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SAP FI optimizes Financial Accounting performance

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This research was to investigate the components of SAP ERP Financial Accounting module and its main functions in order to find out how SAP FI optimizes financial accounting performance.

There were two theoretical parts: SAP ERP system and financial accounting. In the first part, there was a short introduction of SAP Company and its products, illustration of the components of SAP ERP, accounting module and FI module and summarization of main features of SAP system. In the second part, the financial accounting process and financial analysis tools and their limits were described.

In the research part, the focuses were put on the investigation of main components and key functions of FI four basic sub modules which are FI-GL, FI-AR, FI-AP, and FI-AA.

The research results found that SAP FI optimized financial accounting performance through providing high quality accounting information, multi-dimensional and extended analysis and report tools and accelerating decision-making process.

These findings could help decision makers to improve their financial performance and web-developers to improve the design of financial functions, and also could be used by students or researchers who are studying or interested in ERP FI module.

Key words

SAP ERP, R/3, ECC 6.0, Integration, Standard System, FI module, General Ledger, Accounts Payable, Accounts Receivable, Assets Accounts.

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1 Introduction

In this chapter author introduces the background information of the thesis topic and the research goals and scope including SAP ERP and SAP FI module which is one of the most important sub module in SAP accounting module. Then the author lists the terminologies that are frequently used in this thesis.

1.1 Background information

"The benefits lie in the visualization of processes, resulting in improvement of communication and higher transparency." LUHNS Gmbh said when answering the survey of SAP R/3. (Curran, T. & Keller, G. with Ladd, A. 1998, xxviii.)

Since the beginning of 1990s, most companies in the world are taking advantages of information technology (IT) to radically improve their business conductions. In the past, IT was used simply to automate existing business functions, but nowadays IT can fundamentally improve business operations. (Curran, T. & Keller, G. 1998, xix-xx.)

In the early of 2000s, the main form of management information system for enterprise was enterprise resource planning (ERP). However, with the development and application of ERP system, it provides a new information environment for corporate finance and accounting management. The traditional accounting information system (computerized accounting software), like an "isolated information island", cannot meet the requirements of modern enterprise development any more. (Jones, P. & Burger, J. 2009, 7-8.)

SAP, as the global leader of ERP system, is famous for its integration, real-time control and centralized data storage and thus has been called as management master of companies. SAP ERP system is a configurable and standard ERP software system for distributed client / server environment, and its function covers accounting, logistics (purchase, inventory, production, sales and quality, etc.) and human resource management, internet applications link function and so on. SAP ERP system is the one source of information integration systems through integrating above-mentioned functional modules and realizes the full utilization of SAP database. (Jones, P. & Burger, J. 2009, 7-8; Hernández, J. 2000, 38-47.)

1.2 Research scope and goals

The research scope of this thesis includes the theory knowledge of SAP ERP in operating layer, the theory knowledge of financial accounting and the research of Financial Accounting (FI) module of SAP ERP. The author uses SAP R/3 as the main research object and uses the ECC 6.0 which is SAP ERP 2005 issued by SAP in 2005 as minor research object, and all the researches are only in the operating layer, not related with technological layer.

"The business modules in R/3 and ECC are almost the same, and only the arrangement and specific configuration of each module helps differentiate R/3's somewhat vertically oriented deployment methodology over ECC's more horizontally orientated and much ex-tended approach." (Anderson, G. & Larocca, D. 2005, 144.) Therefore using both R/3 and ECC 6.0 as the research objectives will not lead to conflicts in the final research results.

ERP system provides a new information environment for corporate finance and accounting management. This thesis investigates how the main functions provided by SAP FI module to complete financial tasks?

Therefore, the research aim is to answer how SPA FI module optimizes financial accounting performance?

In the theory part of SAP ERP, there is a short introduction of SAP Company and its products, illustration of the components of SAP R/3, R/3 accounting module and FI module which is one of the most important sub modules in SAP ERP accounting module and summarization of main features of SAP ERP which will be frequently used and support the research of FI module.

In the theory part of financial accounting, the process of financial accounting, analysis tools of financial statement and their limitations are written there.

In the research of SAP FI module, the focuses are put on the investigation of main components and key functions of FI sub module which are FI-GL, FI-AR, FI-AP, and FI-AA. The components and part functions of above four sub modules are based on R/3 knowledge, and

some functions are based on ECC 6.0, meanwhile the research of SAP FI module is implemented in ECC 6.0.

1.3 Terminology

SAP R/3

SAP R/3 is a client/server ERP system issued by SAP Company in 1992, and it is one of the core SAP products. (Hernández, J. 2000, 14.)

ECC 6.0

SAP ECC is known as the SAP ERP components as its core component, which is the updated products of SAP R/3 system, provides data processing place for business transactions. ECC 6.0 is SAP ERP 2005 issued by SAP in 2005. (Jones, P. & Burger, J. 2009, 2.)

SAP FI module

SAP FI module is one of the most important sub modules of SAP accounting module. It contains General Ledger (FI-GL), Accounts Receivable (FI-AR), Accounts Payable (FI-AP), Asset Accountings (FI-AA), Bank accounting (FI-BL), Special Purpose Ledger (FI-SL) and Funds Management (FI-FM). (Hernández, J. 2000, 38-41.)

Financial Accounting

"Accounting is a process of identifying, recording, and summarizing economic information and reporting it to decision makers. Financial accounting focuses on the specific needs of decision makers external to the organization, such as stockholders, suppliers, banks and government agencies." (Horngren, C., Sundem, G., Elliott, J. & Philbrick, D. 2006, 4.)

GAAP

"General Agreed Accounting Principle is the term that applies to all the broad concepts and detailed practices to be followed in preparing and distributing financial statements. It includes all the conventions, rules and procedures that together comprise accepted accounting practice." (Horngren, C. et al. 2006, 27.)

IFRS

"International Financial Report Standards are sets of standards promulgated by international accounting standards board (IASB), an international standard-setting body based in London, United Kingdom." Most of listed or global companies are using IFRS. (Mirza, A. & Holt, G. 2011, 2.)

General Ledger

"The collection of accounts that accumulate the amounts reported in the major financial statements." (Horngren, C. et al. 2006, 94.)

COA

"Chart of accounts is a number or coded list of all account title." (Horngren, C. et al. 2006, 97.)

Accounts Receivable

"Amount owned to a company by customers as a result of delivering goods or services and extending credit in the ordinary course of business." (Horngren, C. et al. 2006, 50.)

Accounts payable

Amount owned to a vendor by company as a result of receiving goods or services and extending debit in the ordinary course of business.

Fixed-Assets

"Fixed-assets are long –lived assets and physical items that you can see and touch, examples are land, buildings and equipment." (Horngren, C. et al. 2006, 367.)

Depreciation

"the systematic allocation of the acquisition cost of long-lived or fixed assets to the expense accounts of particular periods that benefit from the use of the assets."(Horngren, C. et al. 2006, 55.)

