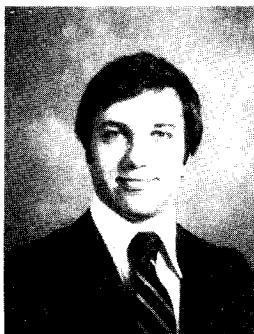

Navigating Through a Banking Complex

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■ Information is identified as one of the most important competitive edges in today's banking,^{4,9} and the result is an expanding market for data processing analysts and programmers in the banking business. Since the beginning of the computerization of banking information systems, professionals have been busy automating voluminous and routine tasks. Having exhausted such opportunities, the present challenge is to integrate existing automated tasks to produce faster response to higher level ad-hoc management queries. However, the development of the architecture of such integrated information systems requires a comprehensive understanding of the totality of the system.

Until recently, in complex banking systems only a few people, through lifelong experience, have developed a comprehensive and integrated view of their business; integration of information has been done in the mind of such executives. However, the architecture of today's integrated banking information systems is beyond the capacity of the few at the top; it requires expanded participation by many managers, analysts, and even programmers throughout the organization. The participation is effective only if the participants have a good understanding of the "bigger" picture; otherwise the efforts are often lead to suboptimization.¹⁰ In Belden Menkus's words⁷ "Systems professionals tend to miss the wider implications of the changes that they try to impose upon the data handling practices of line people . . . Some apparent saving may be imple-

mented in one part of the organization that turns out to increase operating costs elsewhere." Moreover banking managers, consultants and analysts are moving from one project to the next and from one department to another. To find their way into the new complexities they encounter, a set of navigation charts are useful.

Following a top-down analysis methodology,² this article presents a sequence of models to demonstrate an integrated view of a banking business system with emphasis on decisions and information. With this approach, the organization is analyzed first in its overall organizational view by determining the internal and external environment. The organization is then further segmented into its functional subsystems. Although the models are developed as context independent, the real system we are using as an example is City National Bank of Los Angeles.

Top View Of A Multi-Branch Banking System

At a high level of abstraction, a business system consists of: 1. Decision-making, 2. Wealth, 3. Operations, and 4. Accounting and information systems. Figure 1 demonstrates the relationships of these four components in the City National Bank environment. In general, a business system, if viable, has to achieve higher values in the form of goods and services through the transformation of resources which are in the following categories: 1. Design talents: managerial and professional talents and skills; 2. Information; 3. Physical: properties, equipments, and materials; 4. Monetary. In fact, every business starts with a wealth of one or more of these resource categories. In Figure 1, the wealth is depicted as a reservoir feeding into the Operations system. (Operations in its broader scope includes all administrative tasks as well.) The Operations system, composed of

