Developing and Implementing an Airline Stores and Purchases Accounting System: A Case Study of PIA

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Abstract

This case study explains the process of developing and implementing a new microcomputer based accounting system for the Stores and Purchases department of PIA. After briefly highlighting some difficulties which were experienced under the existing manual accounting system, the study continues to chart the various steps which were taken to analyse and map different processes and explains how various modules were developed and tested through parallel runs and ultimately resulted in full cutover to the new computerized accounting system. The role of involving all the existing staff and using their expertise and inputs in the development of the new computerized accounting system has been highlighted as a major factor in its successful implementation.

Keywords: *Airline accounting, stores and purchases, letters of credit*

INTRODUCTION

The Director, Stores and Purchases Department of Pakistan International Airlines, was chairing a meeting in his office to discuss the mounting problems and delays in completing the annual financial accounts of the Stores and Purchases Department. Each Divisional Head had made his presentation and now it was the turn of the Finance Manager to explain the underlying causes of the delays. In his presentation during the meeting, the Finance Manager explained that historically a manual accounting system was used in the Finance Section of the Stores and Purchases Department which was not linked to the on-line inventory control system which resulted in numerous discrepancies and involved lengthy manual working and reconciliation exercise every year which held up the finalization of the Corporation's Annual Accounts. This had become such a persistent problem that even the external auditors had been highlighting it in their reports for many years. In addition to this there were persistent backlogs in many other areas of accounting such as bank letters of credit, foreign stations payments, accounting for paid invoices, import duty, uniform fabrication, etc. Late or non receipt of original documents as well as manual processing and lengthy correspondence to resolve issues

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were other contributing factors. Posting out of staff on foreign postings and non availability of expert staff created bottlenecks in processing of documents each year.

After hearing the detailed presentation of the Finance Manager, Stores and Purchases, it became clear to the participants that unless the Stores and Purchases Accounting system was fully automated such discrepancies could not be resolved and would continue to cause delays and headaches for the management in the years to come. The Director, Stores and Purchases, then addressed the participants, who included General Manager Purchases (Commercial), General Manager Purchases (Technical), General Manager (Stores) as well as other officials of the Stores and Purchases Department. He was of the view that the time had come to develop and implement an in-house computerized Stores and Purchases Accounting System which would streamline the entire accounting and avoid future problems.

'I will speak to the Director, Information Systems, to provide all necessary assistance to the Finance Section but your people will have to take the lead as they are fully aware of the intricacies and limitations and requirements of financial reporting as well as external and internal audit. As far as possible, manual interventions will have to be discontinued and the system must be transparent and resilient to accommodate future developments', concluded the Director Stores and Purchases. He instructed the Finance Manager to constitute a team to work on system development on top priority basis and to keep him posted about the progress.

Constituting a Development Team

The Finance Manager (S & P) did not waste any time as he had recently worked on the automation of the airline's foreign and domestic stations' financial reporting system. He also had an experienced team of qualified and dedicated professionals working with him who would be able to contribute their expertise in developing an automated financial reporting system for the Stores and Purchases Department which would be a big step forward in streamlining the overall financial reporting system. The first step was to discuss this new development with the higher management of the Finance Department which included the Director Finance, General Manager (Accounting), General Manager (Budgets) and General Manager (Funds Management). Fortunately there was overwhelming support from all levels of management as the need for automation of the manual systems was already well understood and the recent proliferation of Personal Computers in every department of the airline was proof of this development.

The next step was to constitute a team from the Finance Section, Stores and Purchases, to start work on designing a personal computer based accounting system and the main inputs and required outputs of each process were to be identified. For this purpose a number of coordination meetings were held which were also attended by experts from such areas as Stores, Purchases, Information Systems, Engineering and Maintenance, Marketing, Catering Services, Motor Transport and Technical Ground Support, Flight Operations, Precision Engineering, Flight Services, Corporate Planning, PIA Printing Press, PIA Training Centre, Sports, Security, Air Freight Unit , General Accounting, Disbursement, Funds Management, Administration, Medical Services and General Services Departments. In each meeting specific requirements relating to purchases were discussed and problems identified and recorded which needed to be addressed or incorporated in the envisaged Financial Reporting System.

