

Integrated Financial Management and Accounting System : A Conceptual Model Using Relational DBMS Approach

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Abstract

This paper describes the conceptual model of an integrated financial management and accounting system (FIMAS) in terms of its objectives, system architecture, process, input and output. The design is based on a case study carried out at Penang Regional Development Authority (PERDA) and Development Authority of Pahang Tenggara (DARA). Both commercial and cash accounting systems are integrated in the model to meet the operational needs of the organisations. The integrated system includes expenditure sub-system, payroll sub-system, allocation sub-system, investment sub-system and billing sub-system. The relational database approach was adopted in the model design to enhance the flexibility in financial data processing.

Abstrak

Kertas ini menerangkan suatu model berkonsep sistem perakaunan dan pengurusan kewangan bersepadu dari segi objektifnya, senibina sistem, proses, input dan output. Rekabentuk ini adalah berdasarkan suatu kajian kes yang telah dijalankan di Lembaga Kemajuan Wilayah Pulau Pinang (PERDA) dan Lembaga Kemajuan Wilayah Pahang Tenggara (DARA). Kedua-dua sistem perakaunan, i.e. sistem tunai dan perdaagangan, telah disepadukan dalam model ini untuk memenuhi keperluan operasi organisasi tersebut. Sistem bersepadu ini termasuk sub-sistem perbelanjaan, sub-sistem gaji, sub-sistem peruntukan, sub-sistem pelaburan dan sub-sistem bil. Pendekatan pengkalandata hubungan telah digunakan dalam rekabentuk model untuk menambahkan fleksibiliti dalam pemprosesan data kewangan.

Keywords : *Relational Database, Accounting, Finance, Information System, Commercial Accounting, Cash Accounting, Conceptual Model, Payroll, Allocation, Expenditure, Billing, Integrated System*

1. Introduction

Financial management and accounting system has been given a priority due to the need for better control and management of the financial affairs of an

organisation. There are two major types of accounting system, i.e. commercial and cash accounting systems. Majority of the government agencies practise cash accounting and private sectors practise commercial accounting. However, there are a few government agencies practise both commercial and cash accounting because of its area of jurisdiction and functions. The need for better financial management and accounting system is more demanding for continuous monitoring and optimisation of its financial resources.

The objectives of the FIMAS are (i) to record and monitor the financial expenditure, (ii) to record, monitor and facilitate the process of revenue generation, (iii) to record and monitor the financial allocation, and (iv) to record and monitor the financial adjustment in the financial resources.

2. System Overview

The system consists of five sub-systems, i.e. (i) Expenditure sub-system, (ii) Payroll Sub-system, (iii) Billing sub-system, (iv) Allocation sub-system, and (v) Investment sub-system. Figure A illustrates the association of the sub-systems. The expenditure sub-system deals with the storage, retrieval and processing of information relating to expenditures which are effected through the various established documents such as local order, travel warrant and work indent. Any transaction of such expenditures will automatically update the cashbook and expenditure ledgers.

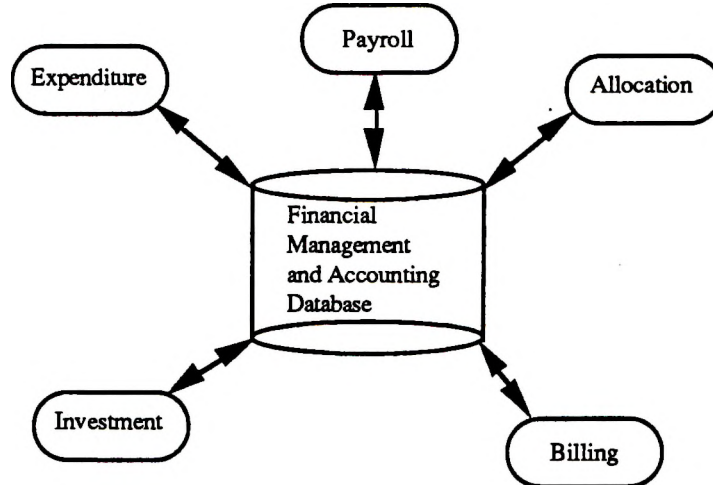


Figure A : Basic Components of FIMAS

The payroll sub-system is responsible for the preparation of salary which includes claims, allowances, deductions and generation of payroll reports. To facilitate the collection of revenues such as sales of products, the billing sub-system is included in the system. This sub-system will among others be able to monitor overdue payments and credit rating of the corporate customers. The allocation that has been received need also to be monitored. This sub-system in conjunction with the expenditure sub-system will help to monitor

expenditures according to projects, its location and details object codes. The investment sub-system deals with the monitoring of investment.