A Top View of a Multi-Branch Banking System

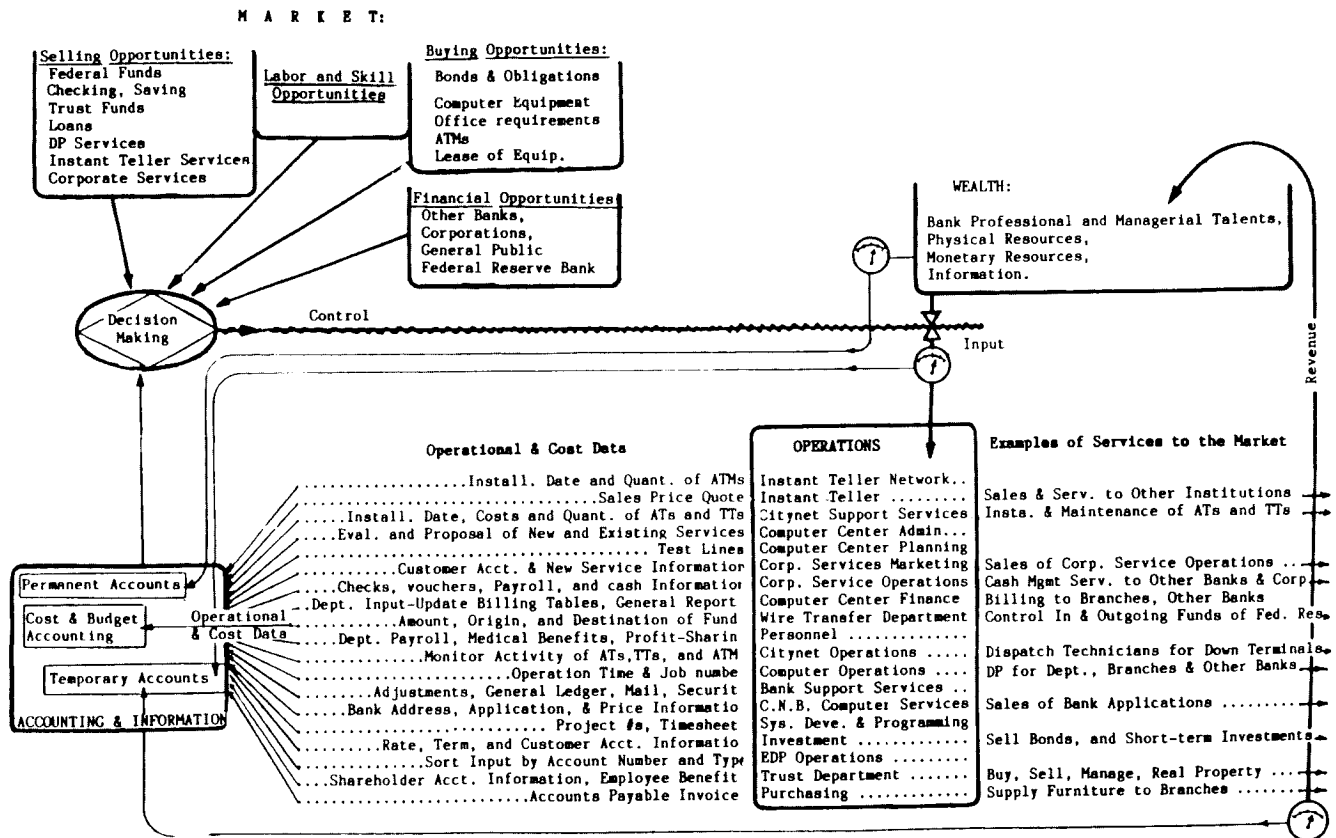


Figure 1

departments, blends the first three resource categories to produce the business output. The blending is a dynamic process needing varying proportions of the resources at different times. Money, as the catalyst, facilitates the exchange of output and resources with the external environment — the market.

The Market: The external social, political and economic environment provides as well as limits and regulates the exchange by way of four segments of market opportunities: 1. Selling, 2. Buying, 3. Labor/Skill and 4. Financial.

Selling Opportunities: The customers of City National Bank are the general public, corporations, other banks, and financial institutions. The services are provided through the following subsystems: 1. Branch Services, 2. Corporate Services, 3. Computer Services, and 4. Instant Teller Installations and Services.

Figure 2 demonstrates the relationships of customer categories with these subsystems.

Multi-Customer, Multi-Service Nature of Complex Banking Business

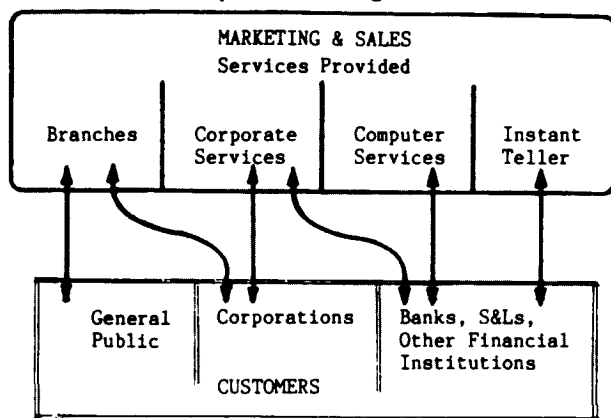


Figure 2

Each of these subsystems can be considered as an independent business facing the four segments of the market. In fact, one reason for the complexity in the banking industry is that even a medium size bank, as City National, is a conglomerate of several business types.

Major services include Federal Funds, Customer's Saving, Demand Deposits, Time Certificate of Deposit, Money markets, Trust Funds, Commercial Loans, Installment Loans, and Data Processing.

Federal Funds include Treasury Notes and Bonds, Zero Coupon Bonds, and Federal Home Loans. Other bonds include Tax Free Municipal Notes and Bonds, General Obligation Bonds, Corporation Revenue Bonds, Residential Mortgage Bonds, and Project Notes. The interest income from the U.S. government, state, and municipal obligations accounts for over half of the total interest income. Regarding federal funds sold and securities purchased under resale agreements, City National Bank is the middleman between the government and the customer. It offers consulting services along with the convenience of having the government bond held at the bank.

The trust department offers a variety of services such as managing employee benefit plans in other companies, rent collection, lease negotiation and insurance, and analysis of properties. The Trust Department is also involved in private trust administration, probate administration, and in a transfer agency capacity, transferring all certificates and maintaining shareholder account records in the corporate trust.

The Instant Teller network has been ex-

panding rapidly. Also, City National Bank supplies a broad range of services to over two hundred banks and financial institutions in California and Oregon.

Various data processing services are offered to the departments and branches of City National Bank as well as to other banks. Among these services, for which fees are charged, are installation and conversion of terminals, item processing, trial balance, mailing labels, monthly credit reporting to TRW, processing active and closed accounts, histories, and terminal maintenance. Many new services are being provided to smaller banks which depend on City National Bank for higher technology and more sophisticated applications.

