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Touche, Ross started work on the concept described in this article in 1962 as a result of the research that went into Richard Sprague's book, Electronic Business Systems and Jesse Lynch's work on bank customer services. This culminated in the presentation of the SAVE concept at the Bank Presidents' Conference, January 31, 1966.

It is the opinion of our firm that this is a compelling idea which must be considered in some depth in the long-range planning of large financial institutions, retailers, computer manufacturers, and many other organizations.

We do not say that the SAVE concept is inevitable or that it will emerge within any specific period of time. We recognize it as an idea which may have far-reaching effects on our entire economy and which may be one of the most revolutionary ideas of this decade.

We take great pride in having been one of the major contributors to the development of this concept.

A System for Automatic Value Exchange

by Richard E. Sprague



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Mr. Sprague is one of the pioneers in the computer field, having worked for National Cash Register Corporation as Director of Sales of the Electronics Division (formerly Computer Research Corporation, of which he was co-founder in 1950).

He is the author of the first book on On Line-Real Time Systems, Electronic Business Systems — Management Use of On Line-Real Time Computers, has published several significant papers and has participated in various discussion groups throughout the country. Mr. Sprague also has several basic patents in computer design.

He is a member of the American Management Association, Society for Information Display, The Institute of Management Sciences, The Institute of Electrical and Electronics Engineers, Inc., Association for Computing Machinery, and was Treasurer of IFIP Congress '65. He is the Touche, Ross, Bailey & Smart representative on the Management Information Systems Round Table of the American Management Association, Secretary of the Management Control Center Systems group of the Round Table, and an alternate member of the Electronics Committee of the Retail Research Institute of the National Retail Merchants Association. He is a graduate of Purdue University.

Electronic systems can no longer be regarded as mysterious instruments used only by highly trained specialists. No longer will we be affected merely indirectly by them through a computer-generated bill from a department store or a telephone company. Very soon we will be "talking to" computers and they will be responding—by voice, in some cases.

Information handling by electronic systems is already showing its impact upon the changing business world. The potential of systems in business is being realized now and will continue to influence our lives. Direct confrontation with computers demands that we understand not only how they work but how they will benefit numerous financial transactions which occur during a month as well.

The automatic credit transfer concept is perhaps one of the most exciting utilizations of computers, data communications, and information systems being discussed today. The concept is a familiar one, assuming such names as checkless banking, or financial and credit information utility, among others. In one form or another, it has been in the forefront of thinking, planning and experimentation of leading banking institutions.

Until recently, it has always been considered as having only long range potential at best. But, quite to the contrary, this concept could become an implemented reality much more quickly than has been previously thought. All the technology required for such a system exists today. The national airline reservation system, the increasing use of credit cards, and the overdraft loan service of certain banks all attest to the acceptance of portions of the concept. In this article we shall examine these components and their combined functions in what we have named a System for Automatic Value Exchange, or SAVE for short.

As an example of an imaginary SAVE in operation, let us see how Mr. Jack Smith might purchase a vacuum cleaner in the appliance department of Universal Retail Store, Inc. The cost is, say, \$53.00.

First, the salesperson inserts Mr. Smith's SAVE card in an on-line transactor directly connected to a computer. The on-line transactor is the successor to the cash register.

Next, the clerk inserts the sales media under the imprinting device and depresses the start key to begin the entry process. A computer generated automatic voice answerback instructs her to depress the enter key.

The enter key is then depressed. The computer replies over the phone: "Verify: Jack Smith, 1421 Adam Avenue, age 40, blue eyes, red hair, 5'11", 176 pounds."

The salesperson presses the verify key indicating valid identification. Automatic voice answerback tells her to "enter purchase price". She keys in the amount of \$53.00. The computer responds with "amount \$53.00," as a verification of proper keying. The computer file on Mr. Smith is then checked. In this case Mr. Smith is neither delinquent nor overlimit, and the computer therefore immediately responds: "purchase authorized." The transactor under computer direction then imprints the transaction and ejects the sales media for signature. The sales person then tears off the customer's copy and hands it to him. At the same time, an automatic transfer takes place between the accounts of the customer and the store, and is reflected immediately in their account balances in their respective banks.

