and evaluations in organizational memory that are shared by members of an organization marks the final stage of organizational learning and also generates changes in organizational theory-in-use. This encoding of changes in shared maps of organizational theory-in-use distinguishes organizational learning from individual learning [2: p.19].

Organizational learning theory deals with the quality of organizational change. It focuses particularly on the feedback processes of organizational change. In analyzing the quality of changes in organizations, we will use the following two terms: theory-in-use and espoused theory. By theory-in-use we mean a theory of action that can be constructed from observations of an organization's actual behavior. Espoused theory, we explain as a theory of action that can be constructed from publicly and formally announced or written rules/procedures of an organization [2].

Changes in theory-in-use defines the level of organizational learning. Argyris and Schön [2] defined these changes by explaining how organizations learn or fail to learn, and further distinguished three levels of organizational learning: **single-loop, double-loop,** and **deutro learning**. When the error detected and corrected permits the organization to carry on its present policies or achieve its present objectives, then that error-detection-and-correction process is single-loop learning. Single-loop learning is like a thermostat that learns when it is too hot or too cold and turns the heat on or off. The thermostat can perform this task because it can receive information (the temperature of the room) and take corrective action. Double-loop learning occurs when error is detected and corrected in ways that involve the modification of an organization's underlying norms, policies, and objectives.

Deutro refers to the kind of learning that an organizational learning system learns.

Research Method and Strategy

Our study of the role of information technology in a major international bank, for which we will use the pseudonym Elite Bank, employed a research method [16,17,26] that allowed us to gain a historical and developmental perspective on the globalization process as well as to observe its dynamics. We traced the development and implementation process of a global information system which we will call the Automated Banking System (ABS).

In studying the ABS, we collected stories as well as directly observable data because stories link and explain the processes that occurred in which the data were presented. Without knowing how the data were produced and what the context of ideas that gave meaning to the data was, one may lose hold of the complete picture of what occurred.

In collecting stories on the organizational workings of the bank, we intentionally included subjective opinions and conflicting data that most conventional researchers have hitherto overlooked. The critical clues as to how the bank actually works lie in the complexity of incongruities between different stories on the subject from different individuals or groups involved in the globalization process. The first-order incongruity results from the difference between an individual's espoused theory and theory-in-use. The second-order incongruity results from the fact that one's espoused theory and theories-in-use are likely to be different from another individual's. Thus, a multiplicity of espoused theories and theories-in-use may exist. This is why reconstructing a story through checking interactions among the parts of the story and the whole can be the source of corroboration, thereby serving as a checking method for objectivity in the story.

We started with two primary propositions which guided our story-collecting process and ways of inferring theory-in-use from directly observed data and collected stories: (1) A story may contain espoused theory and theory-in-use, and there may be an incongruity between the two [26]; (2) a problem has its context of frame [23].

The first proposition was useful in collecting and interpreting stories and directly observable data because it explicitly distinguished organizational theory-in-use from the publicly-held organizational espoused theory of action. The second proposition guided us to raise the following critical questions: Who framed the problem? How did it come to be a problem? Why was it a problem to some and not to others? How was it solved? Was the solution used for predefining the problem?

The interviews were of two kinds: structured and unstructured. The structured interviews were designed to elicit information that could be used for comparison of information systems of local banks. They included questions on technical changes in the ABS's implementation process. The unstructured interviews were designed to collect information on the bank's working process and the organizational issues related to the ABS. To avoid interviewers' bias, multiple members of our research team were present for each interview. As a further validity check of the review response interpretation, post-interview meetings were held to review the different interpreted versions of the interview responses. We also showed written copies of the results to a group of interviewees so that they could check response accuracy. Face-to-face interviews were conducted in New York, London, Venezuela, and Puerto Rico; telephone calls were made for follow-up questions.

In analyzing and reconstructing the stories, we compared and identified two sets of incongruities: (1) changes in organizational theories-in-use at different times, and (2) differences in organizational theories-in-use held by different groups. These two sets of incongruities are explained in the context of what went on in the bank — changes in personnel, market, technology, and decision-making processes.

The International Bank

The Elite Bank was established in 1812. It has more than 80,000 employees in 90 countries, more than $9 billion in assets as of 1989. There are three primary sectors in the bank: institutional banking, individual banking, and investment banking sectors. Being highly decentralized, the heads of the three sectors essentially run their own business and review operations with their chairman each quarter.

