Applications	Order processing, inventory control, accounts payable and receivable, purchasing, management reporting
Type of Industry	Wholesale Cooperative
Name of User	Kesko Oy Helsinki, Finland

Equipment Used	Univac 494 data processing system
	Univac 1004 data processing system
	ICL 1500 data processing system
	Data communication terminals

Synopsis

Kesko Oy, a retailer-owned wholesale cooperative in Finland, is using six computers and a data communications system to handle a variety of applications. The company system is based on a long range plan for a total management information system which is midway in development. New applications and innovations in existing applications are made in accordance with the plan. Existing systems were designed with the ultimate goal in mind.

The system currently processes orders, handles inventory control, accounts payable and receivable, facilitates purchasing and shipping, produces orderbooks for customers and produces statistical reports for management. Three large data banks--on inventory, customers and the 23 branch offices--form the hub of the system.

The management of Kesko Oy -- Finland's largest enterprise in terms of annual turnover -- has made a major commitment to data processing, viewing it as a competitive necessity to guide and control the company's entire marketing operation.

Since systems development began in 1962, Kesko has aimed toward building a management information system that would be used as a decision making tool to compensate for human error. Additionally, Kesko has placed heavy emphasis on system flexibility, believing that in a dynamic company every action must keep pace with the company's development.

Kesko Oy was formed in 1941, evolving from a group of highly competitive cooperatives formed around the turn of the century. Business has grown steadily, and today Kesko is the second largest business enterprise in Scandanavia.

Annual sales are consistently around the $400 million mark. Business is split among four commercial divisions and subsidiaries, with foodstuffs accounting for the largest portion of Kesko's sales (51 percent). The hardware division accounts for 18 percent, followed by agricultural supplies and machinery (17 percent), textiles (8 percent) and subsidiaries (6 percent).

Kesko serves more than 20,000 retailers and other customers with 23 branches strategically located throughout Finland. The most important group is formed by 5,000 retailers who own more than half of the company's voting shares and account for three-quarters of total sales.

Kesko's four major marketing divisions represent a wide variety of products, ranging from a large assortment of foodstuffs, to iron goods, building and industrial materials, household appliances, domestic oil, coal and gas, televisions, radios, small appliances and clothing.

The company is in the midst of a three-phase (mechanization, automation, optimization) EDP program designed to develop a total management information system by 1971.

The mechanization phase was begun in late 1962 and was virtually completed by 1965. It covered the implementation of the main daily routines onto the computer. Among the most important were stock/ledger updating, production of article and customer statistics, statement invoicing, printing of order and price books, and automating purchase proposals.

With the implementation of the mechanization phase Kesko accomplished three major goals. Data for automated decision-making was collected, the company became accustomed to EDP and personnel additions, which had been growing until that time, were slowed down.

The automation phase, scheduled to run through 1970, concentrated on further development of routines already on the computer. An important aspect of the second phase is the development of statistical reporting using the management by exception technique.

The stock ledger updating system, completed during the summer of 1966, started Phase II. Accounts receivable, customer and article (or item) profitability, transportation and scheduling are also included in the second phase.

The ultimate objective of EDP at Kesko is the introduction of a total management information system, consisting of a main top-management information system controlling the various subsystems for stock control, warehousing, transportation and market analysis.

THE IMPLEMENTATION PLAN FOR ADP

Time	1962 - 1965	1966 - 1970	1971 -
Phase	Mechanization	Automation	Optimization
Object	Routine work	Middle management	Top management
Projects	Stockledger up-dating Price and order book Purchase proposals Sales statistics Article statistics Accounts payable	Inventory control Article reports Accounts receivable Transportation statistics Transportation planning Customer profitability Automation of ordering Co-operation with suppliers	Costs control Capital control Market research Activity reporting Simulation
Objectives	Collection of basic (historical) material Making the company accustomed to ADP Slow up the growth in personnel employed in routine work	To increase the degree of automation To increase the total integration To give to the middle management reports made by the "management by exception" principle	Supervision and guidance by top management To create the system To utilize simulation techniques

EDP ORGANIZATION AT KESKO

Data processing at Kesko can be divided into two major parts: the ADP department and the ADP field organization.

The ADP Department

The main duty of the ADP Department is the planning and operation of Kesko's own computer routines. In addition, the department participates in the company's long range planning for information processing. The ADP organization is headed by a department manager answerable to the administrative director who serves as a direct link to the managing director and the board of directors. Below the EDP manager come the following sections: systems analysis and design, systems services, programing, computer operations, field liaison, and administration.