This example provokes some questions. Is SAVE really going to evolve in the foreseeable future, and, if so, is the above illustration typical of the form that checkless-cashless banking will take? Let us examine these questions by taking a critical look at the prospects for the SAVE concept. To do this, we must define the objectives of SAVE somewhat more precisely, see what trends we find today, and then attempt to assess the proper and ultimate role of banks in SAVE and the way in which this future role might change existing relationships.

The core feature of the SAVE concept is that the exchange of money and credit for goods and services can take place independently of checks and currency or other tangible evidences of value. If Professor Martin Greenberger of MIT is right when he says that "money is information," then the growing abstraction of value since the barter system of exchange should continue—not stop; continue even beyond the use of the credit card as a license to buy—even beyond a universal identity number on a social security card.

The system of exchange as we know it today would be changed by SAVE in a very basic way: payment would occur as the first rather than the last step in the normal clearing process. Today, actual collection of funds follows a credit purchase by as much as seven or more interest-free weeks.

In contrast to this, SAVE would operate as follows: at the time a transaction with a customer is taking place, say at 10:05 a.m., at that moment—10:05 a.m.—an automatic transfer of funds between the accounts of

the customer and the merchant is accomplished by the computer.

The purpose of all this is straightforward: to obtain the great economic advantages that would stem from providing rapid and paperless financial settlements among the elements in a community involved in buying and selling and debtor-creditor relationships. More specifically it would dramatically decrease float and it would eliminate the need for much currency, keeping the value it represents invested. In the absence of other countervailing influences it would tend to increase the number of deposits and loans because, to the extent that SAVE is successful traditional accounts receivable would appear instead as additional cash, and accounts payable might well become instead short-term loans. This is a major impact of SAVE's immediate settlement of routine obligations.

The typical SAVE transaction would not be a credit transaction as we know it at all; it would be in effect a money transaction, although not involving cash or checks at the point of sale. No merchant in his right mind would refuse to accept money as we have defined it, even if it is not in the tangible form of cash. The merchant and consumer must forget everything they have thought about money, (a piece of paper with a picture of George Washington on it) and remember what money really is; namely—INFORMATION about value due.

The consumer would be concerned primarily by three things: the cost to him of using SAVE, its convenience, and the fact that automatic payments may enforce inflexibility in the way he schedules payments to conform with income periods. The consumer, who today lives close to the cuff, would not be able to rely on check float or delays in billing and payment to cover cash shortages. Automatic overdraft arrangements can be made with the bank; those consumers who qualify for a line of overdraft SAVE credit, will have then an excellent substitute for float. This overdraft feature will be discussed in detail later.

Before we examine some of the functional components of a SAVE system, let us look at some influential factors that have emerged which account for the trend toward its eventual realization.

First, while the economy has been expanding at a tremendous rate, the use of banking services such as demand deposit accounts is expanding even faster, as seen in Figure 1. Indeed at present rates of accelerating growth, check clearings will more than double in ten years.