The Stores and Purchases Department

The Stores and Purchases Department was responsible for centralized procurement of all materials for the commercial and technical areas of the airlines and for maintaining adequate inventories of essential items of regular use at all domestic and foreign locations. This entailed the establishment of a global network of suppliers of aircraft parts as well as consumable items of engineering, catering and all other departments mentioned above. There were field offices of the Stores and Purchases Department located at all major domestic stations such as Lahore, Islamabad, Peshawar and Quetta and overseas offices at London and New York. Separate Stock rooms were maintained for various types of stores, e.g., aircraft and engine spares, tools, petroleum and lubricants, paper and stationery items, computer equipment and spares, catering items, dry rations, cold storage, motor transport, raw materials and finished goods of precision engineering, medical supplies, uniform items. All these diverse activities entailed specialized ordering and replenishment requirements. Aircraft spares inventories were already being maintained either fully or partially on mainframe based inventory control systems. The challenge was to integrate all these diverse systems and extract the financial information in the required format at desired intervals. As the initial studies progressed major areas were identified where work could begin in the first phase.

Preliminary Studies and Requirements Mapping

A team had been assembled from the Finance Section of Stores and Purchases which was headed by the Finance Manager (S & P) and included all the unit heads. Some of these officers already had recent exposure to automation activities at their last station of posting. The starting point was the procurement of brand new, high powered personal computer systems which were linked into a local area network (LAN). The next step was the writing of program modules for various applications in order to capture data from the original documents like suppliers' invoices, Purchase Orders and Receipt Vouchers, run various programs and prepare payments to the suppliers and account for the purchases. These functions had been carried out manually so far but the time had come to convert them on personal computer based accounting software. At the outset it was decided to arrange training for all the personnel working in the Finance Section on operating the PCs. The officers having higher level qualifications like MBA and ACMA were sent for further training to the PIA Training Centre and the Finance Automation Section. A selected group was assigned the crucial task of system design based on the analysis carried out initially through visits, meetings and series of discussions. Simultaneously the writing of program modules was started on a test basis within the Finance Section of Stores & Purchases Department. The following areas were identified as the main components for inclusion in the financial reporting system:

1   Local Payments
2   Reconciliation of Stores Imprest
3   Letters of Credit
4   Foreign Stations Payment Authority
5   Foreign Suppliers' Invoices
6   FBD-1 Invoices from New York
7   Accounting for Paid Invoices
8   Processing of Receipt Vouchers
9   Commercial RVs Accounting
10 Invoices Matching Menu
11 Accounting for Import Duty
12 Accounting for Uniform Fabrication
13 Accounting for Aircraft Spares
14 Accounting for Discrepancy Reports
15 Accounting for the P.I.A. Press

As the work progressed various questions were raised and possible solutions were discussed and alternatives selected based on the participants experience and the requirements of the various users. Ad hoc reports were identified which were demanded by various offices from time to time and these requirements were also included in the output options. The principal benefit which became evident at this early stage was the elimination of multiple data entry as data captured once could be used to generate multiple reports with minor amendments. The other benefit which also became evident was the early identification of data entry errors and omissions which were identified immediately after data capture by running validation programs. This was a very powerful capability and motivated the team to carry on with the development work at a fast pace.

As mentioned earlier manual processing of documents in different units created backlog in processing of documents which resulted in accumulation of large amounts of liabilities in the clearance accounts pending completion of matching/clearance by completing all missing data. That is why it was necessary to develop a system whereby all required data would be captured including receipts of materials from suppliers, automated accounting of receipt vouchers so that differences between ledger accounts and computerized (mainframe based) inventory could be eliminated. Imported material invoices were also included in the computerized accounting system in such a manner that their matching with receipts could be carried out and the balances in the clearance accounts for imports could be cleared expeditiously. The top priority objective of automating the accounting was to capture data from both invoices and receipt vouchers of local purchase orders and use the same for generating pay vouchers and payment cheques.