ADP Field Organization

The field is split into two groups, the head office and the branches. Within the Kesko framework, each of the commercial divisions has an EDP supervisor responsible for co-ordinating, planning and implementing the data processing activities for his division. He is also charged with taking care of his division's interest in the total EDP department's plans. Some special departments (accounting, transportation and the forwarding department) are important enough to have their own EDP officers.

In the branches, an EDP liaison officer is responsible for the data processing activities of his branch. He controls an EDP center, which handles branch office work, along with a punching group which prepares input on punched paper tape and sends it via telephone lines to the computer center in Helsinki. Additionally each commercial department within the branches has an EDP representative. The liaison officer and the representative, together with the branch controller, form a group which coordinates and develops branch office data processing activities.

Hardware

There are two computer installations at the Head Office in Helsinki, consisting of five computers. Kesko's 65K Univac 494 central processor includes six tape drives, an FH 880 magnetic drum capable of storing four million characters, two Fastrand drums (135 million characters) and a line printer.

Kesko also has two Univac 1004's, each with two tape drives, a line printer and card reader; two International Computer Ltd. 1500's, each with a 40K central processor, paper tape reader, line printer, two 6-cluster tape units and disc file capable of storing 44 million characters; and a 20K ICL 1500 with paper tape reader, tape punch, line printer and one 4-cluster magnetic tape unit.

A major feature of Kesko's operation is on-line data transmission. Data is transmitted at 62.5 characters per second. The system has an automatic error detection capability for single bit errors. More complex errors cause the computers to stop and an alarm is initiated. Data is punched on eight-channel paper tape. Kesko uses Addo punches, transmitting data over the public telephone network.

Other equipment in the Head Office includes: six data receivers, three data transmitters and six teleprinters.

Standardization

Wherever possible, Kesko has found that it's important to standardize procedures in planning and operation. Standards have been set for: definition of terms, procedures and phases of programing and planning, documentation, flowcharting, coding, machine time logging, control functions, general machine operations, tape library operations.

Registers

Three major registers (files) stored on discs are used in the daily processing runs. These are the article register, customer register and branch register.

Stock ledger updating, construction of picking lists and control of returns and stock statistics by computer are made possible by the article register (stored on disc file), from which, by means of an article number, all necessary information concerning a product is obtained.

For stock ledger updating, the article's identification, warehouse information and price must be stored in the register. Stock statistics, on the other hand, need sales information concerning the article. Moreover, there is in the register, information for delivery charges and the automatic ordering system.

Random access storage is more suited for the processing of a large article register, and Kesko stores the large article file on disc. Future plans call for this information to be transferred to magnetic drum.

Article records are stored in the random access memory by department. For each department there is reserved a part of a series of consecutive numbers, with which the department articles are numbered.

The information on each article is broken down into two parts -- main and branch record. The article's fixed data is contained in the main record. The fixed data is used throughout the company and contains address information for locating the branch record.

The branch record contains the article's price and warehouse data arranged by branch. Each article has one main record and as many branch records as there are warehouses from which it is sold. There are 100,000 main records and 330,000 warehouse records stored in the computer system.

The register is organized so that article space is reserved for as many branches as needed, and extra space is provided where possible. When the extra space is used up, new branch records are located on emergency disc tracks. If the emergency tracks are filled, the disc files are divided according to the new requirements.

Customer Register

For stock ledger updating and the collection of customer statistics, information about Kesko's customers is needed as well as data concerning stock items. The information is contained in the customer register, also located on disc.

At the present time only fixed data on customers is stored on the disc files. The customer number acts as the direct address to the disc files. Kesko serves 18,000 customers with the system which is expected to remain relatively constant.

The following data is kept in the customer register: name, address, account number and sales tax number.

In addition, to provide flexible customer service, supplemental data is needed -- transport code, billing code, number of copies of invoices, distance from warehouse, main delivery date and time of payment code.

Branch Register

Two kinds of data are stored in the branch register: a branch name record for each branch and a data record for each department in each branch. Name and data records are stored consecutively on the disc files so that the data record of a branch follows the name record. The branch register is updated daily and designed so that standard data for the branches is readily obtainable.

The branch name record contains the branch number, name and address in both Finnish and Swedish, abbreviation of the branch name, number of customer numbers, branch priority and type of branch. The data record contains the branch and department number, warehouse, picking list code, department discount code, along with a purchase, proposition, transport and quota code.