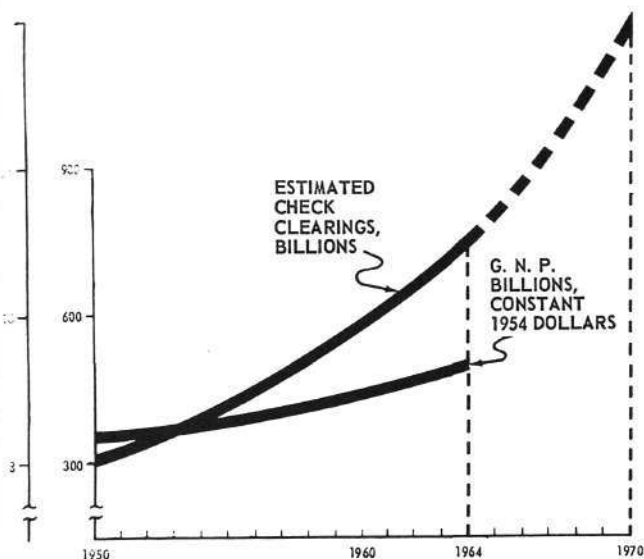


Fig. 1

Secondly, since World War II, banks have been under continuing pressure from competing institutions and their own customers to provide a variety of new customer services, both for businesses and individuals. An automatic financial clearing process such as SAVE can be viewed in part as an extension of this trend. Moreover, it has so many ramifications in other parts of the bank's business that it must be viewed not merely as a new service and a new source of profit, but as dramatically supportive of the traditional loan and deposit relationships of the bank.

Thirdly, of course, is the technological feasibility of SAVE as a result of major industry advances. The technology involved in SAVE which combines computers, communications, and special terminal devices is implemented in and familiarly illustrated by the American Airlines reservation system known as SABRE.

Fourthly, is the emergence within banks and the organizations with whom banks deal of professional systems people of a new breed, who are not limited in their thinking by the traditional boundaries of their trade. As business relationships change, as new techniques come to the fore, these professionals are pressuring their own managements to exploit the opportunities arising from the technological fallout taking place now almost daily.

Fifthly, is the explosive growth in personal and installment credit. The growth, universal acceptance, and use of credit by individuals is well known to bankers and retailers. Today, there is a growing need for control in the extension and use of personal credit. Banks

have a major opportunity in the short-term consumer credit, directly and indirectly. The costs, the number too frequently true that an individual's multiple credit lines are controlled by nothing other than his own good sense. Banks have a responsibility in this since they ultimately underwrite the extension of much of this credit, directly and indirectly. The most, the number of accounts, the cards, the statements mailed, credit checks, etc., are multiplying in a seemingly profligate and unnecessarily burdensome way.

In summary, we believe these five basic factors constitute not only a trend, but an economically sound support for the emergence of SAVE. Therefore, it is clear that banks of all sizes must do everything in their power to begin to establish themselves more firmly at the center of the consumer-merchant-vendor communications channels, and thereby strengthen their relationships among these major economic sectors.

How would such a system work functionally, if operated by the banks? Looking at the diagram in Figure 2, which shows some of the functional components of SAVE, it can be seen that the consumer's demand account is tied into the point of sale in order that the initial system function—purchase authorization (or verification of the ability to pay)—can be accomplished. If there is sufficient balance in the account to cover the amount of the contemplated transaction, authorization is automatic. If for any reason the purchase cannot be automatically authorized, and if automatic credit cannot be extended, a human decision maker enters the loop in the form of an authorizer who examines the consumer's credit history as it is automatically displayed on a cathode ray tube and discusses the problem with him on the phone before deciding finally to authorize or refuse. This avoids the impersonal, undignified, and embarrassing "flashing red light" kind of refusal.

If there is insufficient balance in the consumer's account to cover the purchase, credit can be injected automatically into his account by his bank on the basis of a prior revolving loan arrangement, provided he was not delinquent or overlimit. This is SAVE's counterpart of the traditional retail revolving or option account. The source of these overdrafts may be a debit made at the time of sale, or could arise as a result of other kinds of transactions for which the consumer has authorized SAVE to make payment, such as utility bills, rent bills, installment loan payments, automatic savings deposits, etc.

The transfer of money between the accounts of payers and payees can take place between separate banks, large

and small, who are SAVE participants in their communities. Thus, there would no longer be any handling of foreign items, interbank clearings as such, no float, no NSF's, no holds, no stops, etc. The transfer would not generate an accounts receivable, thus eliminating a major cost to the merchant. A large portion of what are credit purchases today would be turned into essentially cash transactions.