The Elite Bank, recognized as one of the world's leading financial institutions, has a "technical whiz" reputation with high-tech front- and back-office operations. To understand how the Bank and its information systems have evolved over the years, we shall describe its workings including decision-making behavior throughout its recent history. 'We shall focus on the globalization process of one of the bank's information systems, the ABS.

The Mini-Banks: Locale of Decision-Making

Throughout the Bank's history, each local branch has essentially behaved as an independent mini-bank for its own local operation — based on overall corporate objectives. The decentralized structure of Elite Bank's operations provide a setting to which the information system's architecture is accommodated. Local bank information systems were developed and implemented within the local bank's control, based on its needs.

Marching for Growth: Globalization

To explain in greater detail how the bank and its infor-

mation systems grew, we shall describe the evolutionary process of the information systems at both the global and the local levels. In this study, "global" means the international bank level and "local" means the country bank level.

In the 1960s, the Bank's main focus shifted to development of franchises in order to broaden its customer bases in various regions. In the 1980s, the focus was on gaining strategic advantages globally. It broadened the functions of the local banks in North America, Europe, Africa, Latin America, Asia, and Australia.

"Let's globalize our business" and "exploit information technology" became the Elite Bank's common strategies. Most often, globalization as a strategy means "external globalization," which focuses on the expansion of the scope of a market to a world-wide one, at least one beyond the North American territory. Information technology was seen as a competitive advantage in making this globalization strategy work more efficiently.

In the globalization process, the headquarters' major concerns were issues such as its competitive strategy within the financial industry. At the local level, managers believed that advanced information technology attracted more global customers. "We don't want to lose the oil princes to other banks just because we don't have better technology," one local manager said. Information technology would not only enable global customers to connect and mobilize their resources, but also would make the Elite Bank more competitive in transaction-based and fee-generating operations.

Yet, intra-organizational competition was also intensified as distinctions among institutional banking, individual banking, and investment banking became blurred. This was particularly evident between investment and institutional banking sectors — both needing information and data from each other and both having similar groups of customers. Examples of needed data might range from macro level information on the overall economy to the exact exchange rate at a certain time. These increased needs for interdependency contradict three long-held organizational theories-in-use of the bank:

- Each local bank runs its own business — "mind your own business";
- Members of the Bank compete against one another — "me first"; and
- Results and products are the only evidence for evaluation — "the bottom line."

Searching for Integration and Standardization: The Automated Banking System

How did the Elite Bank's global strategy of using efficient information technology unfold? How was the intra and inter-organizational competition related to this unfolding process? In the late 1960s, a "stand alone" system, which we have called the Automated Banking System (ABS), was developed in a German branch for providing an efficient and all-encompassing information processing capability for the branch. The rationale given by the German branch was the lack of an information system that could process local banking operations. The ABS was originally designed as a batch system that had components for transaction processing, letter-of-credit processing, and accounting reports. As the German branch continued to use the ABS, other functions such as managerial reports were added. As other European branches used the ABS, it became known as a "standard" system.

The fact that the ABS was working favorably to meet particular local needs was recognized by a senior business manager at corporate headquarters. The new problem he espoused at that time was the lack of a common information system that could integrate the banking operations at the global level. He formed an alliance with a technical manager in Europe who was involved in the development of the ABS, and proposed the implementation of the ABS globally to the top management based on the following rationales:

- The application from one country to another is very similar — "Why reinvent the wheel ninety times?"
- Proven technology has a lower risk — "The ABS is the best system we have at hand."
- Benefits from automation and standardization — "The ABS can save payrolls."
- Fit to the bank's image of being a technical whiz — "With the ABS, we will look more attractive."

Consequently, a decision was made by top management in 1976 to implement the ABS around the world. This decision was seen as a strategy for cost saving and globalization of information technology. Local banks in various countries welcomed the decision because they had pressing needs for processing an ever-increasing volume of transactions due to successful expansion of their banking business.

In order to export the ABS to overseas branches, a central support group was established in Belgium. This group was also responsible for overseeing its installation around the world. Regional support groups were established in Hong Kong, Latin America, and other locations. Under the regional support groups, there were project coordinators in each country for implementing the ABS.