The branch register has provided Kesko with flexibility. The programs were written to take all possible variations into account. The program itself determines the basis for processing, by means of the codes in the data record.

Maintaining the Registers

Updating runs maintain the customer, article, branch and header registers which are kept in random access memory. A statistics code register is stored on magnetic tape.

There are five basic operations which can affect a register:

1. Insertion of a new record into the register.

2. Changing data within an already existing record.

3. Deleting a record.

4. Card file maintenance. In connection with one of the previous operations, a card or list in Finnish is automatically output for the person in charge of maintenance.

5. Interrogation: an inquiry is made concerning data in a record and the data becomes output.

A card file of the customer and warehouse records are kept in the branches and a main record list -- arranged by divisions in the main office. A branch register list is kept in the ADP field liaison office.

Maintenance is initiated by a change form, from which the data is punched into paper tape. The type of maintenance activity needed is indicated by a code on the form. A magnetic tape, which updates the random access memory register, is generated. The updating information is transferred from the tape in the statistics record application.

Each updated transaction is audited. The audit is performed separately by register and by transaction for updating and error detection.

A numerical check, by branch and department, is made during updating. An additional audit updates the sorting of the cards produced by branch, department and invoicing.

Special attention has been paid throughout to reliability and audit reports, in an attempt to design a flexible system by which both the records and those maintaining them are kept up to date.

DAILY ROUTINES

The computers are used mainly to cover the daily activities of Kesko's 23 branches. The system records changes in stock and prints shipping documents and invoices. Other runs cover the printing of purchase proposals designed to help the buyers, inventory lists to control stock and spot possible discrepancies between the physical stock and the stock information stored on the disc files. A comprehensive computer performance report is also produced daily showing all errors.

Kesko has a general policy of delivering goods two days after receipt of the order.

The salesman at the branch normally has an agreement with the customer to call on him on certain days of the week. Contact is made, usually by phone, and the customer gives the salesman his customer number and the numbers and amounts of the articles he wishes to order. The customer also requests that the goods be delivered on the next delivery day.

The customer also has the option to order merchandise from an orderbook, which he receives weekly, and mail the order to the branch office.