2 Theories concerning SAP system

2.1 General introduction of SAP Company

SAP is the abbreviation of systems, applications and products in Data Processing. SAP Company was founded in 1972 by five Germany engineers. Today, SAP has become a global leader in the field of business software and can provide business software solutions and services for more than 25 industries in different kinds of company size. It currently provides services and products for about 18300 customers and operates in more than 120 countries and regions, has 54,589 employees. The revenue of 2011, 2010 and 2009 were 14.232, 12.464 and 10.672 billion euro respectively, average increase rate of total revenue was about 14.5% in the last three years. (Jones, P. & Burger, J. 2009, 1-2. & SAP annual report 2011, 2-4.)

2.2 SAP products

SAP products are gradual evolved and improved step by step. SAP R/3 is one of the core SAP products in SAP Company and in the beginning it meant SAP ERP system. Now SAP provides a wide range of products, SAP ERP components as its central component, also known as SAP ECC, in fact, which is updated products of SAP R/3 system, provides data processing place for business transactions. (Jones, P. & Burger, J. 2009, 1-5.)

SAP 4.6C version and earlier versions belong to R/3 series; 4.7 version and later versions are called as R/3 enterprise. After that R/3 enterprise was replaced by the SAP ECC series.

ECC 6.0 is SAP ERP 2005 issued by SAP in 2005. Compared with R/3, the biggest differences between ECC 6.0 and R/3 are in technologies, while they are almost the same in operating layer. (Anderson, G. & Larocca, D. 2005, 144.)

SAP Company has issued a multi-functional product, which is the Business Warehouse (BW) or Business Intelligence (BI). It provides a series of reporting tools and functions through utilizing its database.

In addition, SAP provides the following main software suites: Supply Relationship Management, Strategic Enterprise Management, Supply Chain Management, Customer Relationship Management and Product Lifecycle Management. (Jones, P. & Burger, J. 2009, 1-5.)

2.3 SAP ERP structure and features (in operating layer)

R/3 and ECC contains many business modules, all of which are almost the same in R/3 and ECC version and highly integrated with each other. These business modules are designed for different business demands and represent different business function areas. (Anderson, G. & Larocca, D. 2005, 144-145.)

2.3.1 SAP ERP Structure

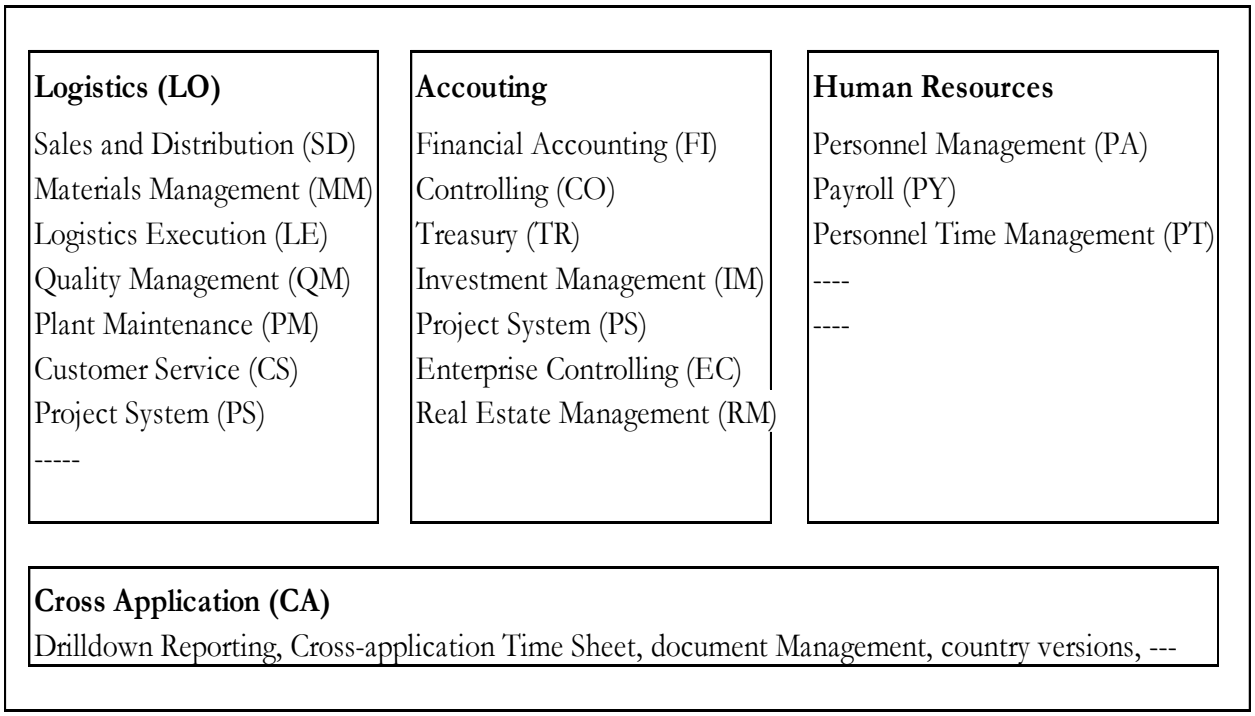


Figure 1. SAP R/3 Structure in Operating Layer

SAP R/3 system has three layers: strategic layer, operating layer and technical layer. The operating layer contains the following four functional modules, including logistics, accounting, human resources and cross application module. The first three modules are also known as 'Industry solutions', while cross application module lists the common functions among logistics, accounting,

and human resources, such as document management and business workflow. (Hernández, J. 2000, 38-47.)

