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Auditing and EDP

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The Institute of Internal Auditors—January 1966*

TO BEGIN PROPERLY, I should like to take a moment to express my gratitude to the Chapter Members, especially Mr. Albert Powell, for inviting me to speak to you this evening. He was kind enough to send your Chapter's membership roster to me. It was impressive. As practitioners, most of you, no doubt, have had direct interest and experience in our subject. Certainly several of you are qualified to speak before a group such as this and relate some rather sophisticated auditing techniques of using a computer. Although a discussion devoted exclusively to the use of computers in specific audits would be an interesting presentation, the subject is far too important to be accorded such limited treatment.

Our treatment of the subject will be divided into two parts. The first will be a review of internal control in EDP systems—an essential auditing function. Our firm has given considerable attention to principles of internal control in EDP systems and we have an approach to the review of EDP controls that represents the distillation of many fine ideas, much hard work, and the lessons drawn from a great deal of practical application.

The second will be a discussion of computer audits and will be directed to those of you who are anxious to escape the drudgery of extending detail, footing columns, and examining transactions. We shall mention some specific examples of what our firm has done in this type of audit. Each example will represent a specific client, with a specific computer system and specific computer applications—facts important to keep in mind as we go along.

Some of you may ask, "Since I am not an EDP user, why is tonight's subject important for me?" Briefly, there are three good reasons.

First, we have an interest as customers of industries that use EDP, such as the public utilities industry.

Second, we cannot escape exposure to the growth of information technology, which has been spectacular. It has developed from a stream of unrelated jobs, such as billing and payroll, to a Niagara of total systems operating in real-time. At one time or another, most trade and professional publications, newspapers, and periodicals have carried

some item concerning automation. Interest and enthusiasm in the business of computer programming and operation are tremendous.

Third, some of you may not be EDP users now, but you very well may be soon. It is a fact that the processing costs per transaction are being driven down by computer manufacturers and users. The service-bureau business has created quite an interest in a potential public utility—the information utility. The idea at the base of this revolutionary concept is simply this: Since we can buy electricity, water, and gas without drilling wells or owning generating stations, why should we not be able to purchase computational or data processing power without the costly investments in computer main-frames? At this point I imagine you have identified to some extent with our subject.

REVIEW OF INTERNAL CONTROL

The degree of confidence the auditor can place in the integrity of accounting procedures and of account balances themselves is determined by the adequacy of internal control. Under either an EDP system or a manual system, internal control therefore must be dependable. However, weakness in internal control is magnified by exposure, and under an EDP system exposure of a weakness would be far greater than under a manual system. One way to look at the relative significance of internal control under the two systems would be to divide the cycle time of a computer system into the basic time it takes to do a job manually. For example, if it takes a minute to foot a column of numbers manually and 600 milliseconds, or 600 thousandths of a second, for a computer to foot the same column, the relative significance factor is one hundred to one; for 600 microseconds, or 600 millionths of a second, it is one hundred thousand to one. Most computers used today operate in the microsecond range. Commercial computer technology has advanced to the nanosecond range, which is computational speed measured in billionths of a second. What is the point we are trying to make? It is simply this, and we might state it as a kind of truism: Computer systems provide valid and erroneous information at the same rate. Conversion to computer systems does not automatically assure the user of correct output. The “fail-safe” devices provided by the manufacturers are limited to the mechanics of computation. The methods of computation and processing are the responsibilities of the user.

Mechanization and computerization of manual procedures has produced a *good effect*, however, so far as internal control is concerned, in

that conversion of procedures from one method to another is a complex process generally requiring several technically skilled persons whose duties are separated from those of operating personnel. This plan of organization produces an improved operating environment. On the other hand, a potential for error does exist, since this same complexity of design and separation of duties could produce misunderstanding of company policy and uncontrolled record-handling practices. Therefore, the *primary objective* of a review of internal control in a company that has a computer or tabulating facility is to determine the soundness of the EDP operations and the compliance of mechanized procedures with general company policy and good accounting practice.

Work Program

The basis of our approach to reviewing internal control is a comprehensive work program. The work program is geared to the objective mentioned above. But, more important, we have found that the objectives of good internal control are consistent with sound and efficient EDP operating practices.

The work program is divided into three general categories:

- A review of the organization
- A review of operations
- A review of applications

Each of these categories is subdivided into work program steps.