When the purchase amount is quite small, or where non-SAVE subscribers are involved, it would not be practical to avoid using cash. In order to obtain cash conveniently, SAVE has to provide for a means of authorizing the transfer of cash at prescribed locations. This might be looked upon as a public service to be performed for the consuming public as a means of keeping a small but essential part of the economy operating.

Automatic bill payment, unlike an unanticipated transaction requiring authorization at the point and time of sale, would require some form of preauthorization on the part of the payer. Sometimes such preauthorized payments would be for a fixed amount, like a

monthly rent bill; in others, where the amount would vary as in the case of a utility or phone bill, payment would be made automatically on presentation up to a fixed amount. The invoice need not be a visible document, but could equally as well be an electronic communication generated at the payee's premises by his computer system, if he has one, or by a human being seated at the keyboard of a billing machine interconnected with SAVE. If SAVE, for any reason, was unable to make payment upon presentation, notice of non-payment would be immediately transmitted to both parties for appropriate action.

Payroll is a primary source of funds for essentially all consumer activity. Consequently, the payroll process exerts a key influence over the adequate functioning of SAVE. If the net pay of a consumer is automatically credited to his account through the operation of SAVE, the credit reliability of this individual will become more firmly established and permit the network to forecast the flow of funds into his account, thus assuring the constancy of a consumer's willingness or ability to gen-

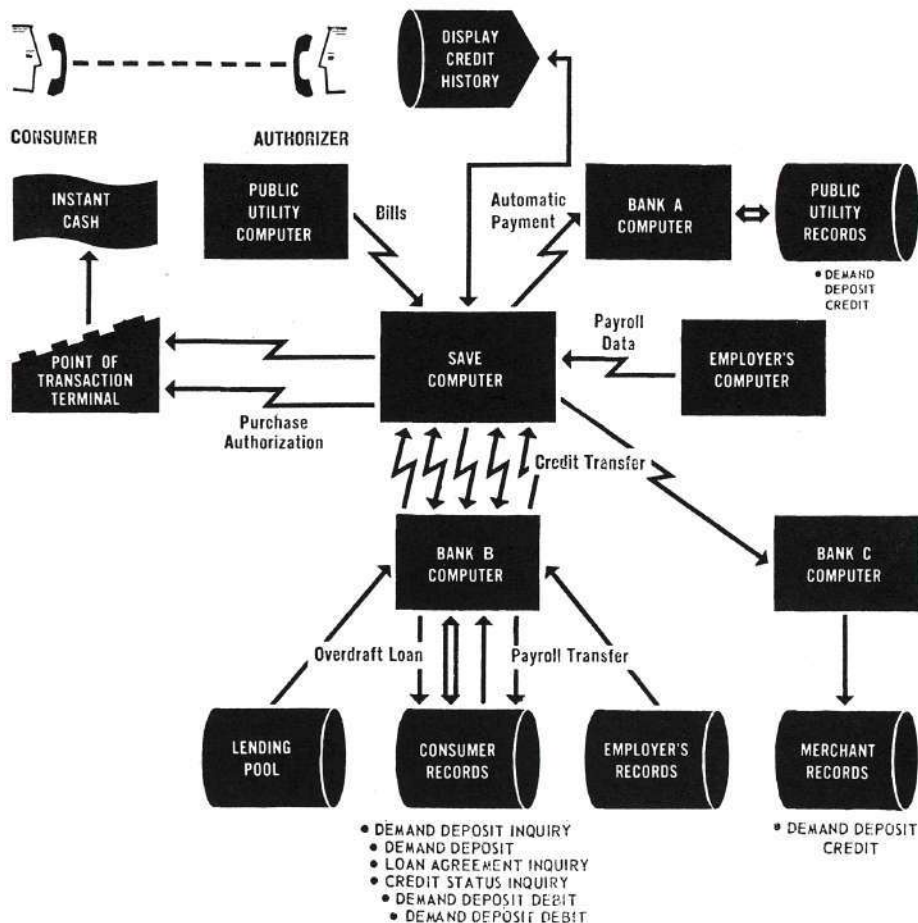


Fig. 2

erate funds to cover his economic activities, and enabling SAVE to project that flow and avoid an over-limit situation. The system might offer payroll computation service to those employers who so desire. In any event, the employer's account would be debited the total net pay and each employee's account credited with his net pay.