2.3.2 SAP ERP accounting structure

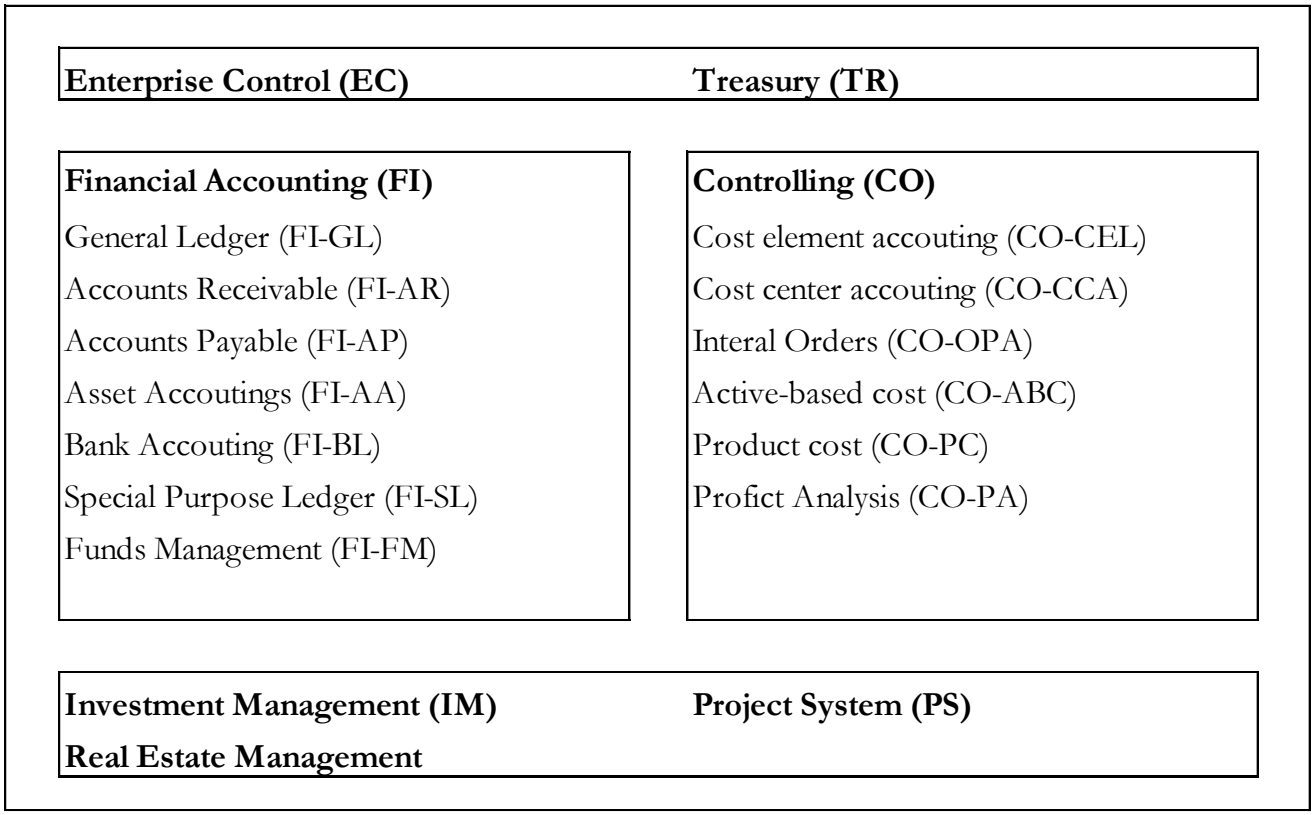


Figure 2. SAP R/3 Accounting Structure (Hernández, J. 2000, 38-41.)

The latest SAP structure can be found at http://service.sap.com/quicker-sizer. (Anderson, G. & Larocca, D. 2005, 145.) The appendix 1 is SAP menu in ECC 6.0 which provides the components of SAP ERP, accounting module and finical accounting module.

2.3.3 Main features of SAP ERP system

All modules in the SAP ERP system are designed for the mutual sharing of information resources, and automatically update relevant transaction data through their own business processes. Meanwhile all the sub modules within SAP system inherits SAP features, which means that all the following features of SAP system are the features of SAP accounting module as well.

2.3.3.1 Integration

SAP ERP system is a company-wide application with high integration, meaning that all modules within the SAP ERP system are designed to share information and create transactions based on business starting points automatically. All source data are only needed to enter into the system once, which ensures the data consistency, and data can be shared among all related business modules. (Nowak, D. & Hurst, Q. 2000, 2.)

For example, company A receives goods, after which it will receive purchase payment invoice. When user inputs the invoice into system (here we assume that user uses manual input setting), system will automatically check the information in purchase order, reception and input invoice information to confirm whether the information of unit price, quantity, date and some other common information are the same in these three documents. If they are not, the system will inform the incorrect information to user; if they are, the invoice will pass the check and enter into payment status. The related data can be shared in all business parts and business transactions can be visualized in operating layer, so accountant does not need to check invoice information with purchaser manually. Meanwhile if warehouse confirm the goods receipt in the system, then system will automatically generate a payment invoice for supplier and reference account payable and general ledger will automatically updated as well.

2.3.3.2 Standard system

SAP ERP system is developed from standard management software plants which are based on ISO and Capability Maturity Model (CMM), rather than developed in the implementation of the system in the customer office, meanwhile through using standard Business Application Program Interfaces (BAPIs), SAP R/3 offers business framework architecture and open integration with other components. (Hernández, J. 2000, 27.)

Various industries, types of business, company scale, and business combination will enable customers to have different kinds of needs. Then people may ask: how SAP uses only one standard system to meet different kinds of needs from customers? To achieve this goal, actually SAP uses the following two principles, one is that SAP ERP is a configurable system and another is that SAP ERP system is based on best practices. (Jones, P. & Burger, J. 2009, 7-8.)

Firstly, SAP is a configurable system which typically builds many changeable parameters that combine different solutions and let the system work according to various customer needs, For example, users can choose the type of inventory accounting FIFO or LIFO, or whether to recognize revenue by geographical unit, product line or distribution channel, or whether to pay for shipping costs when a customer returns a purchase to realize their different needs. (Nowak, D. & Hurst, Q. 2000, 4.)

Secondly, the SAP system is based on best practices. "It offers a better view of what SAP is able to cover and examples of 'best practices'." (Curran, T. & Keller, G. with Ladd, A. 1998, xxviii.) This means that SAP absorbs the advanced management ideas and best business process model of different industries into system. After more than 30 years' accumulation, SAP system has standard solutions for different kinds of industries. Today SAP provides business software solutions and services for more than 25 industries, has about 18300 customers and operates in more than 120 countries and regions.

Companies that implement industry best practices can reduce the time of conducting consuming tasks such as configuration, documentation, testing and training. In addition, best practices can highly reduce risk when compared to other software implementations.

2.3.3.3 Paralleled reporting of each sub module

SAP accounting module adopts paralleled reporting principle and it contains several sub modules, like financial accounting, controlling and so on. Each sub-module has different functions but they can work in a paralleled way in accounting module. Similarly, the different solutions in the sub modules work in parallel. (Wang, W. & Sun, J. 2005, 9-10.) The original is (王纹 & 孙健 2005, 9-10.)

Here I use SAP depreciation solution as an example to explain parallel reporting feature of SAP ERP system.

A is a Chinese company and lists in New York stock market, now it should submit its financial report to both Chinese Tax Bureau which is based on PRC GAAP and American Securities Regulatory Agency based on IFRS. However, PRC GAAP and IFRS have different principles on

fixed asset depreciation, so how company A adjusts its PRC GAAP financial report automatically into IFRS financial report?

Here I assume that all the other standards in PRC GAAP and IFRS are the same, only the accounting principle of fixed asset depreciation is different.

The SAP system has three parallel depreciation solutions, one for PRC GAAP principle, the other for IFRS principle, and the third one for IFRS adjustment which indicates the difference between PRC GAAP depreciation and IFRS depreciation. The amount of IFRS Adjustment is that IFRS depreciation minus PRC GAAP depreciation.