ORDER AND MERCHANDISE FLOW
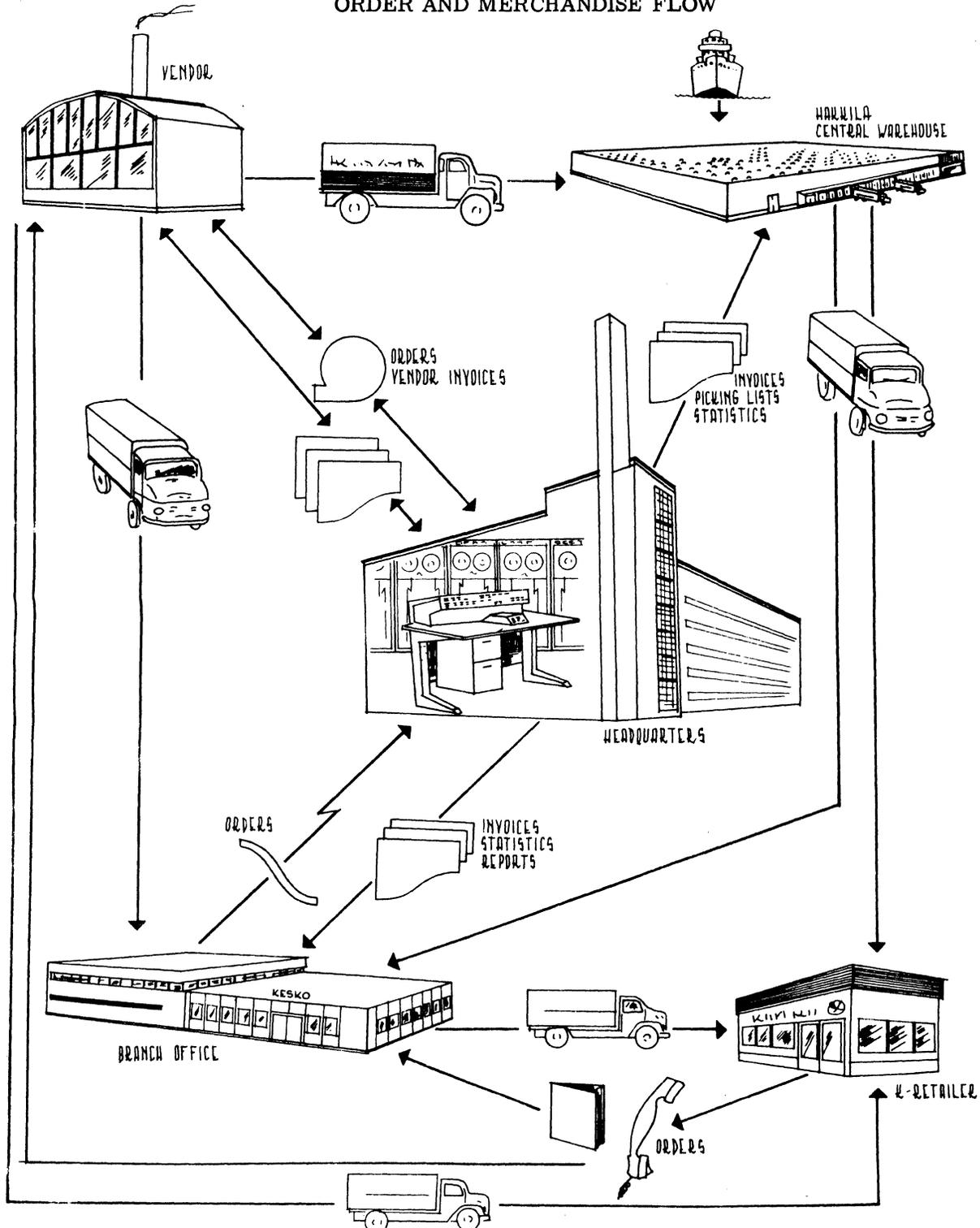
ORDERS RECEIVED B Y BRANCH OFFICE FROM RETAILER ARE TRANSMITTED TO HEADQUARTERS AND PROCESSED. BEFORE ORDER PROCESSING RUN, DATA ON GOODS RECEIVED FROM VENDORS IS PROCESSED TO UPDATE INVENTORY FILES. SHIPMENTS FROM VENDOR TO BRANCH OFFICE, INSTEAD OF WAREHOUSE, ARE REPORTED BY BRANCH OFFICES. OUTPUT OF ORDER PROCESSING IS SENT TO WAREHOUSE TO TRIGGER SHIPPING AND TO BRANCH OFFICE TO TRIGGER INVOICING.

The order is punched on five channel paper tape on Addo X machines and sent via telephone lines to the head office. Punching and transmitting is done throughout the day. The computer center runs three stock ledger updates daily, the first at 11 a.m. and the last about 6 p.m.

Input data for stock ledger updating consists of orders, returns, payments and inquiries. The processing consists of warehouse balance, the output of invoices and picking lists and the computation and storage of statistical data.

The information is transmitted directly to the computer which validates the input by verifying the customer corrections and the article number by using a check digit. It also examines the length and limits of the data fields and cross checks on data for exceptions and the customer and branch files. Reports of errors are sent to the punching unit and the erroneous line is rejected.

The verified input is sorted by branch and department so that purchases and returns are processed before orders, and warehouse balances can be maintained chronologically. At the same time orders are sorted by customer order, by delivery routes, so the invoices can be printed in the proper delivery order. This facilitates the collection of goods and the organization of deliveries. The branches are not sorted by branch number, but rather processing priority sequence, which takes the possibility of night transport to the branches into account. The branches with poor transportation connections are output first. Priorities can be changed as conditions warrant.

The warehouse inventory positions, stored in the article file, are updated and the calculations needed for invoicing and sales statistics are performed taking special prices, payment conditions associated with the customer and procedures associated with the branch, into account. If the warehouse doesn't stock an article, another warehouse can be designated in the order file and the shipping order automatically sent to the proper warehouse.

Statistical data concerning the goods ordered is stored in the article file maintained on the drum. Sales data is stored on magnetic tape for further processing. At the same time, invoice data is stored on magnetic tape for the preparation of invoice statements sent to customers on specific dates.