These sub-systems are linked to each other through **revenue** ledgers, **expenditure** ledgers and **cashbook**. These components formed the focal point of the Integrated Financial Management and Accounting System. Figure B illustrates the general overview of the system.

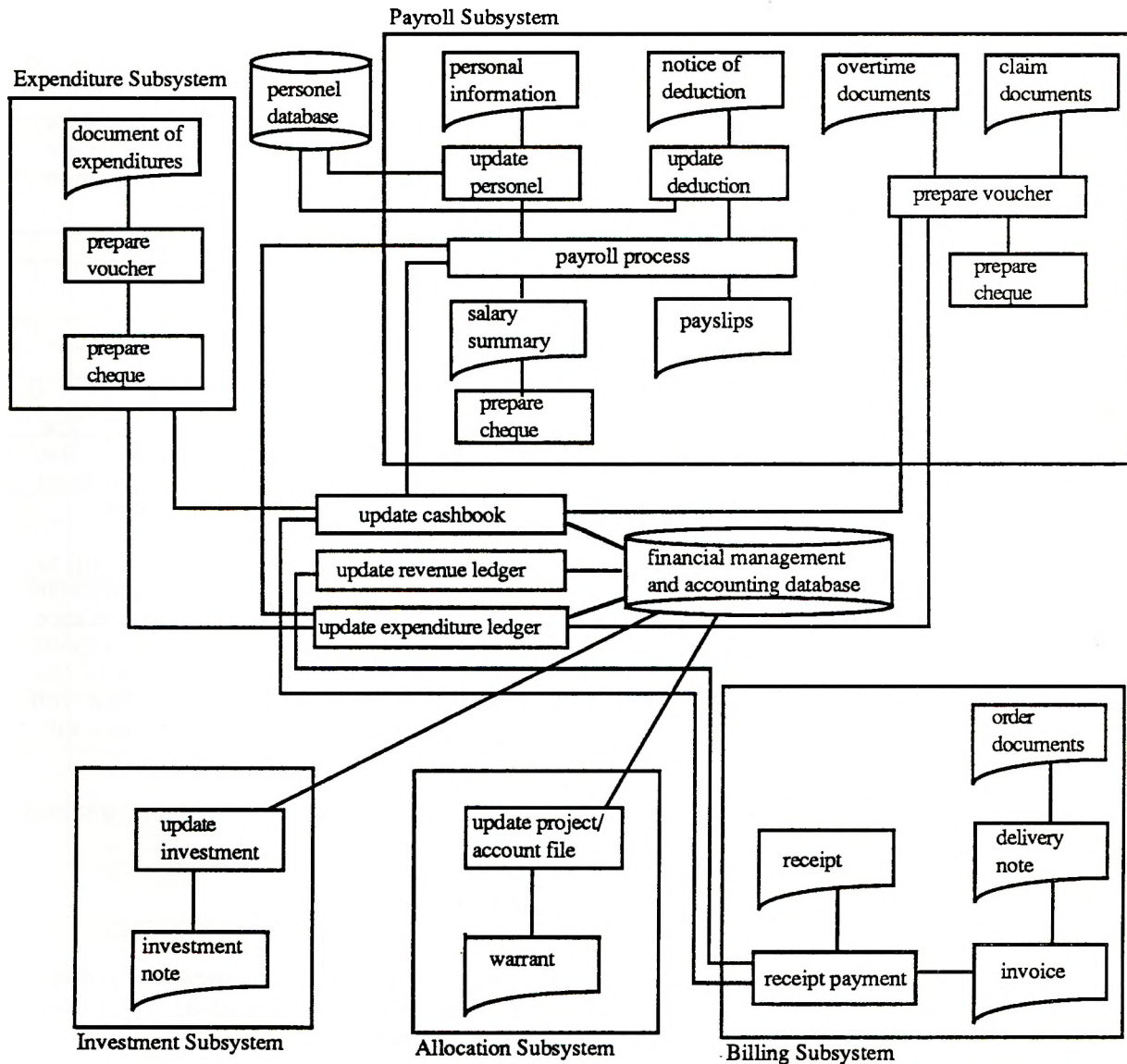


Figure B : Overview of Financial Management and Accounting System

2.1 Database Approach

The approach adopted in designing FIMAS is a relational database approach. This was taken due to the need for a certain degree of flexibility in the file intergration and manipulation. Another consideration in the design is that the system could be implemented using fourth generation language such as ORACLE or INFORMIX which offers relational data modelling.