Buying and Skill Opportunities: In addition to purchases for daily requirements to accommodate an expanding number of employees and building space, purchasing activities are for capital investment, including computer facilities, or capital requisition (e.g. Diebold and Docutel automated teller machines, and government bonds and obligations) for resale. Recruiting is fairly routine and, for most part, done through employment agencies.

Financial Opportunities: In addition to common creditors in the market, City National Bank can borrow from the Federal Reserve Bank. Because most banks routinely cover their overdrafts at the end of the day with additional funds borrowed until the next morning, the Federal Reserve has adopted a policy which controls the risk involved in large dollar transfers and overdrafts. The bank must build or adopt new systems to comply with the Federal reserve overdraft regulations and limits.⁶

Decision-Making: Business decision-making is an integrating process determining how to apply the limited controlling power of resource allocation in response to internal and external opportunities and limitations. Division of labor in the organization is primarily based on the elements of decision-making. Externally, the decision-maker is faced with choices in each of the four market opportunities. Internally, the tasks are short-range and long-range resource allocation.

The input valve system (Figure 1) represents the control decisions of resource allocation.

Observation and measurement of wealth, and input and output of Operations, produce accounting and operational records which are the bases of historical information to give feedback to the decision-maker. (In addition to historical information, the process of decision-action requires three other categories of information: operational instructions, patterns, and predicted values of alternative options for decision-making.¹ However, the flow of observed and measured or forecasted data is the building block of all categories of information.)

In particular, an information system is necessary to determine the optimal allocation of resources to meet the needs of the organization. The information center supplies the line department with statistical data of transaction types by volume and unit costs of labor and machine activities. The evaluation role taken by the Accounting and Finance department is that of assessing the financial implications of decisions recommended by line departments and doing a follow-up audit of results of the major decisions which affect the service mix.

Business Structure and Functionalities

At the second level of analysis, the internal environment of a business is divided into its functional areas. Each area takes responsibility for one element of decision-making, (Figure 3): 1. Sales and Marketing, 2. Purchasing and Logistic Procurement, 3. Personnel and Recruitment, 4. Accounting and Finance, 5. Produce/Service Design, 6. Operations Design, 7. Administration Systems and Procedure Design, and 8. Operations.

The first four functional areas deal with four segments of the market. (To be precise, Accounting and Finance are two functions. Accounting has the information role while Finance plans for and controls the internal and external flow of cash. However, the two are so intermingled that they are often considered as one.) The next three functions have to do with "design" in the organization. "Design" in its broad meaning refers to the decisions on how to put things together to produce optimal results. Design of product/service (what to produce) is the shared responsibility of Sales/