A separate program prints the invoice. Kesko uses a four part invoice. The original is attached to the customer's statement. The first copy is attached to Kesko's copy of the statement. The third serves as a shipping order and picking list which the customer signs upon receipt of the goods. The fourth is also a shipping order retained by the customer with the shipment.
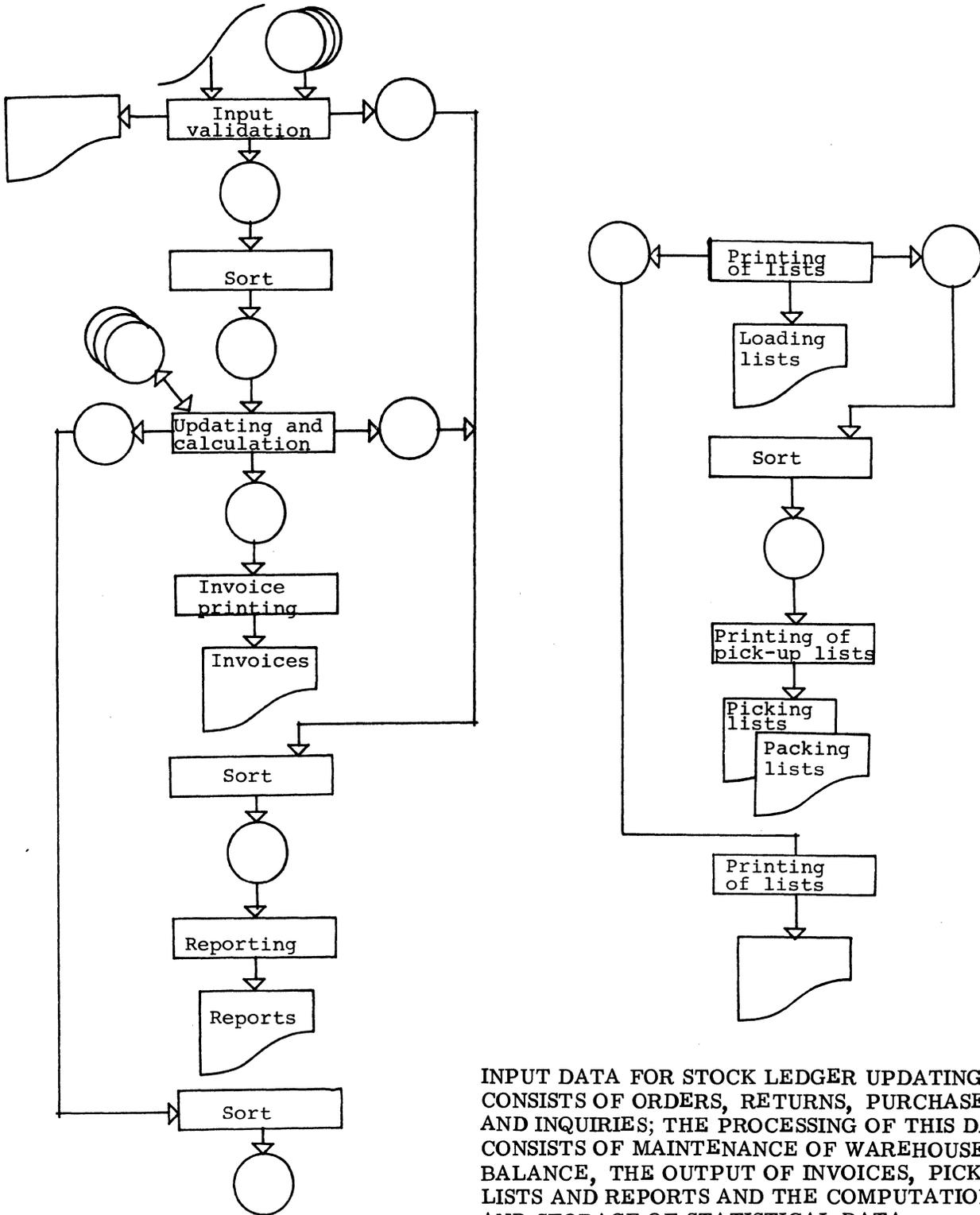
Shipping documents and reports not sent via data transmission are delivered during the night to the branches so that collection of goods in the warehouses can begin early the next morning.

The collection of goods in the warehouse is performed individually for each customer with the aid of the shipping order and picking lists. In some cases, the goods are loaded into delivery vans the same day the warehouse receives the order. Most goods are shipped no later than the day after the warehouse receives the order so that the two-day delivery policy is maintained.

Invoicing

The branch offices are responsible for customer invoicing. The printing of the invoices, however, has been concentrated at the computer center. The branches send all the data needed for invoicing to the computer center. In addition to the invoices, several invoice reports are printed by the computer to help the branches in their invoicing operation.