2.2 Data Types and Structures

There are various data items gathered during the investigation phase. As a result of analysis, i.e. subject classification and synonyms analysis, there are 47 files identified necessary in the system. Table 1 shows the classification and the purpose of each file with respect to the various sub-systems.

3. Sub-systems of FIMAS

3.1 Expenditure Sub-system

The overview of the expenditure sub-system is illustrated in Figure C. The shaded symbols indicate the common attributes among the sub-systems. The sub-system has four main processes involved, i.e. issuance of requisition documents, processing of payments and updating of expenditure ledgers.

The aim of the expenditure are (i) to monitor the status of expenditure, (ii) to monitor the status of financial liability, (iii) to monitor the status of particular order with respect to delivery and payments, (iv) to monitor the performance of suppliers with respect to delivery and payments, and (v) to generate reports relating to expenditures and financial liabilities. The file structure of the expenditure sub-system is summerised below. These files in conjunction with expenditure ledgers, cashbook, and project files make up the expenditure sub-system.

supplier (id, name, addr, status, class, head, business type, bank, phone, reg no, valid)

supplier-head (head, subhead, detail, code)

supplier-class (head, subhead, ddetail, code)

business-type (code, name)

requisition-LO (number, date, supplier-id, detail, quantity, price, nett-price, vote-no, project-no, sector-code, location-code, object-code, req-ref, treasury-contract, dept-contract)

object-code (code, detail)

requisition-indent (number, date, supplier-id, detail, quantity, nett-price, project-no, sector-code, location-code, object-code)

requisition-warrant (type, number, date, icno, amount, project-no, sector-no, location-code)

requisition-contract (number, date, supplier-id, detail, quantity, price, nett-price, projecct-no, sector-code, location-code, object-code, req-ref, treasury-contract, dept-contract)

requisition-misc (ref-no, account-no, sector-code, location-code, object-code, amount, date, ic-receiver, supplier-id)
voucher (number, date, source-doc, doc-no, receiver-id, supplier-id, invoice-no, account-no, sector-code, location-code, allocation-yr, object-code, amount-total, amount-reduction, amount-nett, cheque-no, approval-no, ccheque-date, financil-yr, detail, bank-code)
receiver (icno, name, addr)

| N o. | Table Name | Purpose of Table |
|-------------|---------------------------------|---|
| A | Table for all subsystems | |
| 1. | Expenditure Ledger | Maintain records of all expenditures that have incurred |
| 2. | Cashbook | Maintain all records of all cash incurred |
| 3. | Revenue Ledger | Maintain all revenue records that have been generated |
| 4. | Project/Account | Maintain all project or account types |
| B | Expenditure Subsystem | |
| 1. | Supplier | Maintain records of supplier of goods and services |
| 2. | Supplier class | Keep records of class of supplier |
| 3. | Business type | Maintain names and codes of supplier's types of business |
| 4. | Requisition - local order | Keep records of services made through local order |
| 5. | Requisition - Indent | Keep records of services secured through work indent |
| 6. | Requisition - warrant | Keep records of services secured through warrant |
| 7. | Requisition - Contract | Keep records of goods and services secured through contract |
| 8. | Requisition - miscellaneous | Keep records of goods and services secured through others |
| 9. | Voucher | Keep records of vouchers made for payments |
| 10. | Individual receiver | keep records of receivers of payments |
| C | Payroll Subsystem | |
| 1. | Personnel | Maintain information of personnel |
| 2. | Deduction | Maintain information of personnel salary deduction |
| 3. | Recipient of deduction | Maintain information of the recipient of deduction |
| 4. | Allowance codes | Maintain codes of all allowances |
| 5. | Overtime | Keep details of overtime records of staff |