Accounting for Local Purchases

The existing purchase reporting system was retained in order to maintain continuity and not create sudden disruption in the supply chain otherwise it would have serious consequences including possible stock outs and consequent delays. A number of additional processes were also identified for conversion during the analytical study and discussions with various managers in the Stores and Purchases Department. Once the requirements were identified, the next task was to ascertain if there were any off-the-shelf programs/packages readily available in the market which we could purchase and install. Unfortunately there was no such package which could meet most of the airlines' requirements without extensive modifications. Therefore, it was decided to develop all the program modules in house. Assistance would be obtained where necessary from the Information Systems Department as well as the Finance Automation Section.

The team assembled from the Finance Section of the Stores and Purchases Department started to write the first program modules for the Local Payments Unit which handled a large number of payments to local vendors within Pakistan. The second goal was to speed up the process of reconciliation of various imprest and clearance accounts. Once the monthly data was available online, the year end reconciliation process would be automatically streamlined. One by one, the team would write out the initial program modules and hand them over for test runs on a parallel basis so that output results could be compared. This process would be repeated until all the stakeholders were satisfied with the results. Training of staff in data preparation, data entry, processing, output verification, etc., would be carried out simultaneously. A brief description of the automation process in each section follows.

Local Payments Section

Payments to suppliers within Pakistan are processed in this section using the following basic documents:

1. Invoices
2. Receipt Vouchers
3. Purchase Orders

The automation team, after studying the existing system in detail, developed a system which comprised of the following four database files to capture data from the source documents:

1. INVOICE.DBF: for entering invoices
2. RVIR.DBF: for entering Receipt Vouchers for internal requisitions
3. RVIN.DBF: for entering Receipt Vouchers for indents
4. PO.DBF: for entering Purchase Orders

Invoices Database File

The suppliers' invoices are received along with a copy of a delivery challan. The main fields for data entry in the INVOICE.DBF file were TFRM (Supplier's identification code), INVNO (Invoice number), INVDT (Invoice date), PONO (Purchase Order Number to which the invoice relates), PODT (Purchase Order date in standard format), AMOUNT (Total invoice amount in rupees), SNO (Serial Number allotted by Finance Section for control). Additional fields were created which would be filled up automatically after processing.

Purchase Orders Database File

Purchase Orders are received from the Commercial Purchases Section and data entry is carried out by the concerned finance staff in the following fields. TFRM (Supplier's identification code), PARTY (Name of the supplier to be left blank), PONO (Purchase Order Number), PODT (Purchase Order date), PAMT (Total amount on the purchase order), DLYDT (Agreed date of delivery in case of single consignment), DPT (Department code of indentor for accounting purposes), LOC (Location code for accounting purposes), ACC (Account code to be debited), SLNO (Serial control number allotted by Finance). Additional fields were created which would be filled up automatically after processing.

Receipt Vouchers Database File

These vouchers are received periodically in the Finance Section from various stockrooms. A separate database file has been created where data is entered in the following fields. TFRM (Supplier's identification code), SR (Stockroom Number where stores have been received), RVNO (Receipt Voucher Number), PONO (Purchase Order Number), AMOUNT (Total amount/value of stores received), PRAMT (Price Reduction Amount applicable in case stores received do not meet all required specifications), SNO (Receipt Voucher's serial control number), IRC (Internal requisition code such as IR, IN, PR), IT (Income Tax deduction code).

Suppliers' Address File

This file was created to record the complete address of each supplier along with an identification code. The following fields were used to capture all the required information about a supplier. PTY (Supplier's full name), PAYEE (Abbreviated form of supplier's name for printing on cheques), ACC (The Bank name and Account Number of the supplier for printing on cheques). ADD (Full address of the supplier), TFRM (Supplier identification code to be allotted on the basis of Registered or unregistered), NTO (Supplier's tax number), EXPIRES (The date of expiry of supplier's registration), IT (Supplier's tax status) indicating whether tax is to be deducted or not.

Once all the above database files' data entry was completed for a given period the actual processing of payment vouchers, cheques and tax deduction certificates, reports and periodic accounting returns could be carried out with the help of eight different screen menus which could be accessed from a MAIN MENU as follows:

Main Menu

1	Transfer menu	*5*	Accounting menu
2	Matching menu	*6*	Reconciliation menu
3	Printing menu	*7*	D-15 menu
4	Ledger menu	*8*	Tax men

Transfer Menu

This Menu was developed to allocate party names, transfer data of invoices for processing, transfer indent Receipt Vouchers data, transfer Internal Requisition Receipt Vouchers data, transfer Purchase Orders data into a POOL data file for matching. Subsequently, the leftover records of invoices and RVs are rearranged for merging with the current data and matching.