Functionalities and Flows in Business

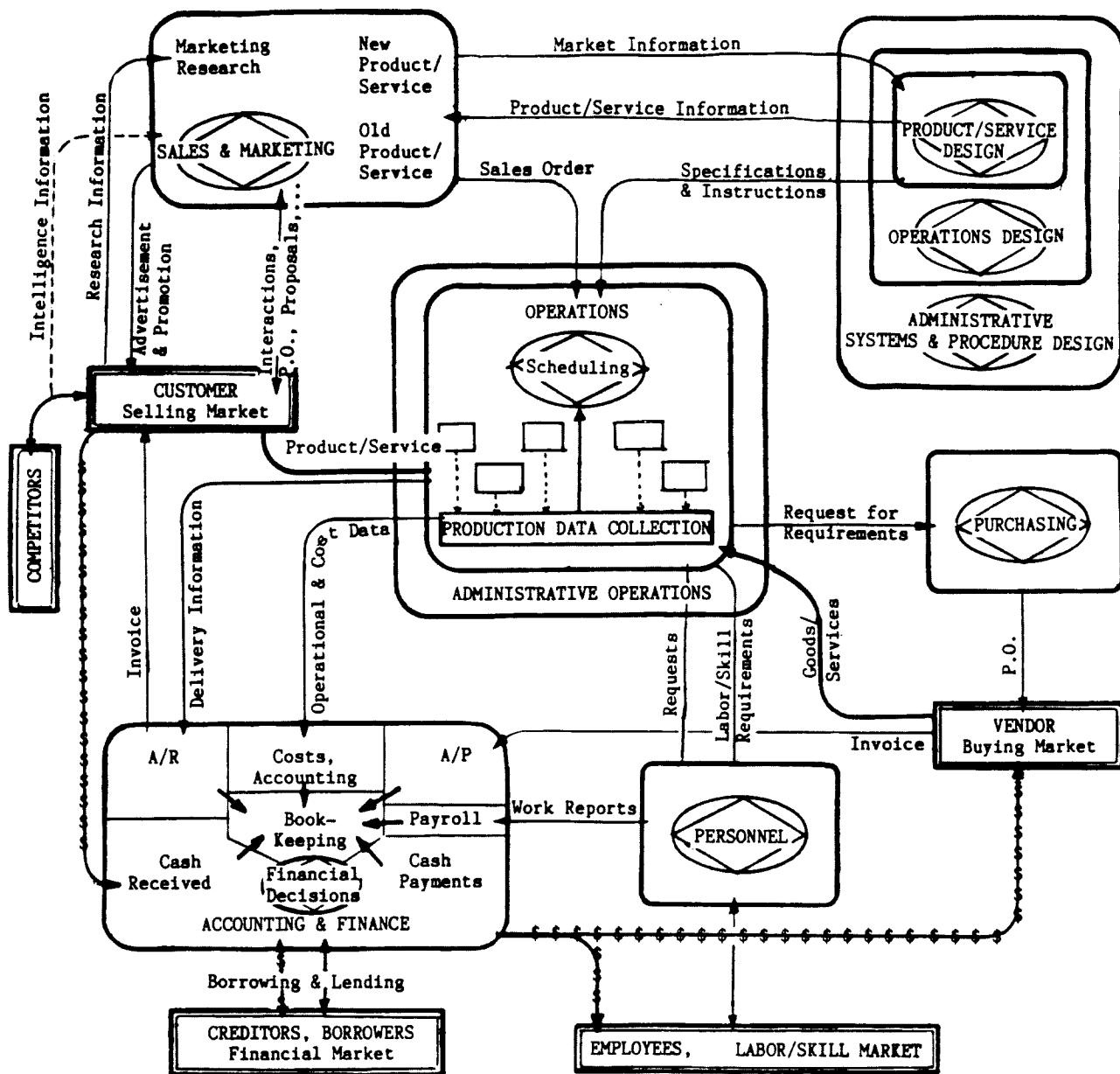


Figure 3



Marketing and Product/Service Design. Once a new product/service is approved, the Operations Design people design the details of the operations — how to produce. Some new operations design may require major structural commitments; as well, they may trigger the need for new administrative systems design. Finally, the on-going, decision-making regarding allocation of resources is the function of Operations.

Among the eight functions, Accounting and Finance, Personnel, and Purchasing are fairly routine; their structure and relationships to other decision points in the business system, (Figure 3), are rather standard and common to all businesses:

- a) ● Requisitions from Operations to Purchasing,
 - Purchase Order from Purchasing to the Vendor,
 - Goods/services from the Vendor to the Operations,
 - Invoice from Vendor to Accounts Payable (A/P),
 - Cash from Accounting to Vendor.
- b) ● Recruitment Operation by Personnel,
 - Labor/Skill needed for Operations,
 - Work Reports from Operations to Personnel and then to Payroll,
 - Cash from Accounting to employees.
- c) ● Product/service from Operations to Customer,
 - Delivery Reports (e.g. packing lists, receipts, acknowledgments) and service charges from Operations to Accounts Receivables (A/R),
 - Customer Invoice from Accounts Receivables to Customer,
 - Cash from Customer to Accounting.

On the other hand, the basic differences between various businesses are in the structure and relationships of Sales and Marketing, Design (Product/Service, Operations, and Administration), and Operations functions. A complex business is defined as a conglomerate of more than one business type. In such

a business, combination of various types of operations (with a large number of variations of services), design, marketing, and customers present extraordinary complexities and make understanding of the total system quite difficult. To facilitate analysis, first the business subsystems which can be considered as businesses within the conglomerate must be recognized. Then, the model of each subsystem can be developed by recognition of the above eight functions as applied to the subsystem.²

With this approach, City National Bank is analyzed first into its major subsystems, (Figure 2). Then, applying the template model (Figure 3) to each subsystem, each service type a model will be presented to demonstrate the relationships between the decision points.

Data Processing Center as a Business Within City National Bank

City National Computer Services provides data processing services to the internal branches and departments and uses a charge-back system. The same services are offered to other banks, saving and loans, and other financial institutions for a fee, (Figure 4). Computer Center Administration, in cooperation with the marketing and sales staff, contacts the customer for new products/services or for changing existing services. Citynet Support Services does the pre-site planning and equipment installation of the terminals. Citynet Support orders the phone lines and coordinates their efforts with Citynet Operations, which brings up the terminal addresses in conjunction with Hewlett Packard CPUs. Citynet Research and Development is in charge of the enhancement of products such as data line testers, modems, memory boards, and auxiliary equipment and communication facilities.