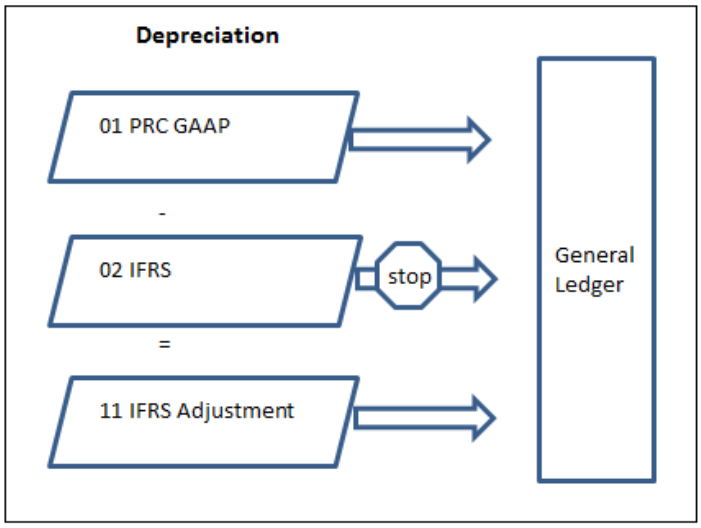


Figure 3. SAP ERP depreciation solution for IFRS (Wang, W. & Sun, J. 2005, 7) the original is (王纹 & 孙健 2005, 7.)

When operating depreciation solution, these three solutions work in a paralleled way and the posted data of PRC GAAP solution and GAAP adjustment solution will be directly sent to general ledger account, while the data of IFRS solution will not be updated in general ledger.

When handling depreciation accounting, the SAP system uses above three depreciation solutions to calculate depreciation and automatically record in PRC GAAP and IFRS adjustment accounts. When preparing financial report, the SAP system has PRC GAAP financial report and IFRS adjustment accounts automatically. The PRC GAAP financial reports will be adjusted according to IFRS requirements and thus used as IFRS financial report. (Wang, W. & Sun, J. 2005, 7)

2.3.4 Summary

As described in the integration part, SAP ERP system realizes the full integration of all vital business processes. Data are highly shared among all modules within the system and any data modification will be updated automatically in the relevant module as well.

As described in standard and parallel reporting part, SAP system is built based on the "best practice" which helps SAP system know customers' demands, and the configuration allows SAP to use one standard system to meet customers' different needs through solution combination.

Accounting module is one of the most important components in SAP system, and meanwhile it has many sub-modules, such as: Financial Accounting (FI), financial management, banking applications, treasury, controlling (CO), investment management, project system, additional features and so on. Here I choose FI module as the research objects to analyze its functions, and how these features affect and optimize financial accounting performance. I will investigate this intelligence in the chapter 5 through implementing the research of FI module.

3 Theories concerning financial accounting

"Accounting is a process of identifying, recording, and summarizing economic information and reporting it to decision makers. Financial accounting focuses on the specific needs of decision makers external to the organization, such as stockholders, suppliers, banks and government agencies." (Horngren, C. et al. 2006, 4.)

In this chapter, the accounting process is introduced first, followed by some financial analysis tools which assist to decision-making and limitations of these financial analysis tools.

3.1 Accounting process

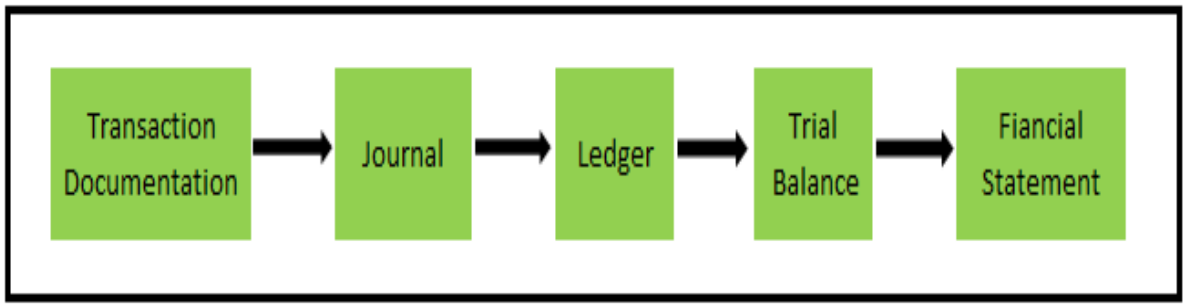


Figure 4. Accounting process (Horngren, C. et al. 2006, 149.)

3.1.1 Checking documents

In financial accounting, the first step is to check whether the business transaction documents are true and correctly reflect business transaction. (Horngren, C. et al. 2006, 97.) This step is extremely important for internal audit.

Usually the transaction documents are the original records of each transaction, and they usually include the transaction data, events, transaction value, and quantities. For example, if a company purchases a car, then it will generate a purchase document for this purchasing business, which contains the information of purchasing date, price, vendor information, car model and so on.

3.1.2 Journalizing transactions

The second step of accounting process is journalizing transactions. Journalizing transactions mean recording business transactions into right account, meanwhile this journal entry should be identified whether into debit or credit side, therefore journalizing transaction is also an analysis process. (Horngren, C. et al. 2006, 97, 99.)

Usually the journal temple includes business transaction data, the explanation of business events, account number, account name, debit and credit column. One account number has a unique account name that reflects which accounts have been affected by the recorded business transaction.

For example, the company purchased LV products in 3.1.2012, and paid rent fee in 5.1.2012, and then we can make journal recording as following:

Table 1. Example of Journal entry

Doc	Date	Events	Accounts number	Accounts name	Debit	Credit
1	3.1	Purchase LV	4004	Purchase	30,000	
1	3.1	Purchase LV	2873	A.P		30,000
2	5.1	Payment for rent	1910	bank acount1	-1,250	
2	5.1	Payment for rent	7234	rent on premises	1,250	

3.1.3 Posting journal to ledger

After journalizing business transactions, then the next step or step 3 is to post these journal records into ledger account, which means summarizing same account data and records this summarized data into this account, for example, the summarization and collection of all bank account journal amounts. (Horngren, C. et al. 2006, 99.)

Usually the ledger template has the same or similar template as journal entry. The following is the example of posting bank account 1 journal to ledger.

Table 2. Example of Journal to Ledger

Doc	Date	Events	Accounts numbe	Accounts name	Debit	Credit	Balance
2	5.1	Payment for rent	1910	bank acount1	-1,250		
5	7.1.	Money transfer fro	1910	bank acount1	35,000		
6	9.1.	paying AP	1910	bank acount1	-14,240		
7	11.1	Advertising expens	1910	bank acount1	-200		
8	12.1	paying advertising	1910	bank acount1	-700		
11	20.1.	Money transfer fro	1910	bank acount1	40,000		
12	20.1.	Salary payment	1910	bank acount1	-16,000		
13	21.1.	paying the electric	1910	bank acount1	-500		
14	22.1.	Receive payment f	1910	bank acount1	15,000		
16	31.1.	Money transfer fro	1910	bank acount1	45,000		
							102,110

After posting journal to ledger, one ledger account lists all the specific journal accounts and shows the balance value which is the sum of total journal accounts and which means the total changes happened in this account.

3.1.4 Trial balance

"Trial balance is a list of all accounts in the general ledger with their balances." (Horngren, C. et al. 2006, 97.) After all journal entries are posted to the ledger, the next step (step 4) is to prepare trial balance. There are two main function of trial balance: one is used to check whether the journal recording and ledger are correct by checking whether the sum of all debit items equals to the sum of all credit items, if they are not same, it means that some error happens in step 2 and 3, but even if they are the same, it does not necessarily mean that all the transactions in step2 and 3 are correct; the other is for the preparation of official financial statements. (Horngren, C. et al. 2006, 108.)