Ironically the ABS, originally developed as a "stand alone" system by the autonomy-seeking local bank, became a core system believed by top management to be an integrating vehicle which would facilitate commonality among local banks and contribute to globalization of the entire banking system around the world. The management team at corporate headquarters interpreted the claim that the ABS "worked" in European branches as a feasibility test for implementing the

ABS beyond European banking boundaries. They viewed the ABS as a way of establishing a global conformity across local banks, while local banks saw it as a problem-solver that would enable more efficient transaction processing.

Implementation Process: Striving for Autonomy within Commonality

Installation and Modification. What happened once the ABS was implemented at the global level? Some 50 nations have installed the ABS since 1976. In terms of the enhancement of the ABS, it evolved to include on-line capability in the late '70s. The ABS was not assumed to be a turn-key system. Instead, it was adopted as a common system which had core and peripheral components that local banks could add to and modify. Headquarters had assumed that the core part of the ABS would require only minor modifications to be effective in all local banks. As a result, headquarters neglected to set policy guidelines for revisions, and to provide detailed and accurate system documentation to local banks. Both the headquarters and the local banks underestimated the scope of modification and guidance needed at local levels from the beginning. Local branch managers initially thought they could pick and choose part of the ABS to fit their local needs.

Consequently, local banks whose working procedures were similar to those in Germany — for which the system was originally designed — experienced relatively smooth implementation. However, other local banks having different needs from those in Germany faced difficulties ranging from locating maintenance engineers to finding ways to adapt the ABS appropriately to local conditions. This, despite training concerned with what the system was about and proper procedures for changing the ABS to accommodate specific conditions.

The ABS was programmed in COBOL — well suited for the batch processing that was needed for the German banks at that particular time. It was not initially made for global processing which requires heterogeneous database management capability. The core of the ABS, which was assumed to address common needs of local banks, automated certain banking procedures such as checking account transactions. However, the procedures were hard-coded; a deep understanding of the code was required to make modifications.

Given the fact that different local banks had different procedures for checking accounts, the checking account module needed to be tailored to each local bank. In some local banks, the ABS provided by the central support group could not process even a checking account. As a result, the ABS was modified and became the butt of a joke as the "Heinz system" because there were about 60 versions of the ABS in various local branches. The revision which took place over a period of 15 years was not recorded coherently. In most cases, the new versions were kept and the old versions were piled up somewhere or overwritten. As one software maintenance engineer put it, "Fixing anything became a hair-splitting job without knowing which hair to split."

Even if the changes were recorded, they were kept in reels of tapes and piles of printouts that could easily be junked simply because they occupied so much space. Records of problems and codes that did not work were not considered important enough to keep. If it worked for a certain task at a certain time, that was enough to go on. Making the ABS work with minimum system-down-time was essential for everyday banking operations, so this took priority over documenting errors detected.

The difficulties the local banks expressed in implementing the ABS were as follows:

- National regulatory agencies had different requirements for reporting banking operations.
- Differences in computer languages used for different databases made it difficult to fit the ABS into other systems.
- Different ways of calculating interest rates made it necessary to create special adaptations to use the ABS.
- Some local banks had unique products which were not provided for in the ABS.
- Some local Banks needed to interface with New York in their banking business, but the ABS was designed to interface with London.

The Disarray

In the early '80s, both the strong senior business manager in corporate headquarters and the technical manager in Europe resigned. The ABS was in disarray, not because it was not working, but because it lost the leader who could keep the flag of the ABS. Moreover, added modifications to the original ABS made it hard to keep the original name of the system. In a U.S. branch, for instance, the system was not called the ABS, and they told our research team that they did not use the ABS. In reality, their software engineers took the ABS's security application and modified it for their own needs. In some branches, one processing module of the ABS had different functions from other branches. However, versions of the ABS were the encompassing software system supporting the larger portion of banking services. The Elite Bank was locked into the ABS without the original leaders of the ABS.

After the two managers' resignations, obstacles to implementing the European version of the ABS in Caribbean and Far East branches became evident, and the central support group was moved from Belgium to the U.S. The new group in the U.S. had mostly old members with a new leader and a

revised charter. The charter included not only supporting the ABS, but also working on new modules of it which included a direct customer interface with the original ABS. Some of these modules were used and exported while others were not used. In an English branch, both individual and investment divisions eliminated the ABS leaving only the institutional banking division to use it. As one of the business managers in England put it, "If you are going to hold me responsible for my bottom line, then give me the flexibility to manage, control, and make decisions on everything including my systems people and the systems." In once U.S. branch, a business manager claimed that "the ABS does not work, we need to restart with a clean slate." What he learned from the implementation of the ABS was that when the reporting hierarchy exceeded two levels, conflicting and overlapping reports were generated due to a turf battle. His claim: "You've got to make your own system only for your management turf. It's easier to standardize."