STOCK LEDGER UPDATING

Input validation

Sort

Updating and calculation

Invoice printing

Invoices

Sort

Reporting

Reports

Sort

Printing of lists

Loading lists

Sort

Printing of pick-up lists

Picking lists

Packing lists

Printing of lists

INPUT DATA FOR STOCK LEDGER UPDATING
CONSISTS OF ORDERS, RETURNS, PURCHASES
AND INQUIRIES; THE PROCESSING OF THIS DATA
CONSISTS OF MAINTENANCE OF WAREHOUSE
BALANCE, THE OUTPUT OF INVOICES, PICKING
LISTS AND REPORTS AND THE COMPUTATION
AND STORAGE OF STATISTICAL DATA.

The customer sends his payment to the branch office which keeps copies of the invoices in its records.

Both drop shipment (purchases delivered to branches rather than the central warehouse) statements and EDP statements are included in the print lines of the invoice. Drop shipment data is punched on paper tape in the branches, transmitted to the EDP center and processed with the invoicing programs. After processing the branches are sent the error reports and the number of control reports of the drop shipment statements. These reports -- together with the invoicing reports -- enable the branches to verify the correctness of their invoicing quickly and with little delay. The invoicing report contains sales figures for each commercial department, with stock sales and drop shipments in separate columns.

Each month is divided into four invoicing periods and invoices are printed once each period except during the fourth period when two printings are made. The branches usually obtain their invoices more than a week before the normal due date.

The invoicing system has simplified the supervision of payments and relieved the branches of manual invoicing.

Orderbooks

Each week an orderbook, or catalogue, is sent to every customer. The orderbooks contain individually selected lists of articles offered by each department within the branch. Article numbers and prices are always up-to-date because the information is pulled from the article file and from a special tape file which contains a statistical code, sales figures and the previous month's sales figures broken down by branch, sales group and order number. Amendments to the tape are validated in the general adjustment run and matched against the file daily.

The orderbook's pages are printed-out on paper suitable for photolithography and produced in Kesko's offset litho works.

Purchase Proposals

Purchase proposals are designed to aid the branches in purchase activities. Each branch is fairly independent and has the right to make decisions on what it will and will not inventory or purchase from outside sources. Only imported goods are purchased through the head office. The records of each article in the branch inventory are stored on magnetic tape. The record includes the period between reviews of a given piece of merchandise as well as the day of the week the article will be included in the proposal. The record is updated by purchasing personnel daily. It provides purchasing with fresh sales and stock balance figures for the day the order is to be made. All items provided by one vendor are listed on the same printout.
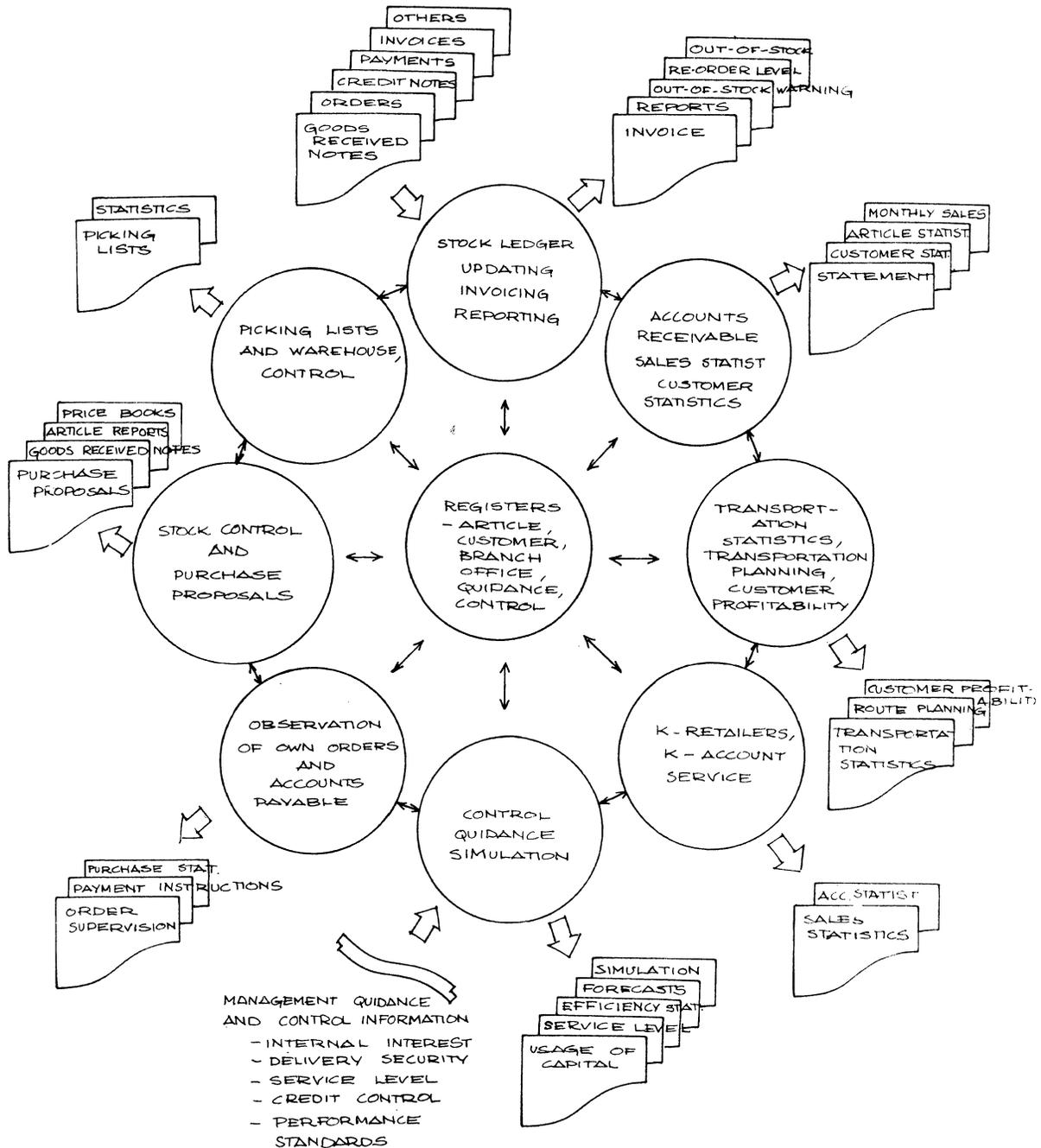
The purchase proposal shows present sales and purchase figures. It also provides a stock balance, shows average daily sales in units and suggests the reorder quantity based on average sales during the review period.