Often the overdraft revolving-type loan arrangements to cover short term credit needs of the consumer will not be suitable for large purchases such as automobiles or major appliances. These special types of installment loans would be negotiated by the consumer with the bank as at present. The proceeds could be credited to his account and SAVE would see to it that the account was periodically debited for the installment amount, and could utilize the overdraft facility for the purposes of making these installment payments, if necessary.

In the preceding paragraphs we have presented the integration of all major SAVE functions. The central theme on which this integration is based is the potential for instantaneous transfer of credits for the majority of transactions in the community. In order to accomplish this, we have seen that it is possible and desirable to eliminate the check, eliminate the deposit, and eliminate the documentary processes that underlie the generation of these pieces of paper. We have seen that automatic value exchange involving a multitude of small transactions requires that verification of the ability to pay be routinized at the point of sale.

Each element of the SAVE concept seems to lead naturally and inevitably to the others. For example, it is difficult to justify the equity in authorizing a transaction without assuming the responsibility for collecting the obligation incurred by the consumer as a consequence of the authorization. The authorizer is, in effect, the guarantor, and as such is performing the equivalent of financing the retailer, by providing him with immediate credits. Therefore, these two functions — credit transfer and purchase authorization — cannot be considered independently.

The revolving overdraft loan is also an essential function. Without this feature — the whole operation of automatic value exchange may very well grind to a halt amid a welter of irritations at its inadequacy in meeting the day-to-day needs of the consumer. Those overdrafts are a type of lending activity that will make routine consumer activity possible at all times.

Automatic bill payment is also an essential service ingredient, because of the sheer volume of payments

involved, because these payments consume a major share of the consumer's income and because the payments are almost always today paid by check or money order rather than cash. But the overriding reason is that if checks were continued for making payments and were tendered for major amounts of the consumer's balance, and if this is the same account balance with which SAVE operates, then the consumer would have to be aware at the time of tendering a check that his balance was adequate.

In other words, the consumer would have to be able to make an inquiry of the system to obtain current balance, then subtract outstanding checks not yet presented for payment to obtain available balance. This is obviously cumbersome and self-defeating. The alternative of a checking account separate from his SAVE account is even more self-defeating. The inclusion of automatic bill payments is an essential feature to the satisfactory operation of SAVE.

The major source of funds supporting all consuming activity is the automatic, periodic payroll deposit. We have seen that SAVE would operate more soundly if it were known as a matter of course that the net pay of its consumers was automatically available at given intervals. If, to the contrary, a consumer might optionally not deposit his pay, or deposit arbitrary and varying amounts at arbitrary and varying periods, SAVE would obviously have to set a lower limit on overdraft credit to the consumer. The consumer, therefore, could retain final authority over his salary disbursement only at the expense of reduced flexibility in his other financial and consuming activities.

The interplay of the various SAVE functions provides a powerful impact in their combined presence — an impact national in scope. We believe that SAVE will evolve first on a community by community basis and that these systems will be ultimately linked together in a nationwide network. The flow of money, or the exchange of value, will become smoother with the immediate settlement of obligations.

The impact of the SAVE concept is obvious; its implementation is possible. The very fact that pieces of the process are in use today brings immediacy to the reality of its acceptance and operation. SAVE incorporates and combines the elements and the features of the financial and credit utilities which are emerging in today's check-less-cashless society.

The concept deserves careful consideration by those who will be affected by its implementation.