Data processing services other banks and financial institutions include processing all checks and vouchers for savings, demand deposits, installment loans, and general ledger. These documents, which have magnetic encoding, are sent to EDP Operations to be sorted by application and then merged on-line with other applications.

After a service date on the customer contract has been determined, the Systems Develop-

Data Processing as an Independent Business within City National Bank

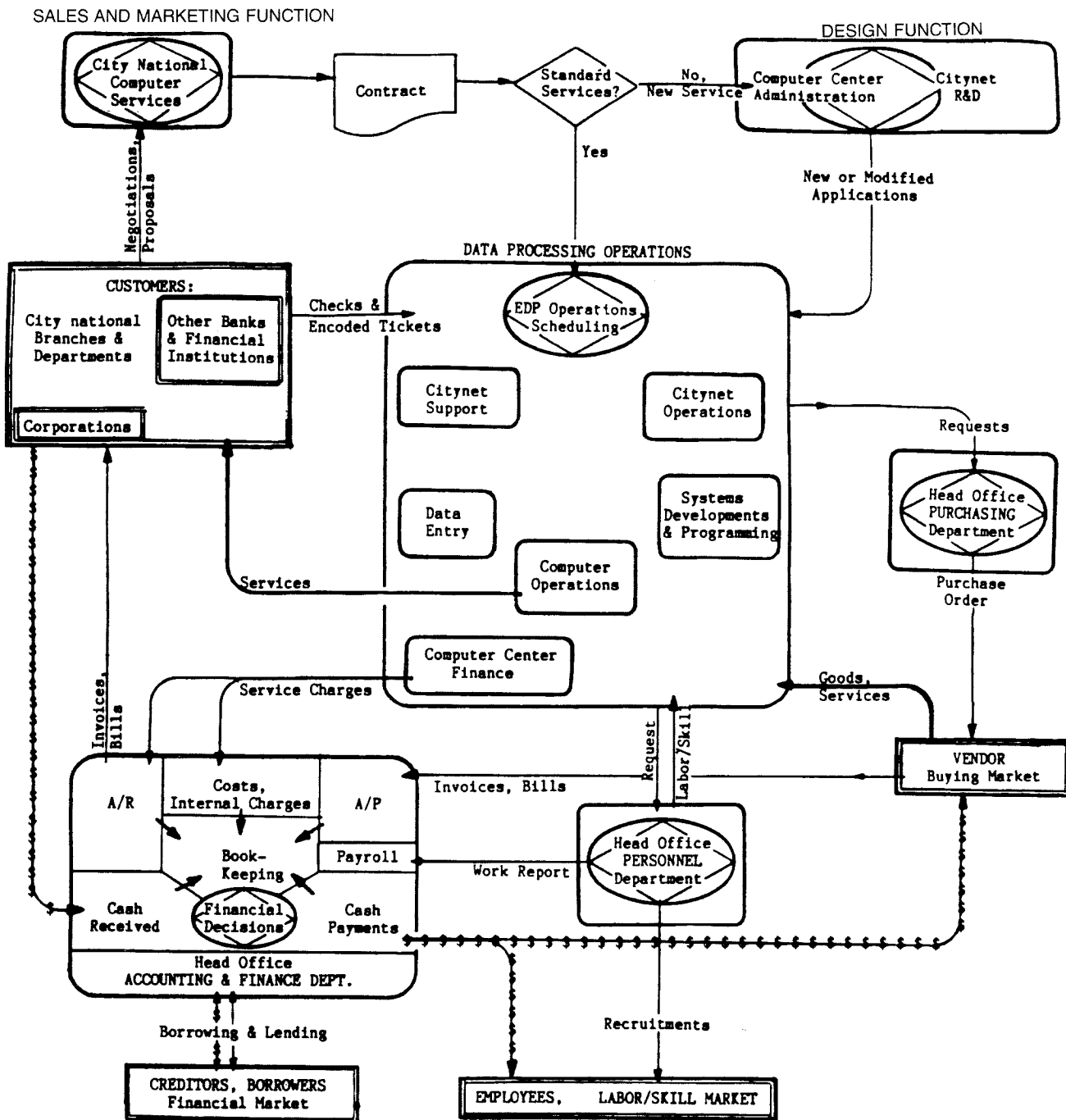


Figure 4

Corporate Services

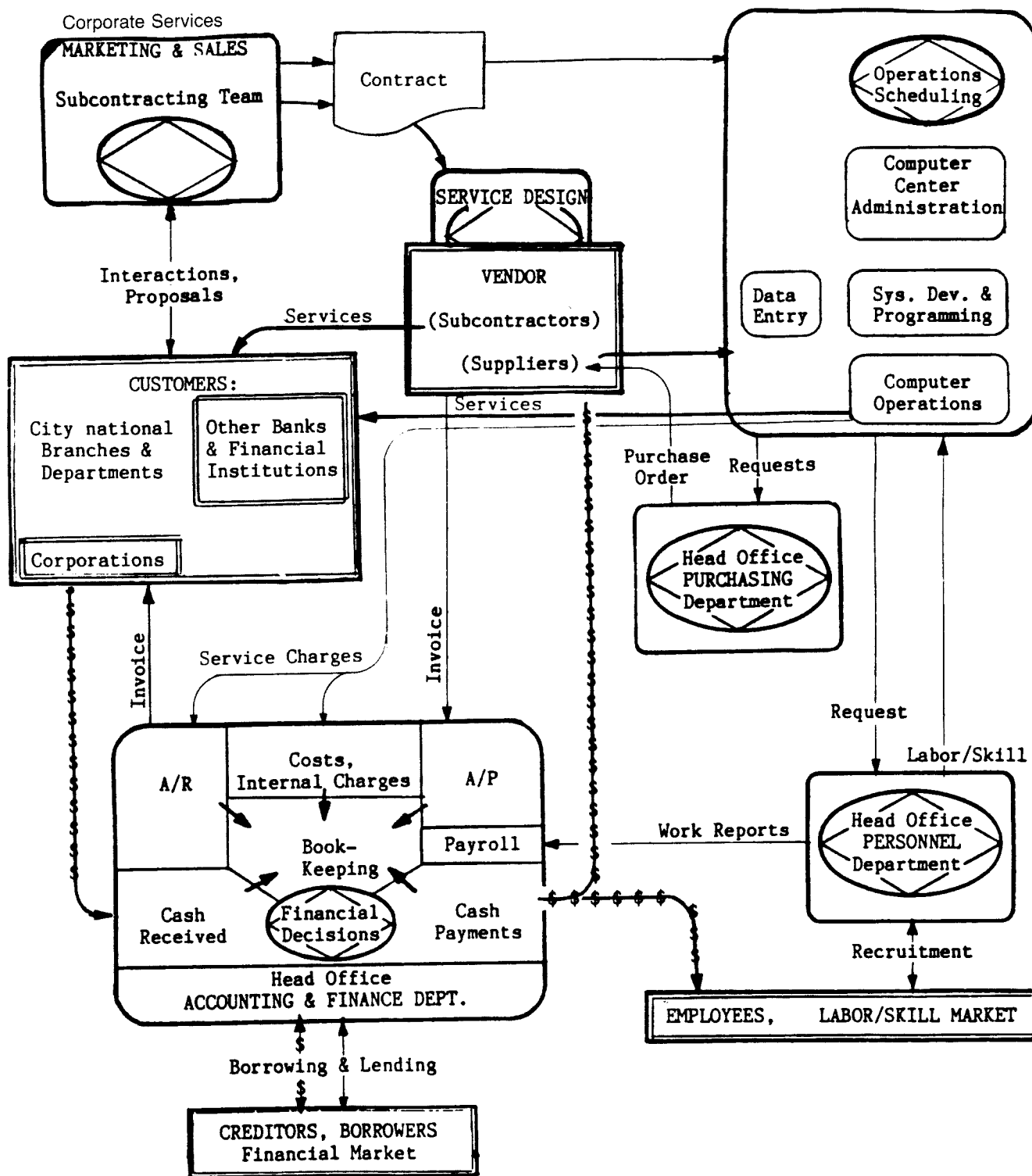


Figure 5

Instant Teller Services

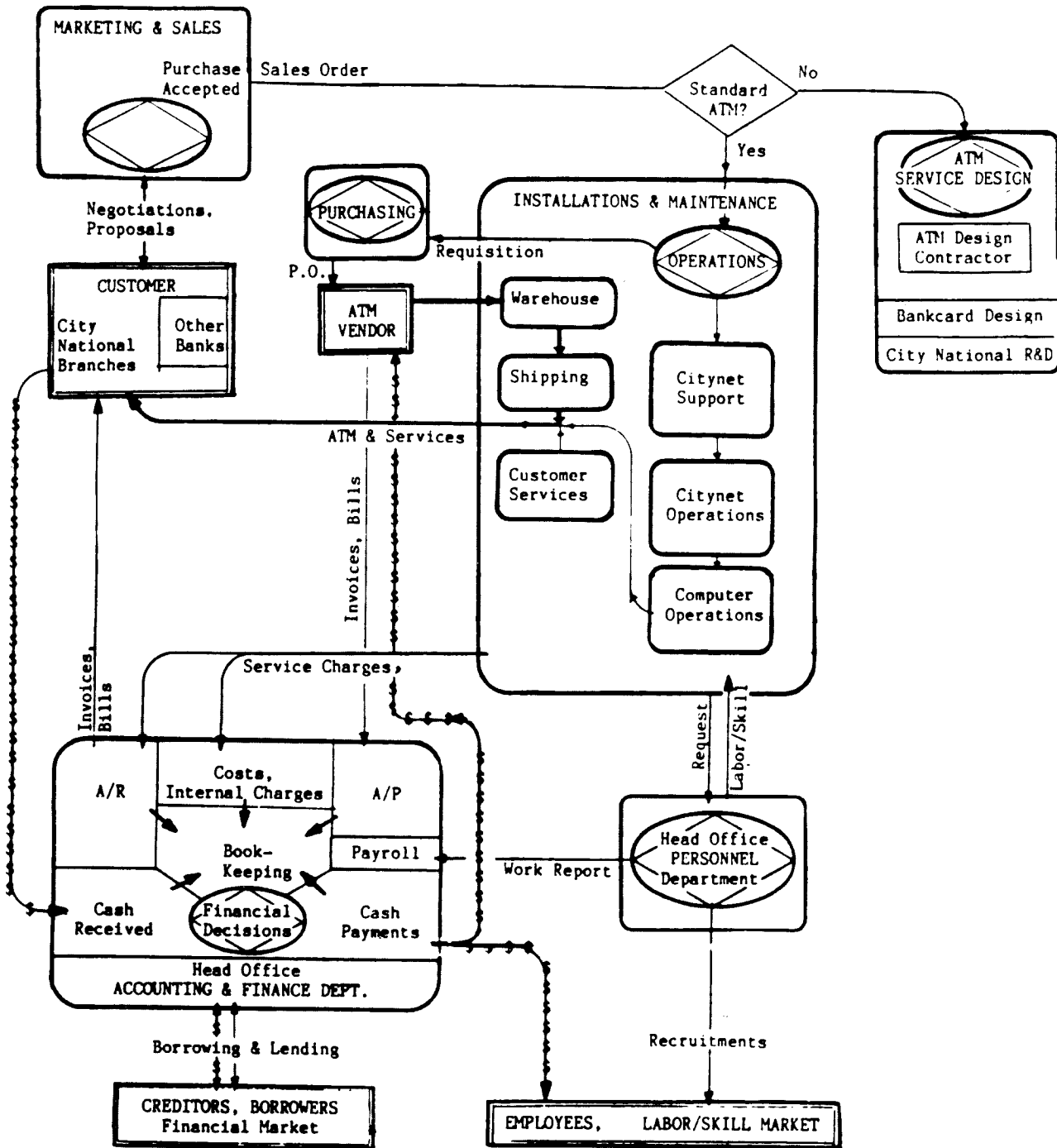


Figure 6



ment and Programming department sets up the customer bank on the system. Computer Services sends input documents indicating the type of services and the starting date to Billing (A/R). The cycle completes with bills sent to the customer and payments received.