| | | |
|--|-----------------------|---|
| 6. | Transport/travel | Keep mileage and travel allowaances for individual staff |
| 7. | Type of deduction | Maintain names and codes od deductions |
| 8. | Location | Keep names and codes of location of departments |
| 9. | Scheme of service | Keep names and codes of scheme of service |
| 10. | Occupation type | Keep names and codes of occupation |
| D Billing Subsystem | | |
| 1. | Customer | Maintain recordds of corporate customers |
| 2. | Order | Maintain records of orders receive from customers |
| 3. | Invoice | Maintain records of all invoices to customers |
| 4. | Order item | Keep names and codes of items in stock/sales |
| 5. | Reciept | Keep record of payment received |
| 6. | Properties | Maintain records of properties |
| 7. | Order unit | Keep names and coeds of units of item |
| No. Table Name Purpose of Table | | |
| E Allocation Subsystem | | |
| 1. | Allocation | Maintain records of allocation for specific project/account |
| 2. | Project/Account | Maintain names and codes of project/account types |
| 3. | Virement | Maintain records of all virements done |
| 4. | SETIA | Maintain records of SETIA projects |
| 5. | Kawasan perkhidmatan | Keep names and codes of parliamentary constituency |
| 6. | Kawasan ADUN | Maintain names and codes of state constituency |
| 7. | Objective Pembangunan | Maintain names and codes of development objectives |
| 8. | Seektor | Maintain names and codes of sectors |
| 9. | Loan sources | Keep names and codes of loan sources |
| 10. | Consultant | Maintain names and codes of registered consultants |
| 11. | Implementation status | Maintain names and codes of implementation status |
| 12. | Problem | Maintain description and codes of problems |
| 13. | State /district | Keep names and codes of districts |
| 14. | Development | Keep descriptions and codes of development |
| F Investment Subsystem | | |
| 1. | Investment | Maintain records of all investment |
| 2. | Institution | Maintain names and codes of financial institution |