Matching Menu

This Menu enables the user to proceed step by step to prepare documents, print pay vouchers, cheques and income tax certificates. Although detailed scrutiny of the records was required, this menu was essential to prevent errors, duplicate or wrong payment as so many checks had been built in at every stage to ensure error free processing. This Menu presented a number of options to the user to systematically process invoices, receipt vouchers and match them based on the Purchase Order numbers. It also enables the user to select records for releasing payment on a give due date. If a supplier did not adhere to the delivery schedule specified on the purchase order, late delivery charges would be deducted automatically. Next cheque serial numbers and Pay Voucher serial numbers would be entered. After the first few test runs the staff were enthusiastic and word soon spread about the efficiency and time economy of the automated menu driven system.

Printing Menu

This menu is used to print Pay Vouchers, Income Tax Deduction Certificates, cheques, tax variance statement and party codes list. Various options enable the user to print the required items as desired. Special cheque printing stationery had been ordered from the Bank to enable

cheque printing.

Ledger Menu

This menu assisted in completing the post payment activities like printing of party wise ledger on a monthly basis as well as on quarterly and annual bases. Also a number of reports had been developed in response to requests for information about total year to date purchases party wise as well as amount wise. The last mentioned report was especially useful as it gave full details of purchases, price reduction, income tax deduction, invoice amount and late delivery charges deducted.

Accounting Menu

This menu was developed in order to facilitate accounting of the locally purchased stores by crediting the local purchase clearance account (see accounting flowchart) and charging the respective inventory and expense accounts at the end of each month. Accounting is based on a classification of Receipt Vouchers either as Indent RVs or Internal Requisition RVs.

Reconciliation Menu

This menu presents programs for the month end reconciliation and accounting of advance payments and amounts for capitalization. An Advance payments account was debited at the time of payment to a supplier. After receipt of the invoice and RV, accounting action was completed with the help of this menu. Similarly all amounts meant for capitalization (fixed assets) were charged to the Capital purchases account which was later cleared through adjustment pay vouchers through the General Accounting Division.

D15 Menu

This menu assists in the release of additional types of payments such as payments to staff for Leave, duty travel, casual labor, etc. Also advance payments as well as payments against work orders where no RV is prepared are released thru this menu. The third category of payments made here are for staff uniforms for air crew and ground staff. The last category of payments is for PIA Press invoices.

Tax Menu

After the monthly payments have been completed, it is necessary to deposit the tax deducted at source into the government treasury. For this purposes, proper checks have been introduced to ensure there is no duplication or missing data. After carrying out all audit checks, the Statement Showing Tax Deduction at Source from External Parties is printed (See Appendix A for a flowchart depicting the local payments accounting system).

Foreign Payments

Foreign payments are made to suppliers mainly through Letters of Credit established in favour of the suppliers after receipt of authorization letters from General Manager Purchases. The letter of authorization is supported by all necessary documents such as a copy of the purchase order, Capital Sanction, Internal Requisition or Indent. The request also contains the terms and conditions of shipment including validity period, exceptions from standard terms, any conditions negotiated with the supplier, etc. Once an L/C request is received, a serial control number is allotted and entered in a register. The data are entered and processed in the

following database files:

1 TEMP.DBF
2 ESTBFL.DBF
3 RTMTFL.DBF
4 LBLTYFL.DBF
5 TEMP.DBF

This file has 22 fields in which the data are entered from the original documents. After completion of data entry the L/C Establishment and L/C Amendment Requests can be printed. Complete information regarding each purchase order is entered including value in foreign currency, applicable exchange rate, supplier's name and address, shipping terms of L/C, description of supplies/goods, country of origin of the supplies, mode of shipment (air or sea). In addition to this information special instructions may also be entered as negotiated with the supplier. These may include partial payments, shipment deadlines, project payments, etc.