Organization

Under the category of review of the organization, we would consider the following:

- The organization of the company and the lines of authority
- The organizational independence of the EDP group from the custodial departments
- The descriptions of the duties and responsibilities of the departmental personnel

During this review the auditor must make a distinction between idealism and reality. The substantial investment in equipment and relatively high salary expenses experienced in EDP facilities generally produce what may at first seem a poor situation apropos of separation of duties. Here a judgment should probably be postponed until the other sections of the work program have been completed. In some facilities,

it is expedient to have the computer operator perform many tasks that in an optimum environment would be provided by another person or in some cases another section. Ideally, we might look for a control section within an organization. This section would be responsible for logging batch controls over input, matching interim processing controls, and perhaps decollating and distributing printed reports. If the facility is small, conceivably the machine operator might be responsible for these tasks. Therefore, we would look for some control external to the EDP department. The logical places to look for this control are, of course, within the application and the operating departments being served.

Operations

The next general category is a review of operations, during which we would consider—

- Record-handling practices
- File retention and protection policies and procedures
- Review of operating data, such as console lists and machine-usage logs
- Accessibility to the machines and the data files

The main emphasis in this category is on physical control over the equipment and data. In one experience, a client incurred, through careless operations, substantial rerun costs because of the destruction of a master file. In this case, the header label check, which gives the operator an indication of whether or not a tape reel may be written upon, was deliberately suppressed. The reason given was that the minute or two required to print the label check on the console was “costing money.” This kind of “logic” resulted in a rerun cost that would pay for typing the header label check several hundred times.

The protection of disk files or packs has created a problem among users. One practical solution is the periodic writing of the disk file or pack onto a reel of tape. The material cost of the tape is negligible when compared to the non-productive unload time. This is a factor that *must be considered*. One client has a number of data files in two large disk files. The data files are critical to a very sophisticated operating procedure and are linked by means of a complicated series of chaining subroutines. This client is not taking any chances on a prolonged shut-down. In addition to periodically unloading the files onto tape, the client has installed certain “fail-safe” emergency equipment, which, in case

of a power failure, will switch to a large bank of storage batteries. The batteries will provide enough electrical service until a generator can engage and build up sufficient operating power. Still a third client simply produces a duplicate disk pack after a master disk pack up-date.

Applications

The last general major section of the work program, concerned with the review of applications, requires the greatest amount of effort. The essential considerations in this section should include the following:

- Verifying that the scope of the application under examination is clearly and adequately defined.
- Examining the documented descriptions of the data and procedures that have been mechanized. This examination requires tracing the mechanized procedure through operations to verify the integrity of the audit trail.
- Examining the audit trail. In mechanized systems, the establishment of audit trail should include two essential considerations:
 - The continuity of control over the data and the pervasive checking of the manipulation of the data by the mechanized procedures.
 - The ability to reconstruct should files be destroyed.

One can easily appreciate the essential nature of these considerations in real-time applications.

The existence of audit trail as defined above can be verified by examining the evidence available. This evidence might include—

- Flow charts indicating
 - Source departments and possibly the controls generated by these departments over the input
 - Data files whose record contents would be described in each computer program run book
 - Outputs that should include designation of records as well as reports and their disposition
- Program run books that include
 - Program block diagrams
 - Narrative descriptions of what the procedure is
 - Record descriptions including field definitions
 - Logs of—

Programmed halts for various conditions encountered during the execution of the procedure
Program changes after implementation

After relating one run book to another and *observing* the programs in operation, the integrity of the audit trail and the effectiveness of the programmed checks included in each procedure can be ascertained. There are perhaps as many methods of checking data manipulations within programs as there are programmers. However, it might be well to list a few by general category :

- Sequence checks. In sequential processing this check is generally used to assure that the order of a given file is precisely the order called for in the procedure.
- Limit or tolerance checks can be used in processing large volumes of data and accepting a certain variance as a practical matter. One example of this might be the comparison of revenue collected to the IATA price constructed on airline tickets. If the difference is plus or minus two dollars, the program would treat the transaction as correct.
- Edit checks that test the record format.
- Sign and crossfoot checks, both of which are self-explanatory.

Recently, in conducting reviews of internal control for two unrelated clients, we discovered the following situations :

Client number one had a billing application on a disk system that appeared to be working rather well from the EDP operations point of view. However, in our examination of the program that calculated and printed the invoices, we noticed that the sales tax table ended at 3 per cent. Consequently, the sales tax liability was consistently understated for all invoices in states with a sales tax of greater than 3 per cent. Needless to say, the client did not ask its customers for the differences between what they were originally billed and what they should have paid. The program was subsequently corrected.