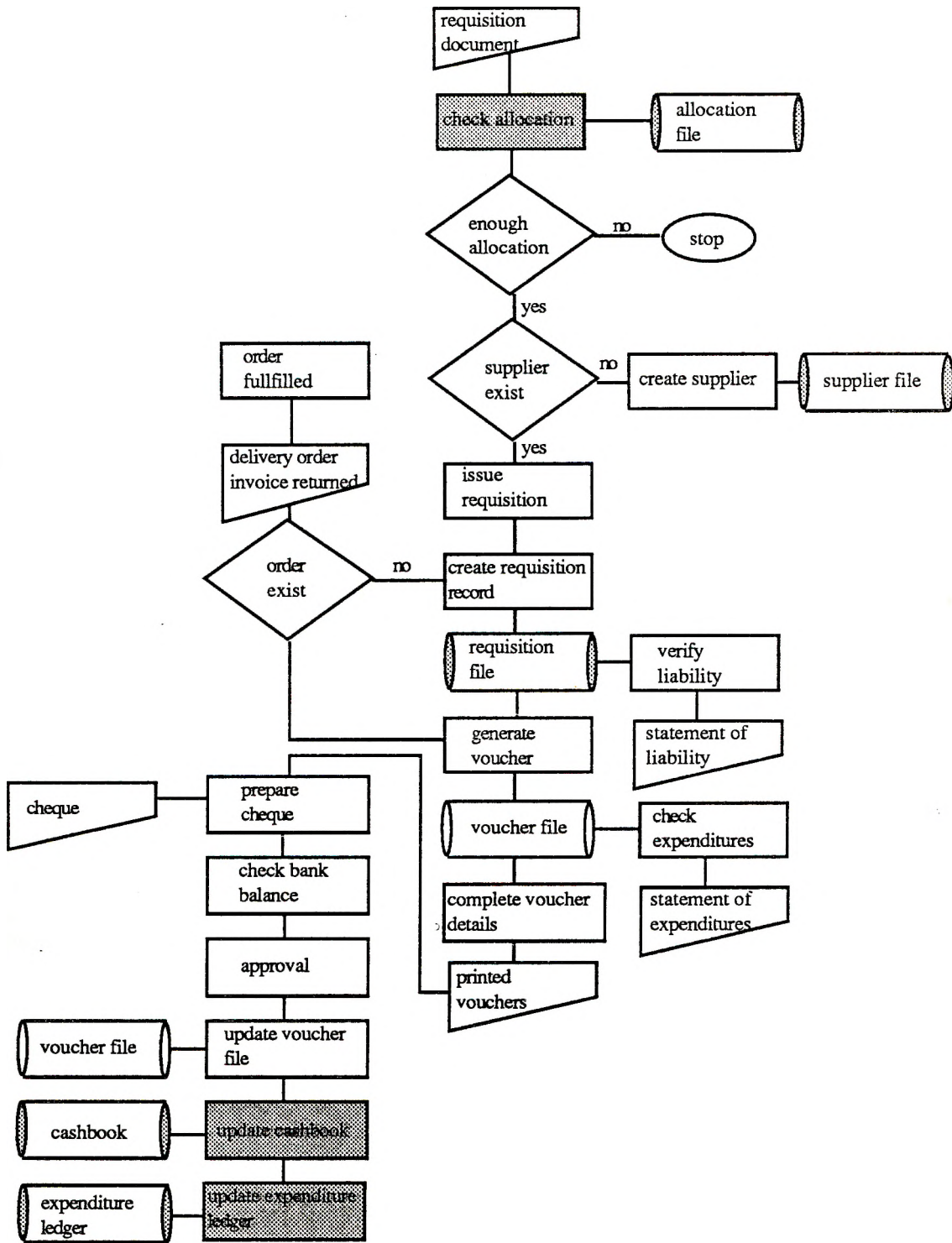


Figure C : Overview of Expenditure Sub-system

3.2 Payroll Sub-system

The overview of the payroll sub-system is illustrated in Figure D. The shaded symbols indicate the common attributes to all the five sub-systems. The sub-system involves updating of personnel file, updating deduction file, payroll preparation, cheque preparation, voucher preparation for payment of claims, updating expenditure ledgers, updating cashbook and updating advance ledgers.

The objective of the payroll sub-system are (i) to facilitate the preparation of payroll and travelling claims, and (ii) to generate salary summary, payslips and salary deduction. The file structure of the payroll sub-system is summarised below. These files in conjunction with expenditure ledgers, cashbook, and advance file make up the payroll sub-system.

personnel (*icno, name, title, sex, race, religion, marital-stat, birth-date, nationality, govn-hse-loan, ministry, dept, division, state-federal, scheme-service, occupation, grade, appointment-date, confirm-date, confirm-date-post, promotion-date, pension0benefit, salary-code, act-salary-code, basic-pay, increment-mth, allown-code, salary-no, bank-code, bank-account*)

deduction (*icno, deduct-type, deduct-receipiant, amount, ref-no*)

receipiant (*id, name, addr*)

allowance (*code, name*)

overtime (*icno, account-code, sector-code, location-code, month, year, amount*)

title (*code, name*)

location (*code, name*)

scheme-service (*code, name*)

occupation (*code, name*)

deduction-type (*code, name*)

3.3 Billing Sub-system

The overview of the billing sub-system is illustrated in Figure E. The shaded symbols shows the common attributes to all the sub-systems. The sub-system has four main processes involved, i.e. order processing, invoicing, processing receipt of payments and rental collection of premises.

The aim of the billing sub-system are (i) to monitor the status of revenue, (ii) to monitor the account receivables, (iii) to monitor the performance of corporate customers with respect to payment, (iv) to monitor the status of order, and (v) to generate reports relating to customers' orders, deliveries, billing and payments. The file structure of the billing sub-system is summarised below.

customer (*id-class, id-no, name, addr, status, class, phone-no, telex, bank, credit-limit, credit-status*)

order (*number, customer-id, project-no, sector-code, location-code, date, item, quantity, unit, amount, discount-amt, del-order-no, delivery-date*)

invoice (*number, order-no, date, ccustomer-id, delivery-no, invoice-amount, delivery-date, quantity, unit, total-discount, sales-tax*)

receipt (*number, project-code, sector-code, location-ccode, customer-id, invoice-no, object-code, amount, date*)

order-item (*code, name, class, type*)

properties (*icno, name, account-no, premis-no, project-no, sector-code, location-code, premis-type, race, addr, phone-no, lot-description, deposit*)

3.4 Allocation Sub-system

The overview of the allocation sub-system is illustrated in Figure F. The shaded symbols shows the attributes that are common to the five sub-systems. The system has three main processes involved, i.e. receipt authority with respect to expenditure, updating of allocation file, updating of project/account file and updating of virement