When preparing balance sheet, the first should list the accounts that belongs to the balance sheet, and then the accounts that belongs to the expenses and revenues. The sum of all the items of expenses and revenues means the obtained earning or net income for the current accounting period. (Horngren, C. et al. 2006, 111.) The following table is an example of trial balance sheet.

Table 3. Example of trial balance sheet

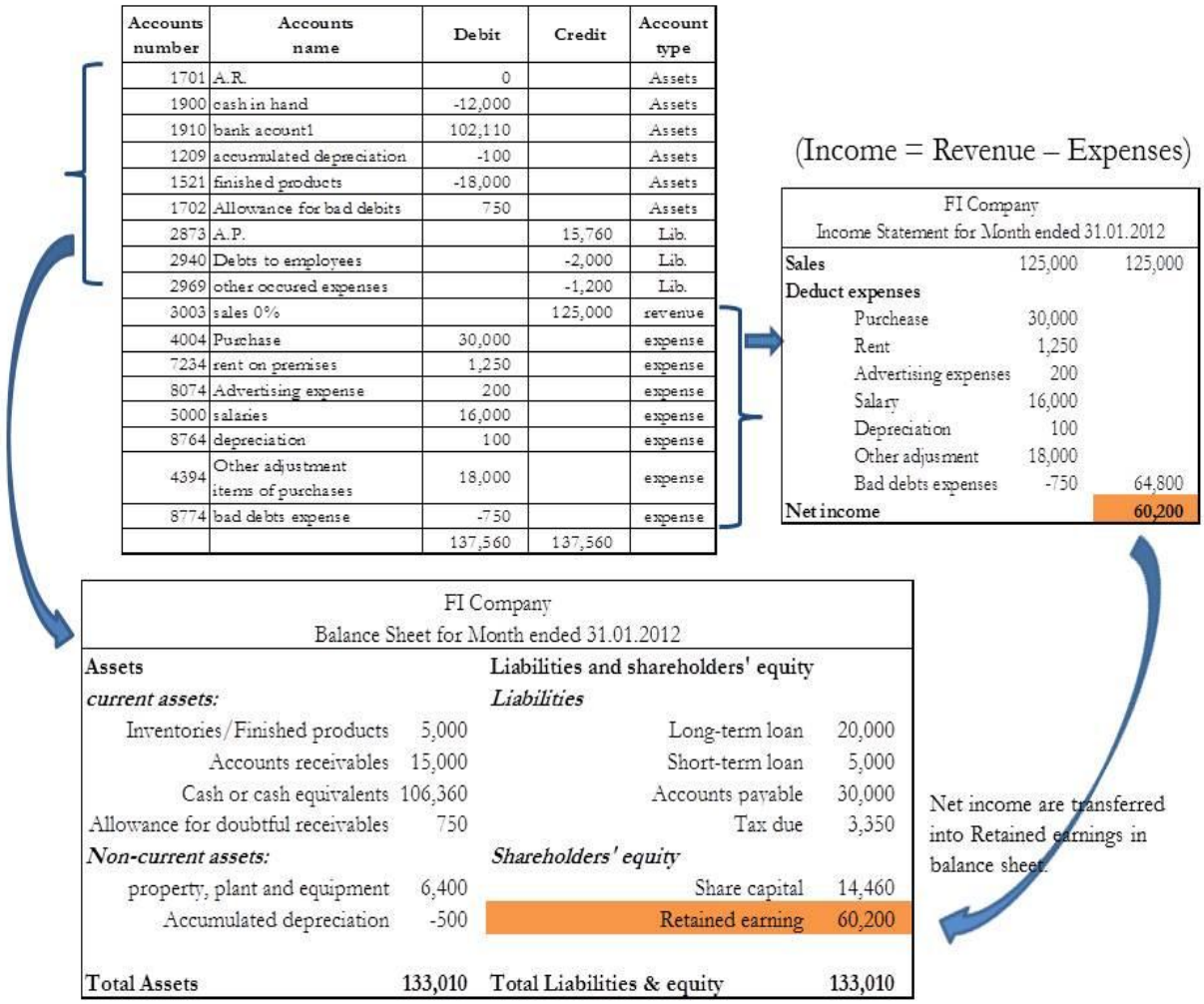
FI Trial Balance Sheet 31.01.2012				
Accounts number	**Accounts name**	**Debit**	**Credit**	**Account type**
1701	A.R.	0		Assets
1900	cash in hand	-12,000		Assets
1910	bank acount1	102,110		Assets
1209	accumulated depreciation	-100		Assets
1521	finished products	-18,000		Assets
1702	Allowance for bad debits	750		Assets
2873	A.P.		15,760	Lib.
2940	Debts to employees		-2,000	Lib.
2969	other occured expenses		-1,200	Lib.
3003	sales 0%		125,000	revenue
4004	Purchase	30,000		expense
7234	rent on premises	1,250		expense
8074	Advertising expense	200		expense
5000	salaries	16,000		expense
8764	depreciation	100		expense
4394	Other adjustment items of purchases	18,000		expense
8774	bad debts expense	-750		expense
		137,560	137,560	

As shown in above trial balance table, the sum of all debits equals to the sum of all credits. If they are not equaled, it means that there is something wrong in journal or ledger parts and the accountant must find out mistakes, otherwise accounting process cannot move forward. However, the same sum of credits and debits does not mean that all journal and ledger accounts are correct, but to some extent, trial balance is an efficient process to check the correctness of journal and ledger accounts.

Meanwhile the sum of revenue and expenses will be transferred to income statement, and items of balance sheet account represent the changes in these accounts during the current accounting period. This will be described in next process.

3.1.5 Financial statement

Usually the financial statement includes income statement, balance sheet, and cash flow statement. Here I just use the income statement & balance sheet as examples to illustrate the step of financial statement.



Accounts number	Accounts name	Debit	Credit	Account type
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1900	cash in hand	-12,000		Assets
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1209	accumulated depreciation	-100		Assets
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4004	Purchase	30,000		expense
7234	rent on premises	1,250		expense
8074	Advertising expense	200		expense
5000	salaries	16,000		expense
8764	depreciation	100		expense
4394	Other adjustment items of purchases	18,000		expense
8774	bad debts expense	-750		expense
		137,560	137,560	

Figure 5. Trial balance, balance sheet and income statement

After preparing trial balance sheet, income statement and balance sheet can be derived from the trial balance sheet. The first step is to prepare income statement, as shown in above graph the net income equals that the sum of all revenue items subtracts the sum of all expenses in the trial balance sheet (Net Income = Revenue – Expense). The next step is to prepare balance sheet (Ending balance = Beginning balance + Changes during the period), at the same time net income should be transferred into retained earnings in balance sheet, which is the reason why the income statement should be prepared before balance sheet. (Horngren, C. et al. 2006, 111-113 & 154-155.)