L/C Establishment Database File

This file is used for maintaining complete record of opening, increases and amendments in the L/C and also for the printing of the L/C Establishment and Amendment requests. It has a shorter structure of 11 fields and only the required data are transferred from the TEMP.DBF through the main menu.

L/C Retirement Database File

This database file was created to maintain records of L/Cs which have been retired (paid or negotiated). This information is received from the banks through bank statements and the supporting debit advices. Other supporting documents such as copies of the bill of exchange, Bill of Lading (sea shipment) or Air Waybill (air shipment), invoice, declaration of shipment and insurance declaration are received separately. The debit advice is used for entering the data about retirement of each L/C including bank charges charged by the opening bank. This is a comprehensive database file and contains 23 fields including codes for bank identification, date of retirement and value of invoice paid in original currency, the exchange rate used for conversion to USD, value in PKR, account code to be charged and other required information such as the supplier's name, description of material and value date of retirement is also entered.

L/C Liability Database File

This file consists of records of all outstanding L/Cs which have not been retired upto a certain date. No data entry is required as the records are transferred to this file after the current period's retired L/Cs have been updated from the main menu. Nine fields are required such as L/C number, value of L/C in original currency, month of retirement and total amount paid along with the currency code and exchange rate applicable.

Together the above three database files contain all the data required for further processing and generation of reports and are used for the monthly, quarterly and annual closing of accounts. Having the data readily available and updated speeded up the process of annual closing dramatically and further reduced the need for and volume of correspondence with foreign suppliers and the banks. A comprehensive menu driven program was developed which was

regularly used for the establishment, retirement and updating the L/C liabilities systematically. It also enabled the users to create backup files for data protection and generate various reports for management information purposes.

The cycle of establishing fresh L/Cs, amending and retiring existing L/Cs and checking the liabilities status is an ongoing process. The extensive menu helps the users to complete the above tasks easily and accurately. Once the data entry has been completed from the L/C request letter the menu enables the automated printing of the L/C opening request addressed to the selected bank with all the standard terms and conditions printed on it. This eliminates chances of errors and omissions. Any special instructions can be entered in a separate Remarks field which has been developed for this purpose. Similarly an L/C amendment request can also be printed. The L/C amendment request is sent whenever the L/C amount has to be increased or decreased or the validity or shipment date has to be extended beyond the original date.

Updating the L/C Establishment database file

An option in the L/C main menu enables the user to update the L/C Establishment database file after the last data entry has been completed in the TEMP.DBF file. First the records from the temporary file are appended to the Establishment file. These records are then sorted on the field LC:NO. This file is now ready for further processing.

Printing the Debit/Credit Analysis Schedule and Updating the Retirement and Liability files

This report shows complete details of L/Cs which have been retired during a period including Pay Voucher number, L/C number, L/C retirement date, material value, bank charges, exchange rates and details of materials accounts charged. Further options exist for systematically updating the L/C Retirement file and the L/C Liability file respectively thus saving many hours of labor which would have been required for manually updating the individual L/C records. In this manner all the current information was available in the system and management queries could be efficiently handled. Once all the regular processing has been completed for a period, the data of Establishment file, Liability file and Retirement file can be transferred to back-up files for safe keeping against loss or damage to the original files.

Foreign Stations' Payment Authority and Other Modules

Certain suppliers receive payments at foreign stations where the airline has established its offices. In all such cases a formal payment authority letter is sent to the concerned finance manager for making payment locally. Payment authority letters are prepared in the Finance Section of the Stores and Purchases department after receipt of a request letter signed by the General Manager Purchases concerned along with a copy of the Purchases Order, internal requisition or indent and financial coverage. The documents are scrutinized before data entry in the specially prepared module for printing of station's payment authority letters. This is a menu driven module which helps to keep a complete record of the payment authorities issued during a period. The payment authority database file contains a number of fields including serial number, date, expiry date, station of payment, foreign currency code, payment terms (COD or net thirty days), value in foreign currency as well as Pak rupees, other charges , discount allowed, supplier's name and address, purchase order number and account to be debited such as goods in transit. After data entry is completed, a batch print can be printed for checking for errors and after making necessary corrections the station's payment authority letters can be printed.