The new idea from the U.S. branch was similar to the original ABS except for its claim that this would not be for globalization purpose. The idea was to design database systems with a structured modular system for local databases. One U.S. branch manager put it this way: "Nobody has ever cared about aggregate. What people care about is whether their department has a project." In fact, the idea did not survive the independent consultant's evaluation. The consultant could not survive the bank's business manager's hiring list either. As a result, "Everybody was making his own toys."

Searching for Connectivity: Experimenting with the CIS Approach

Meeting of the market trend of globalization and local operational mishaps in implementing the ABS provided a new platform for understanding that the realities of local operation and global strategies needed to be incorporated. Headquarters and local banks both realized that the ABS could not standardize the entire banking operation across management turf; it only increased cost for modifying the ABS to fit local needs. Instead of asking what was common, they started asking how they could connect with each other given the autonomous working relationships. In answering these questions, the Composite Information Systems (CIS) approach [28] that the headquarters' management team had reviewed — but not taken action on — became the alternative approach to be adopted. Since 1985, five systems have been implemented at the Bank following the CIS approach. Among others, systems for bank transaction investigations and management information system reporting are examples of implementation [8].

The difference between previous attempts and the CIS approach lie in the assumptions behind the system's design. The CIS approach gives system autonomy yet allows for integration and system evolution. The concepts of adaptability and flexibility are explicitly represented in the systems connectivity it provides. The technical difference from the ABS is that the CIS approach standardizes accessibility to the system, yet leaves applications to local turf; whereas the ABS was designed as a common system that was assumed to be used universally. The technical structure of the CIS approach example consisted of seven major components: external interface, massage control, transaction processing, information processing, administrative support, data control, and a shared data resource. Advantages of the CIS approach can be summarized as a systems design methodology equipped with flexibility and adaptability that the ABS lacks.

Information Technology as a Facilitator for Organizational Learning

What has been the actual role of information technology in the Bank during the globalization process of the ABS and the experimentation process of the CIS approach? Did deployment of information systems reveal diverse autonomous concerns? Were routine operational transactions accompanied by strategies beyond performance questions by identifying organizational theories-in-use held by different groups of the Bank. We will also explain how members of the bank identified and corrected errors, and how they transformed the problems.

The Contradictions and the Incongruities

The organizational espoused theory at headquarters was to encourage managers to demonstrate innovative leadership. Strategies were formulated based on the theory-in-use of each manager finding new opportunities before anyone else could put their "stamp" on it. The strategy of the manager who initiated the adoption of the ABS was to scout a local project alone. He or she formed an alliance with the European manager who had a local product at hand — the progenitor of the ABS. So compelling was the need to find a project to call one's own, one manager we interviewed put it this way: "Having a bad project under your belt is much better than no project here. No project spells you're on your way out." The headquarters' theory-in-use acted as the platform for formulating the strategy of adopting the ABS. However, as we explain below, the local branches' organizational theory-in-use was conveniently ignored (see Table 1).

The local managers' organizational theory-in-use was to show increased productivity and profit without creating problems for themselves. Their local managers' strategy was to protect their local management turfs so that they could control the operational processes necessary for achieving their goals. The local branch managers were not consulted adequately concerning the deployment of the ABS. There-

Table 1. Headquarters vs. local banks: their espoused theories, theories-in-use, and strategies on general management

	Espoused Theory	Theory-in-Use	Strategy
Headquarters	Demonstrate innovative leadership	Find new opportunities unilaterally	Institutionalize a new project with one's stamp on it.
Local branches	Increase productivity and profit	Increase productivity and profit without personal loss	Protect one's turf for operational control

fore, they questioned the lack of consideration of local implementation particularly because they recognized that the headquarters' decision concerning the ABS violated local banks managers' understanding of the Bank's organizational theory-in-use.