3.2 Financial statement analysis

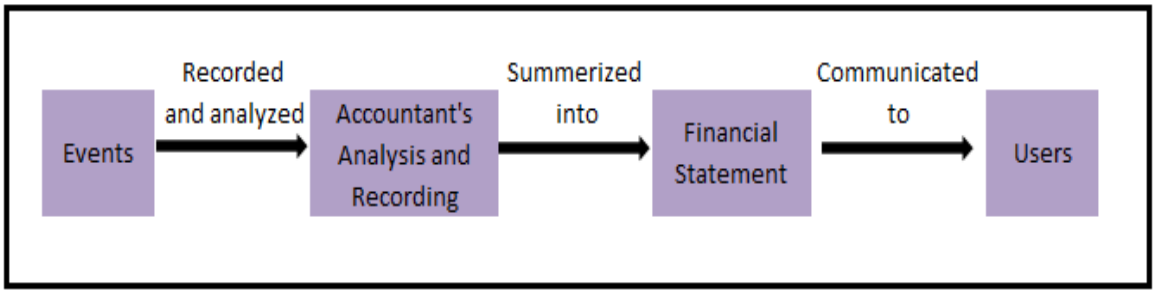

Figure 6. Basic relationships in decision-making process (Horngren, C. et al. 2006, 7.)

The aim of financial accounting is to assist information user to make decisions on how an investor evaluates a company and how managers measure their business performance.

There are three common analysis tools for financial statement: vertical analysis which presents financial-statement items to total revenue, horizontal analysis which measures the percentage changes from year to year, and ratio analysis which expresses the relationship of one number to another. The first two methods are used to make trend analysis, while ratio analysis is the main financial analysis tool and used to assist to business decision-making. At the same time, the above three analyses are based on the income statement and balance sheet. (Harrison, W., Horngren, C., Thomas W., & Suwardy, T. 2011, 784-796.)

In order to match with later chapters, the ratio analysis will be only introduced here while the horizontal analysis and vertical analysis will not be described. If you have interest in these two analysis tools, please refer to Appendix 2 which provides the examples of vertical analysis and horizontal analysis.

Although there are large amount of key ratios in financial statement analysis, here I just choose some key ratios that are related to general ledger, accounts receivable, accounts payable and fix-assets or will be used in later chapter.

3.2.1 Ratio analysis

3.2.1.1 Net profit margin

Net profit margin measures the company's profitability and means the percentage of each sale earned as net income, the formula is as follows:

Net profit margin = Net income / Net sales

The high net profit margin suggests high profitability rate generated by each sales. (Harrison, W. et al. 2011, 804.)

3.2.1.2 Quick ratio

Quick ratio is also called as acid ratio, representing company's ability to pay its current liabilities and checking whether the company could pay all its current liabilities if they come due immediately, the formula is as follows:

Quick ratio = (Current assets – inventory) / current liabilities

In general, a higher acid ratio indicates a stronger financial position and quick ratio of 0.9 – 1.0 is acceptable in most industries. (Harrison, W. et al. 2011, 799-800.) As described in the balance sheet of financial statement, accounts receivable is one of the most important items in current assets and accounts payable is one of the most important items in current liabilities. Therefore, the accounts receivable and accounts payable are the two key factors in quick ratio analysis.

3.2.1.3 Accounts receivable collection period

Accounts receivable collection period represents a company's ability to collect receivables and means how quickly the company collects cash from its sales, the formula is as follows:

*Receivable collection period = Accounts receivable/ net revenue * 365 days*

Generally the shorter collection period indicates a better ability to collect cash from customers. A too long collection period may indicate the credit is too high and will lead a company to lose sales profits compared to those customers who have short receivable collection period. The average receivable collection period is 45 days in industrials. (Harrison, W. et al. 2011, 801.)

3.2.1.4 Payables outstanding period

Payables outstanding period represents the time for a company to pay their accounts payable.
A shorter payable outstanding period means a company pays its vendors very quickly, while a longer period means a relatively slower payment period to its suppliers, the formula is as follows:

*Payables outstanding period = average net accounts payable/ cost of goods sold * 365 days*

Generally the longer payable period is better than shorter one since the company can make a full use of its credit terms, but it does not mean that it can be too long because no vendors want to continue business with one who has delinquent on its payments. (Harrison, W. et al. 2011, 801-802.)

3.2.1.5 Debit ratio

Debit ratio represents a company's ability to pay its long-term liabilities and indicates the degree of leverage of a company, the formula is as follows:

Debit ratio = Total liabilities / Total assets

Fixed asset occupies one of the largest parts in total assets and is the key factor in debit ratio analysis. Generally a lower debit ratio indicates a stronger financial position, and a higher debit ratio indicates higher risk. The average debit ratio in furniture industry is around 0.6, if debit ratio is over 0.9, then it will be alarmed. (Harrison, W. et al. 2011, 803.)

3.2.2 Limitations of financial statement analysis

The sudden change of any ratios or any percentages in vertical and horizontal analysis may suggest something is going wrong, some problems might happen, but these figures cannot identify problems, especially key ratios. Thus, in order to make right business decisions, information user or managers must identify when, where, why and how did these problems happen, which requires them to spend much time and intelligence on finding out when, where, why and how did these problems happen. (Harrison, W. et al. 2011, 796.)

4 The research of financial accounting (FI) module

4.1 FI module

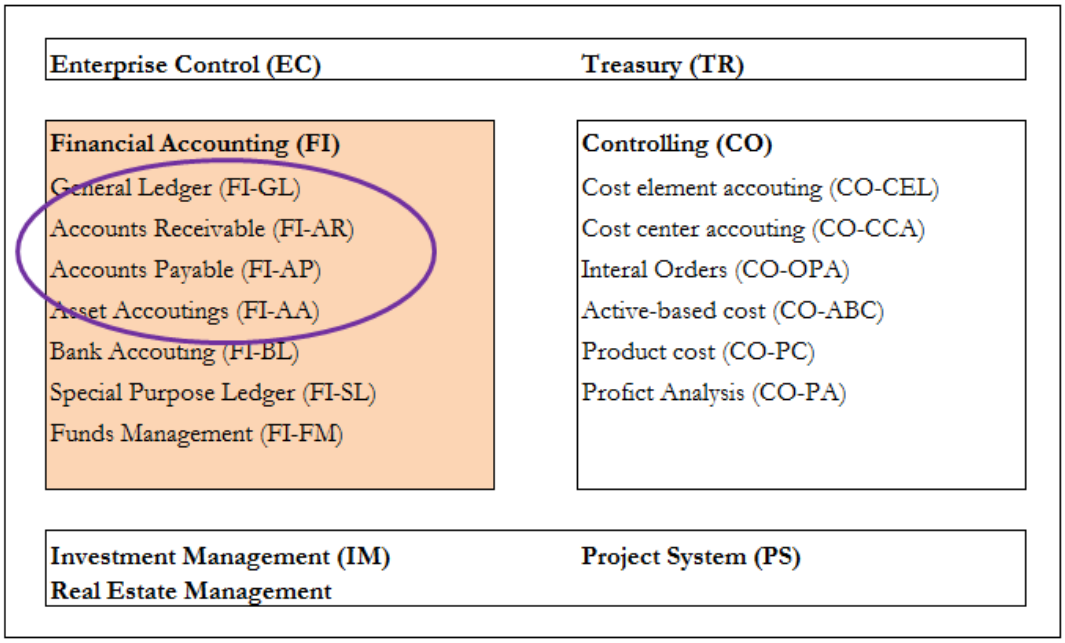

Figure 7. SAP R/3 accounting structure

As shown in the above figure, FI module contains General Ledger (FI-GL), Accounts Receivable (FI-AR), Accounts Payable (FI-AP), Asset Accountings (FI-AA), Bank accounting (FI-BL), Special Purpose Ledger (FI-SL) and Funds Management (FI-FM). While FI-GL, FI-AR, FI-AP and FI-AA are the four basic modules in FI module, when companies implement SAP accounting module, they usually start from these four modules. In this chapter, the research is just focused on FI-GL, FI-AR, FI-AP, and FI-AA.