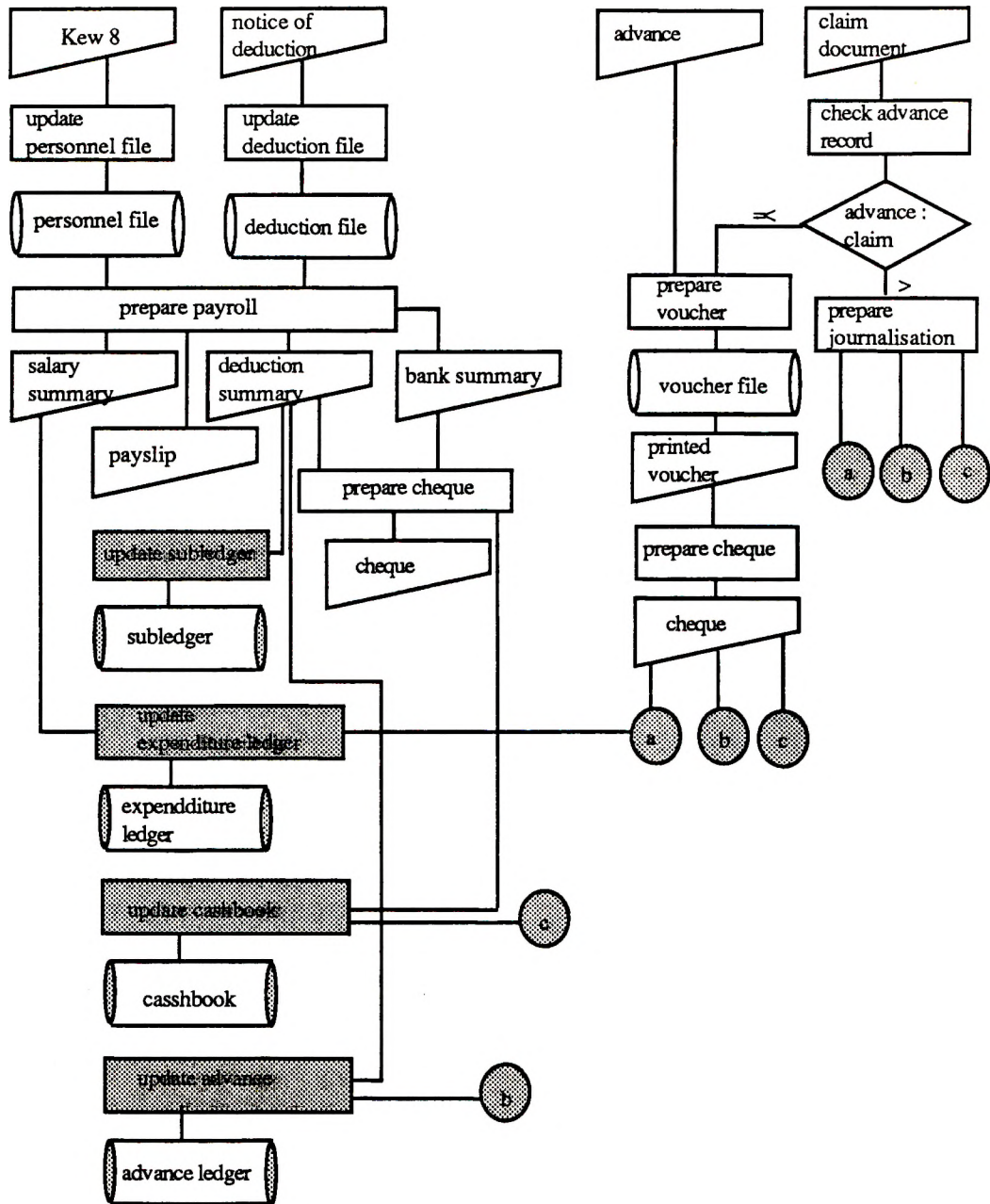


Figure D : Overview of Payroll Sub-system

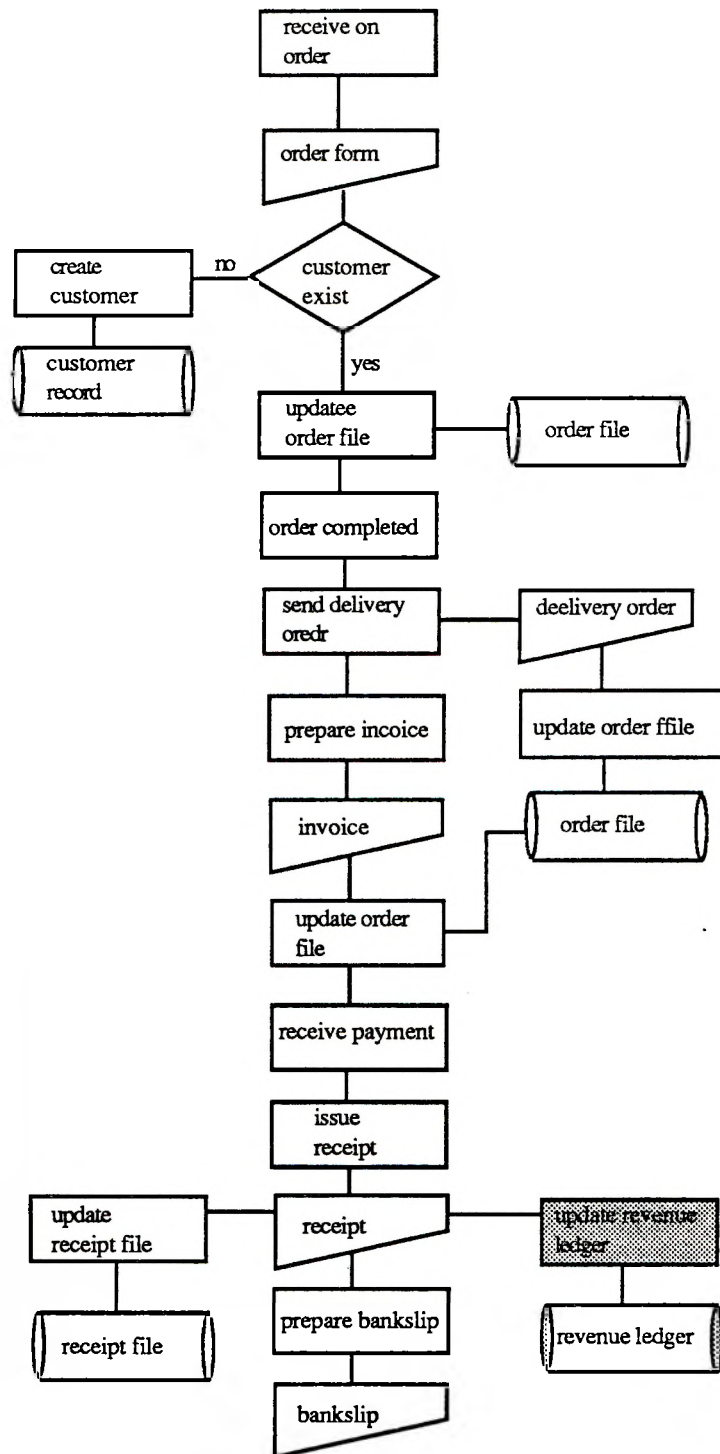


Figure E : Overview of Billing Sub-system

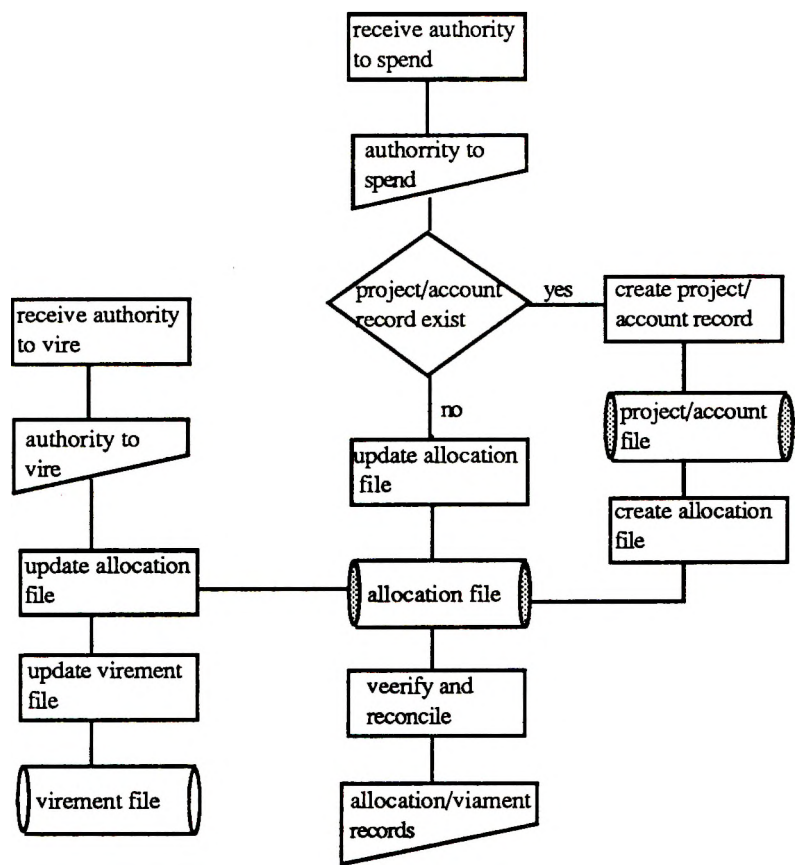


Figure F : Overview of Allocation Sub-system

The aim of the allocation sub-system are (i) to monitor the allocation of particular projects or account types, and (ii) to monitor the virement of allocation from one project or account type to another. The file structures of the allocation sub-system is summarised below.

project-account (project-no[monetary-group, grant, program-code, subprogram-code, activity-code], sector-code, location-code[district-code, place-code, kampong-code], project-name)

SETIA (project-code, ministry-code, dept-code, executive-agency, development-code, detail, project-seriel, project-name, project-sccope, project-title, project-detail, state, district, project-location, physical-code, development-objective, sector, start-date, expect-comp-date, act-start-date, act-comp-date, loan-source, loan-no, consultant, implementation-status, complete-pct, problems, contractor-reg-no, class, contract-no, contract-value, project-cost-est, federal-source, state-source, other-source, act-expenditure)