The local managers' understanding was that the traditionally kept balance between local autonomy and global control could be shifted only when based on profit/loss accounting results — not when based on decisions about the kinds of information systems local banks operate. As summarized in Table 2, this organizational theory-in-use held by the local manager was contradictory to the headquarters' theory-in-use of keeping the "technical whiz" image among the world's financial service institutions. Complaints from local managers to headquarters can be exemplified by this statement made by a South American manager: "If you want me to be responsible for making a profit, let me take care of it. We don't have time for tinkering with new toys for nothing in return now." Such attitudes were directly contradictory to the headquarter's perception of the ABS as a critical technology input to the bank as a whole. Because local branches understood the ABS as one of the tools they could pick and choose to aid their local operations, they easily agreed with headquarters on the deployment of the ABS. However, when the ABS was actually implemented, local branches recognized that the ABS would have to play a greater role in the overall banking operation than they had originally assumed. In order to make the ABS work, local banks had to coordinate the ABS with other banking procedures and operations.

Table 2. Headquarters vs. local banks: their theories-in-use on choice of technology

Headquarters' theory-in-use	Local banks' theory-in-use
Keep the image of being a technical whiz	Choose the appropriate technology for local operations and control

The local information systems group had yet another theory-in-use: to assure that their technical expertise was critical to the banking operation's success. During the initial period of introducing the ABS their gate-keeping power soared, but it was reduced as the technical difficulties of implementation increased. Various groups held different understandings of organizational theory-in-use which served as the basis for developing their strategies. The general rubric of the bank's organizational theory-in-use could be distilled as promoting oneself first by protecting one's turf.

The Error-correction: The Levels of Organizational Learning

Cooperating with the central ABS group in Belgium

created delays in systems delivery and burdensome communications for local banks. Although the local banks publicly applauded fast error-free transactions, they privately expressed mixed feelings about implementing the ABS. They reasoned that the local management team felt that the local banks could not afford the transitional time lag between the old and new systems. Additionally, the local information systems team began to realize that their control over the ABS was significantly reduced. As technical difficulties increased the cost for the ABS modification, the local branch managers began to view the ABS as a system for falsely intended conformity and a hindrance for traditionally exercised local autonomy.

As modification was added to the original ABS version for local needs, the information systems group and the management group began to feel at ease that they had a system that worked. This condition was achieved when the original architects of the ABS resigned from the bank. Regardless of the fact that the ABS was working after times of modification and addition, most local banks no longer called the system ABS.

Bank members maintained the previous theory-in-use: "Minding their own business." The Bank was going through **zero-order learning** [26]. Local banks went back to the old notion of making their own information systems.

However, once the members had an opportunity to discover the differences in organizational theory-in-use held by different groups in the bank — a subject they had privately hypothesized — it became easier to discuss errors they had made. Members of the bank identified the following issues through their discussions on errors:

- Headquarters considered globalization of information technology as a technical agenda because it conveniently assumed that technical and organizational issues were separate. For example, the ABS was implemented to integrate workings of the Bank and to increase productivity by increasing technical connectivity. However, when the ABS was implemented, local banks did not change internal workings to fit the ABS.Instead, the ABS was changed to fit the local banks' procedures and rules. Both headquarters and local banks came to terms with the fact that developing and implementing a common system was an organizational — as well as a technical — endeavor that both line and information systems managers needed to participate in.
- Communication among the local banks was almost nonexistent due to the lack of a rewarding system for horizontal communication which could have speeded up error-detection and error-correction processes.

This discussion on errors reached two major conclusions. First, decisions on technical systems deployment were entangled with autonomous organizational behavior of the bank. Second, an absence of strong communication habits among local banks should be considered in any global systems development and implementation. Because discussions of turf games were thought to be taboo, these two conclusions were not discussed further. However, the conclusions, reached as a result of the ABS implementation, made it easy for the Bank to swiftly endorse the CIS approach as an alternative.

The bank became able to engage in **single-loop learning** by detecting and correcting errors within its conventional values, norms, and assumptions. The CIS approach was used to correct the errors that the ABS had made. This approach guided development and implementation of information systems toward the framework that could facilitate a process of matching information systems with organizational reality. In fact, local managers questioned the balance between local autonomy and global control, but follow-up discussions were avoided. Had such discussions occurred, they might have resulted in double-loop learning. As a result, the Bank maintained the status quo. The basic assumptions, goals, and policies were kept unchanged, while the cost of technical modification was reduced by allowing local design of systems application. In the actual system design, the basic global information systems architecture was framed, yet the systems applications were left to the local banks.