Inventory Lists

The inventory list is another regular run designed to aid the branches and to spot discrepancies between the stock volume on the discs and the physical inventory count.

The printed list is divided into two parts. Both contain the article number and name and the item's size. The first list contains a stock balance record, the number of items which the computer has stored on disc files. This column is left vacant on the second list and filled in when a physical count is taken in the warehouse. The warehouse list is then checked against the computer record and any discrepancies noted. If they are not due to unrecorded purchases, orders or returns, they are corrected by crediting or debiting a special account.

THE TOTAL DATA PROCESSING SYSTEM

Diagram labels:

- OTHERS, INVOICES, PAYMENTS, CREDIT NOTES, ORDERS, GOODS RECEIVED NOTES
- OUT-OF-STOCK, RE-ORDER LEVEL, OUT-OF-STOCK WARNING, REPORTS, INVOICE
- STATISTICS, PICKING LISTS
- MONTHLY SALES, ARTICLE STATIST, CUSTOMER STAT, STATEMENT
- STOCK LEDGER UPDATING INVOICING REPORTING
- PICKING LISTS AND WAREHOUSE CONTROL
- ACCOUNTS RECEIVABLE SALES STATIST CUSTOMER STATISTICS
- PRICE BOOKS, ARTICLE REPORTS, GOODS RECEIVED NOTES, PURCHASE PROPOSALS
- STOCK CONTROL AND PURCHASE PROPOSALS
- REGISTERS - ARTICLE, CUSTOMER, BRANCH OFFICE, GUIDANCE, CONTROL
- TRANSPORTATION STATISTICS, TRANSPORTATION PLANNING, CUSTOMER PROFITABILITY
- CUSTOMER PROFIT-ABILITY, ROUTE PLANNING, TRANSPORTATION STATISTICS
- OBSERVATION OF OWN ORDERS AND ACCOUNTS PAYABLE
- CONTROL GUIDANCE SIMULATION
- K - RETAILERS, K - ACCOUNT SERVICE
- ACC STATIST, SALES STATISTICS
- PURCHASE STAT, PAYMENT INSTRUCTIONS, ORDER SUPERVISION
- SIMULATION, FORECASTS, EFFICIENCY STAT, SERVICE LEVEL, USAGE OF CAPITAL
- MANAGEMENT GUIDANCE AND CONTROL INFORMATION
  - INTERNAL INTEREST
  - DELIVERY SECURITY
  - SERVICE LEVEL
  - CREDIT CONTROL
  - PERFORMANCE STANDARDS