Financial accounting is used to identify record, summarize business information, and report it to decision makers, then present company's financial statement to external decision makers, such as stockholders, suppliers, banks and government agencies.

While the FI module in SAP ERP system fulfills the requirements of traditional accounting, in the meantime it provides the following functions:

1. Management and representation of all accounting data
   All business transactions are recorded according to the document principle, which provides an unbroken audit trail from the financial statements to the individual documents.

2. Open and integrated data flow
   Data flow between Financial Accounting and the other modules of the SAP System is ensured by automatic updates. Data is available in real time within Financial Accounting. Postings made in the sub-ledgers always generate a corresponding posting in the general ledger.

3. Preparation of operational information to assist strategic decision-making within the organization. (SAP Library 2012a)

4.2 General Ledger

General Ledger (FI-GL) opens an account according to the classification of subjects to record all business transactions, collects and presents summaries of sub general ledger accounting information which are the basis for the preparation of financial statements. Therefore, any business entity in a group must set a general ledger in order to record and present their business transactions.

The SAP FI-GL fulfills the GL accounting functions, provides a clear and comprehensive picture for external accounting and accounts and recorded all accounting data including all posted happening to subsidiary ledgers in SAP ERP system, and meanwhile it is fully integrated with all the other operational modules systematically to ensure all accounting data to be always correct and updated. (SAP Library 2012b)

4.2.1 FI-GL Organizational Structure

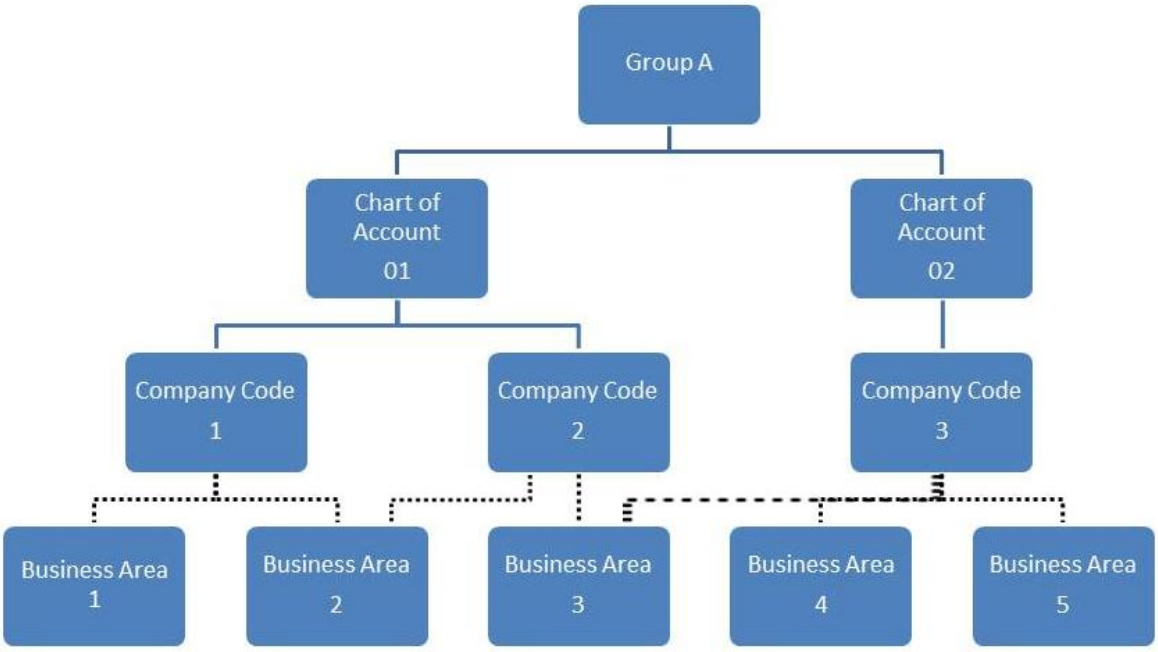

Figure 8: FI-GL Organizational Structure of R/3

The above figure is the organizational structure of FI-GL module. Structurally, there are three components: company code, charts of account and business area. For a group, it can have different sets of chart of accounts, and different chart of accounts can be assigned to different company code. The company code is an independent accounting entity, which can be a subsidiary or branch company. However, each company code can have only one chart of accounts, but different company code can share a common chart of accounts. (Curran, T. & Keller, G. 1998, 142-143.)

Business area, it represents different business or product lines. For example, company code 1 represents company A providing two business products which are software and consulting, and then its business line can be divided into two areas: software product and consulting services. Whereas these two businesses have relative independence in accounting, meanwhile management team requires their financial statement separately in order to distinguish their business performances. Therefore, SAP system designs business area to separate software product and consulting services.

Business area is a cross-company code, as shown in above figure, except for company A whose company code is 1, there are other companies providing software products and consulting services.

If these companies provide software products and consulting services, they also can use these two business areas. From the graph, one can easily make cross-company's report and vertically extended analysis which enable real-time and efficient financial management. (Jones, P. & Burger, J. 2009, 43-68, 77-81.)

4.2.2 Master records: chart of accounts & company code

General ledger master has two main segments: Chart of Accounts (COA) and company code, and the maintenance and management of GL are conducted in two levels: COA and company code. In COA level, it contains the general information which can be used by all company codes, while company code segments contain and maintain the information that is specific to a company code. (Padhi, S. 2011, 30-31.)

4.2.2.1 Chart of accounts

In chart of accounts, each account is assigned to a name and a unique number by which it can be uniquely identified; therefore each account number presents the same meaning even though when they are used in different company codes. In COA, it contains the general information which can be used by all company codes. Basically it has some text information, accounts group (assets, liabilities, equity, expense, revenue, P/L). This makes that analysts, no matter what kinds of level they are in the group, no longer need to identify the ledger accounts from different company codes, and can efficiently make the analysis, comparison and summary of the data among different company codes.

Table 4. Example of Chart of Accounts

Account number	Account name	Account type
1201	Furniture and other movables	Assets
1209	Accumulated depreciation	Assets
1900	Cash in hand	Assets
1910	Bank account 1	Assets
2001	Subscribed capital	Equity
2621	Long-term loan from credit institution 1	Liabilities

The above table is an example of simple chart of accounts. If you are interested in the complete SAP COA, please refer to the Appendix 3.