After the payment authority has been signed by the authorized signatories, it is dispatched to the concerned station.

Once the foreign stations' payment authorities were dispatched to the concerned stations, the station finance managers released the payments to the suppliers and reported them in the Stations Disbursement Reports for the month. All required supporting documents would be sent to Finance Manager S & P for post payment audit and clearance of the Goods in Transit Account which had been debited at the station. With the automation of the payment authorities, this whole process was also streamlined and accounting action could be completed much earlier thus avoiding lengthy delays and keeping follow up correspondence to the bare minimum (See Appendix B for a flowchart depicting the foreign payments accounting system).

After the aforementioned modules had been tested and became fully operational attention was focused on automating the remaining areas and integrating them into the system. These included foreign invoices, accounting of paid invoices and receipt vouchers, accounting for commercial RVs and matching with invoices, adding import duties. Additional modules were developed for other applications such as accounting for staff uniforms fabrication, aircraft spares, and raising discrepancy reports. These modules were completed and tested in coordination with the concerned sections and duly included in the financial reporting system. Finally the entire system was documented and published in the form of the Stores and Purchases Financial Reporting Manual.

CONCLUSION

Once these main modules were developed, tested and implemented in phases spread over a period of more than one year, it was time to evaluate their effectiveness in meeting the objectives which the management had set out. When the time came for the next annual financial closing the Finance Section of the Stores and Purchases department was well prepared and managed to meet or exceed all the benchmarks. All the bottlenecks earlier identified had been successfully identified and addressed and the new system was running smoothly. The final step in the implementation of the new system was the full documentation of the various modules and their detailed descriptions in the form of a Financial Reporting Manual so that future generations could build upon the successes already achieved and keep the department abreast of the fast developments in information technology. The morale of the staff was also very high as they exercised full ownership of the system having been fully involved at every stage of its development and implementation. After the rollout requests were received from many other departments for help in developing similar systems which were gladly agreed.

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APPENDIX

Appendix A: Local Invoices and Receipt Vouchers: Accounting Flow Chart
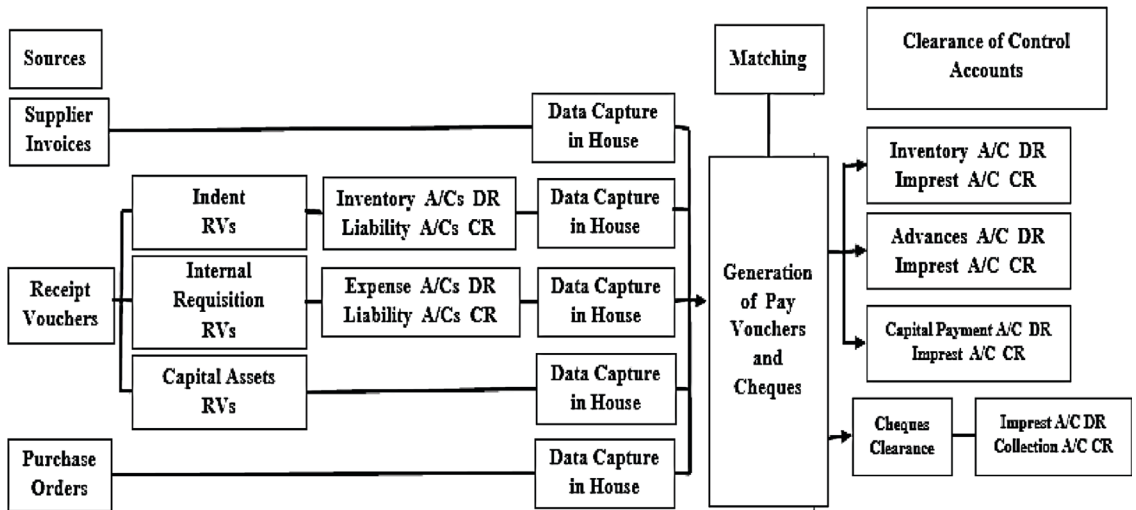
Appendix B: Foreign Invoices and Receipt and Issue: Accounting Flow Chart