REGISTERS, OR FILES, ARE THE CENTRAL POINT OF THE TOTAL SYSTEM NOW EVOLVING. ALL PARTS OF THE SYSTEM WILL BE INTERDEPENDENT AND INTERACTIVE. MANAGEMENT WILL NOT ONLY RECEIVE INFORMATION BUT WILL BE ABLE ALSO, WITH THE HELP OF FACILITIES PUT INTO THE PROGRAMS, TO AFFECT THE DATA HANDLING PRINCIPLES.

INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT (S37)   KESK/11

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Accounts Payable

Accounts payable are handled by the head office and processed daily. Manufacturers' invoices are grouped according to each account in the ledger by the branches, and forwarded to the main data processing department. A sum of totals is attached to each group of invoices.

At the head office, appropriate manufacturer information is added to invoices which are keypunched onto cards and run through the computer.

The accounts payable system is also designed to handle the intracompany transfer of merchandise from one account to another. Social Security and tax pre-payments also fall under the accounts payable umbrella. The accounts payable department is also responsible for different kinds of control statistics and control lists which are printed out for the book-keeping and accounting departments, the branch offices and affiliated companies.

Sales Statistics

Kesko produces numerous statistical reports which can be classified generally as either sales or article statistics.

In the sales statistics category, reports which show the distribution of sales of each commercial department on different due dates are produced monthly. The data for these reports is created by the invoicing programs.

A K-retailers (those who share ownership in the company) report shows figures which represent sales for the K-retailers. These are shown separately for all the departments of each branch.

Two customer reports are produced monthly. One report shows monthly invoices for each customer with the figures presented departmentally along with the corresponding figures of the previous years. The report also contains totals for each department from the beginning of the year and the portion of those totals to which the annual purchase applies. The second customer report shows sales figures of each customer according to article groups.

Article Statistics

Statistics on individual articles are generated monthly to help control stock and analyze profitability.

The article statistics include, among other things, the sale of each article in units and price, the number of orders for each article and the average amount, quantitative purchases, number of times purchased, stock balance or, if an item is out of stock, the date it was sold out. Other reports cover interest on stock value and gross profit.

Comparative figures are covered in article group statistics, including the value of sales for this month and the average of the three previous months, interest as percentage of sales and compared with the previous month, number of times sold out, gross profit this month and as percentage of sales. The last two figures are shown as average per article in the group and as cumulative figures from the beginning of the year.

FUTURE PLANS

The development of Kesko's total system has been subdivided into six separate work sections, each with a project leader and systems analyst responsible for the completion of his project.

--Proper management of stock with the computer taking care of purchases and
 inventory control

--The optimization of warehouse work and transportation

--Money flow

--The production of sales and customer statistics

--Data processing for all K-retailers (Kesko account service, market and sales structure analysis)

--Creation of a management report system which includes forecasts, simulation and control statistics.

Implementation of the total system is scheduled for completion in 1969 and has been broken into four phases.

Project A concentrates on stockledger updating which will be transferred to the Univac 494. The new equipment will make several changes possible and improve the company's on-line operations. The main files will be moved to the 494's mass memory devices. Article statistics and file maintenance are also included in the project. Also scheduled for the 494 is invoicing and accounts receivable and the improvement of invoicing statistics, K-retailer statistics, due date statistics and sales reports. Additionally, statistics on the gross profit of drop shipments and parts of the accounting application will be implemented as a new application.

Kesko is also working on the improvement and computerization of the company's transportation system. The application will supervise delivery economies, routes and vehicle configurations as well as driver efficiency. In addition, Kesko will be able to charge transportation expenses to the various departments more effectively.

The inventory control system is also planned for the 494. The addition to the present inventory control applications, the supervision of orders to vendors and arrivals of shipments will be implemented as a new application. Further automation changes will be made in test inventory.

A system to bring the K-retailers under EDP's control is also being implemented. The main duties of the system would include taking care of the customer's bookkeeping, enabling the company to follow the estimated profitability of the retailer and eventually connect the largest retailers directly to the computer.