virement (project-no, virement-code, sector-code, location-code, object-code, year, amount, virement-date)

allocation-received (project-no, sector-code, location-code, alloc-year, amount)

allocation-approval (project-no, sector-code, location-code, alloc-year, object-code, amount)

3.5 Investment Sub-system

The overview of the investment sub-system is illustrated in Figure G. The sub-system has two main processes involved, i.e. receipt of investment documents, and updating of investment file.

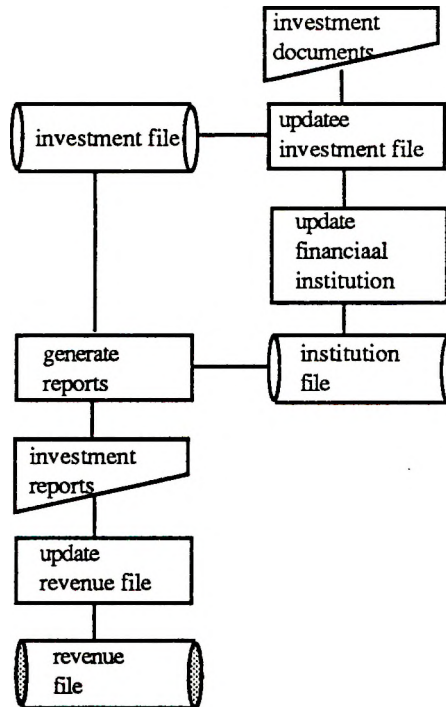


Figure G : Overview of Investment Sub-system

The aim of the investment sub-system is to monitor the investments made and revenues from investment. The file structures of the investment sub-system is summarised below.

Investment (*type, institution-code, amount, period, rate, invest-date, maturity-date, savings-no, seriel-no*)
Institution (*code, name, type*)

4. Concluding Remarks

Financial information system is no doubt very important in any organisation. Wise and systematic management of financial resources is an important success factor in an organisation. For an organisation which operates both cash and commercial accounting such as agencies under the Ministry of Land and Regional Development, the need for more systematic intergration of financial and accounting management is critical for better financial monitoring purposes.

A conceptual model of an intergrated financial and accounting management system is designed to accommodate both commercial and cash accounting systems using relational database approach. It is observed that relational approach allows a wider scope of flexibility in data manipulation to fullfilled the needs of financial reporting and monitoring system requirements of such organisations. **The expenditure ledgers, revenue ledgers, cashbook and project/account files facilitate the intergration of the sub-systems.** The study demonstrates that a complete and working financial reporting and monitoring system can be developed for such organisations which operates both accounting systems.

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