Transformation of the Problem: The Kinds of Organizational Learning

The difficulties in implementing the ABS made local banks search for ways of modifying the system. A search was conducted to identify workable solutions. If one technical solution failed, the search moved to the closest technical alternative. More importantly, the response to a failure in the solution search was based on assumptions of minimizing delays in local banking business operations —this evaluated by headquarters. As a result, local banks had to avoid conflicts between headquarters and themselves, which might require lengthy communications. Moreover, deep-rooted organizational issues such as a balance between global control and local autonomy had to be ignored so that modification of the ABS could be completed as quickly as possible. Local banks had learned to avoid conflicts and to remain close to the established organizational theory-in-use: fix it first and fast.

The bank transformed the problem as it traveled through different learning sites [17]. The bank learned to technicalize the problem within a scope they could handle and solve it at that particular time. For example, local banks reframed the problem as a technical misfit which demanded multiple forms of the system instead of the initial form of the ABS. This si not to say that technical problems of integrating the ABS locally did not exist. What is important is that due to the bank's organizational theory-in-use — be a problem-solver, not a problem-finder — local banks were not able to conduct

the dialogues with headquarters on the revealed organizational issues which were critically linked to solving technical problems. The kinds of decision-making necessary for modifying the ABS were not merely routine operational decisions. Changes in the ABS affected decision in IS personnel employment, the kinds of products needed to be incorporated within the ABS, priorities in work procedures, and decisions in planning and resource allocation with other sectors of the bank. Often, there was a need for more than three departments to clarify the problems. It was not merely that "the new system did not work." The problem was, in fact, beyond the scope that the IS department could handle alone.

The technical connectivity needed among the information systems corresponded to the organizational connectivity among the autonomous groups in the bank [18]. There was a mismatch between the level and the kind of decision-making needed for the technical connectivity of the ABS and the reality of the organizational connectivity within which the banks operated. The bank managers at headquarters assumed consensus and coalition supporting the implementation of the ABS. Local bank managers assumed the problem of implementation to be technical so that fixing the ABS would require decisions merely at the level of performance control and task coordination.

Conclusions

The experience of globalizing the Automated Banking System (ABS) at the Elite Bank has been analyzed in order to explore the role of information technology in a financial service institution in terms of organizational effectiveness.

The global information system was developed initially as a software product aimed at processing a particular local branch's banking operations; it had not been conceived as a tool for globalization. Installing the system globally was an adaptive process to find the best fit between the software available in local branches around the world and the top-down globalization strategy formulated at corporate headquarters. At the same time, the implementation process of the ABS revealed that the managers developed their tactics faithful to the organizational theory-in-use: The bank's managers themselves translated the organizational demand for "innovative leadership" to "a race for unilateral survival." The implementation process was the beginning of an iterative development and re-development process, where local modifications occurred based on technical error-detection and error-correction activities in the software system to fit local needs.

The globalization process of information technology in the bank revealed and intensified pre-existing organizational issues control. In other words, the deployment of information technology revealed diverse autonomous concerns and unilateral decisions behind the espoused consensus and coalition. Information technology played the role as a facilitator for the organizational learning process by enabling participants to discover organizational theories-in-use held by different groups and compare them with their privately-held theories-in-use. Because seemingly routine transactions in information systems often require strategic decisions in such areas as resource allocation, work procedures, and personnel use, the implementation of the ABS revealed a wide range of organizational theories-in use. This discovery of organizational theories-in-use provided a setting for discussions on the issues revealed, which, in turn, set the stage for error-correction.

Our study suggests that an adaptive and flexible process for the globalization of information technology which is conducive to organizational learning can create a medium not only for increased connectivity among information systems but also for improved organizational dialectics among members of an organization. Because the Elite Bank was operating in a decentralized fashion, the bank's organizational learning system may have made the assumption that the local banks' goals differed from the headquarter's goals. Therefore, more centralized organizations may reveal somewhat different issues from the ones we found. Yet, the globalization process includes issues related to integration — the result of a leap from a local operation to a global one, that is, from one management turf to another. Therefore, our findings might be applicable to centralized organizations as well.

Discovering the role of information technology as a potential facilitator for organizational learning fosters discussions on a realistic understanding of relationships between information technology and organizational effectiveness. Such discussions will contribute to identifying ways to improve strategies for change — change conducive to improving the organizational capacity for learning.

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