Client number two converted a ledger-card accounts-receivable system to a magnetic tape system. The accounts-receivable file was blocked by states. The client selected one state for parallel testing. Since the conversion project was behind schedule, even *that state* was not sufficiently tested. Nevertheless, the entire file was converted and put into operation without reconciling the accounts-receivable detail to the general-ledger control account. In our review, we discovered a quarter of

a million dollars variance between the detail and the control account. As a result, the management insisted that a new accounts-receivable system be designed and installed after the errors created had been corrected.

By citing these examples we do not intend to impress you with the amount of effort expended in reviewing internal control, but rather to emphasize the necessity for a conservative and much-tested approach to mechanization. Conservatism is usually considered one of the attributes of auditors and this is an area where an internal auditor can contribute much to his company.

COMPUTER AUDITS

In describing our specific experiences in the uses of computers in audits, allow me to repeat what I mentioned earlier. These are clients with *specific* computer applications for a *specific* type business using *specific* machine systems. Therefore it would be incorrect to imply that these programs have general applicability. We shall examine the more easily understood example first.

The Capital A Company maintains detail records and account balances for all shareholders participating in five mutual funds. In effect, it is the custodian of each shareholder's unissued shares. Acting in this capacity, the company was required by the Securities and Exchange Commission to confirm one hundred per cent of the accounts with unissued-share balances. The volume of these accounts was between ninety-five thousand and one hundred thousand. In addition to this confirmation by mutual fund, the company had to furnish one list each by fund for:

- Exceptions to the share balances stated on the confirmations
- Mail returned by the post office as undeliverable
- Accounts unconfirmed as of a final specific date

Since second requests had to be mailed as of an interim date, the preparation of an additional forty thousand requests was required. The client maintained the shareholders' files on magnetic tape and used continuous card forms on each of which were printed a control number and shareholder's identification. Control lists were also printed in order to process the exceptions. The control number was prepunched into each card and written onto a magnetic tape control record.

When the confirmations were returned they were sorted into the

categories described above and processed against the magnetic tape control file. At the end of the audit, by means of coding those records that fell into specific categories, we were able to furnish the lists required by the Securities and Exchange Commission. Likewise, we had our working-paper analyses prepared for us by the computer.

The Capital B Company audit required a bit more sophistication. Since we did not have to confirm one hundred per cent of the accounts receivable, we stratified the accounts-receivable file and selected certain accounts by means of a statistical sampling computer program.

Next, since this was a manufacturing company, we had to examine the inventory and test the construction of certain standard costs. For the inventory examination, the inventory file was stratified much like the accounts-receivable file and the list that was prepared was in bin-location sequence to facilitate the examinations.

The standard cost examination required that we first stratify and statistically sample the cost file to select certain costs for examination. Next we compared all the standard costs to the corresponding selling prices of the repair parts and selected as exceptions those costs that fell out at either end of the spectrum—the extremely high- and low-profit items. The client has subsequently requested duplicate programs in this series for its own use. The uses to which these programs can be put are obvious.

This client also has a credit-company subsidiary whose financial statements required certification. For the notes outstanding, we have a program that will calculate the remaining unearned finance charges by what is essentially the sum-of-the-years-digits method. This is done as a part of the verification of the earned finance charges taken into revenue for the year. The credit company also has various aging reports, which resulted in nothing more than sort-and-edit programs.

SUMMARY

In summary, the ideas and experiences explored this evening and helpful for you to remember are:

- Internal control becomes *more important* when a company is considering mechanization of its methods and procedures.
- To review internal control, the auditor should have a well-defined and comprehensive work program.
- The complexity and versatility of computer systems *can be* a help rather than a headache to the auditor.

Finally, a word about the future. Contrary to popular opinion in some quarters, an auditor, like any other professional, has vision. He does not limit himself to dealing with historical data but, rather, looks ahead to take advantage of new technologies that will advance his profession and help him to grow in it.

Lord Tennyson says in his poem *Locksley Hall* that we are going to have to dip "into the future far as human eye can see", and see "the Vision of the world and all the wonder" that will be. It is going to be an exciting trip. Welcome aboard!