If a customer bank wishes to change an existing application, City National Services sends a "Request for Services" to the Computer Center Administration; if accepted, a project number will be assigned on the "Programming Systems Request Log." The Project Priority Evaluation is a source document for entering the project number on the system. The project number and corresponding departments are then printed on the Project Status Report. The Project Specifications relay information about the change to all involved parties. The project timesheet records the labor time of the programmers involved in the project in order to bill the user departments.

Corporate Services

Corporate Services provides to businesses, services such as mortgage, cash management, and lock-box. Some services such as Banklink are performed in conjunction with data processing services, (Figure 5). In addition to direct relationship with their customers, the marketing and sales staff of Corporate Services may maintain an indirect relationship with some customers through the branches, particularly for the purpose of billing.

The product/service design is often performed through a subcontracting vendor who provides the start-up, implementation, and technical staff. For example, the Banklink system is a timesharing services that customers of Corporate Services can use to look up their account balances and request wire transfers. Corporate services pays Chemical Bank, the subcontractor supplying the timesharing service, a monthly charge and then bills the users for computer time and the number of accounts accessed.

Corporate Services may also perform a Marketing and Sales function for data processing services, relaying market information and/or customer specifications of a new product to the Computer Center Administration Department.

Instant Teller Installations and Services for Outside Banks

These services involve sales and installations of Automated Teller machines (ATM), and design and production (encoding and embossing) of bankcards for City National branches and other banks. ATM services again involves the Data Processing Center, (Figure 6).

Also, Instant Teller Operations provides communication, training seminars and workshops to their customers. Instant Teller communications sends network information bulletins, customer announcements, letters to the customers, and handles customer inquiries.

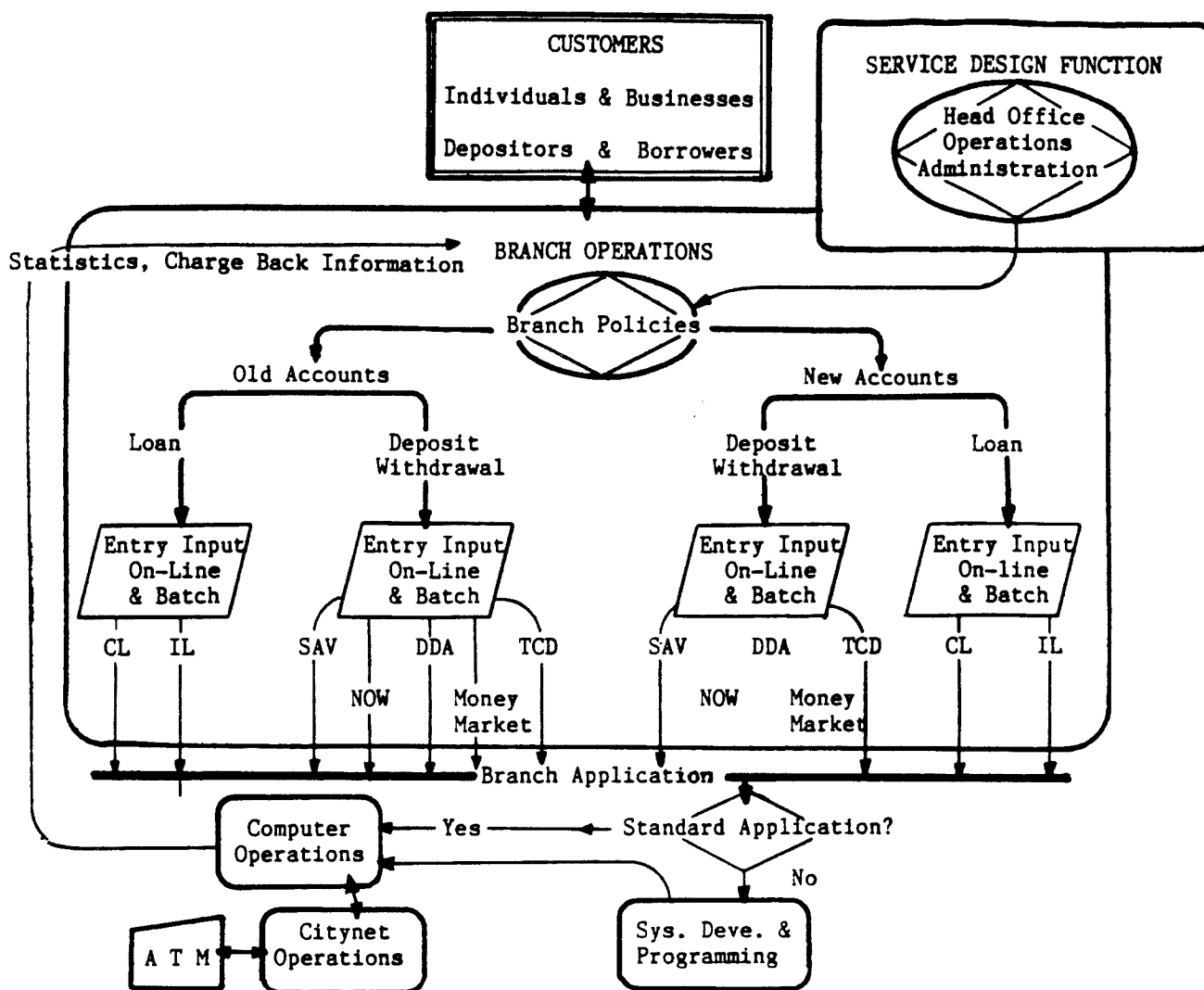
Branch Operations

All City National branches offer consistent services and interest rates. The Head Office Operations and Administration designs the services for the branches and determines what rates should be charged for various loans and deposits, (Figure 7). Also Accounting and Finance, Purchasing, and Personnel departments at the head office perform these functions for the branches. The relationships of these functions are just as shown in previous Figures, and are not repeated in Figure 7. Further details of branch applications are the subject of the third level of analysis which is the job of the systems analyst,^{8,5} and is beyond the capacity of this article.

Summary

Integration of banking information systems is the present and future challenge of banking business. Meeting the challenge requires a wider participation by middle management and analysts. Today's information systems are often characterized by lack of consistency and coordination, which is due to lack of a global understanding of the system under study. This article provides an analysis and a set of System Flow Models to break down the complexity of banking system and to help understanding a comprehensive framework of this business. Such a framework can be useful in the architecture of an integrated banking system. ●jsm

Branch System Processing of Accounts



LEGEND:

CL: Commercial Loans	DDA: Demand Deposit Accounts
IL: Installment Loans	TCD: Time Certificate of Deposit
SAV: Saving Accounts	(NOW is not an abbreviation, it is a name for an interest bearing account)

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Figure 7