4.2.2.2 Company code segments

As described above, company code segments are used to keep and maintain the information that is specific to a company code that can control data, currency settings and some other specific information of the company.

4.2.3 Document - (legers, audit and easy to track information)

Document is an important sub component in FI-GL module, and is used to keep and maintain all the accounting documents.

Accounting documents usually includes date, description, company code, currency, and so on. In SAP system, different business transactions have different accounting documents, e.g. depreciation accounting documents, customer invoice, customer payment document, vendor invoice, vendor payment document, and goods receipt automatic record document and so on.

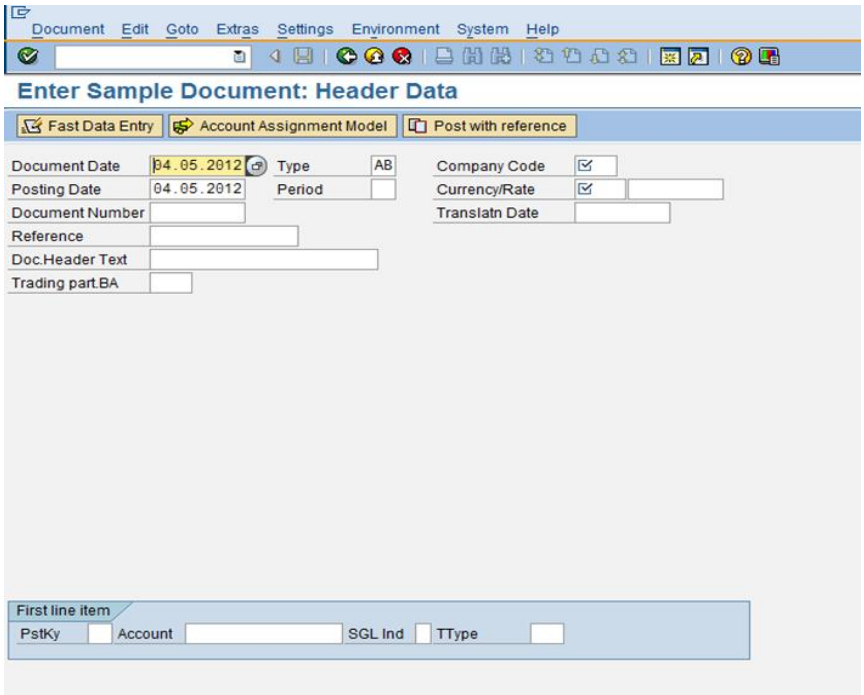

Figure 9. Sample document in SAP ECC 6.0

SAP system supports both automatic generating accounting document and manual entry accounting document. To the variety of automated accounting operations, such as receiving, shipping, invoicing, system will automatically check the information of these certificates and generate related billing, but companies of course can change this automatic confirmation according to their own needs. If choosing manual entry rather than automatic accounting, system will provide a default document type for manual entry, and of course the users can change these default settings.

Meanwhile the system assigns document number range to the defined document, the same type document will be assigned number in chronological order, for example, sales invoice number for consulting service is 10000 – 19999, while sales invoice number for software products is 20000 – 29999. After closing the fiscal year, all the document number can either start from zero, or number sequentially following last year's number. (Nowak, D. & Hurst, Q. 2000, 180-187.)

In addition, system uses an important function "line item clear" in accounting documents. Some accounts, such as the breakdown account of customers and suppliers, the system needs to record each invoice payments status and each invoice receives status respectively. For these accounts, each transaction should be recorded or cleared line by line, and this is the account of the "line clear". In the system, the interface of paid or received invoices will show a green light, while the unpaid or unfinished invoices will show a red light. When handling line clear, the system updates related document status and accounts status automatically. (Nowak, D. & Hurst, Q. 2000, 165-170.)

The benefits of "line item clear" are obvious, especially to accounts receivable, payable, which enables each transaction to be clearly recorded, and also provides a powerful tool for self check. Furthermore, it is the basis of some extended accounting functions, like accounts age analysis, reminders, automatic payment, and reconciliation letter.

4.2.4 Other functions

Fiscal year can be set according to the company's request, at the same time system has the functions of handling multi-currency matter, periodic accounts, information system and so on.

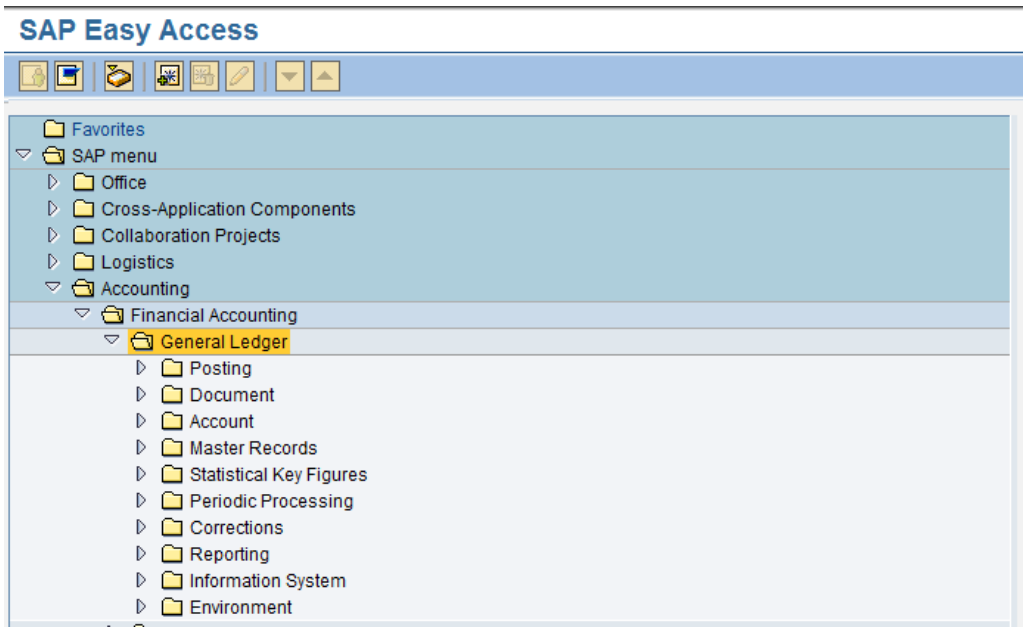

Figure 10. FI-GL menu in SAP ECC 6.0

The above figure is FI-GL menu in SAP ECC 6.0 version, except the master data and document, it also provides functions of periodic processing, statistical key figures whose main function is to provide key figures according to information users' settings and assist decision-making, corrections, very abundant reporting and analysis tools, and information system.

The sub module of FI-GL information system can provide versatile general ledger reports for multi-angle requirements, such as account balance, balance sheet, income statement, cash flow statements, etc. Meanwhile SAP FI-GL information system provides some powerful tools, allowing companies to analyze data from different angels. For example, if information user wants to look at the balance sheet with any kinds of combinations of the company code, business area and period, he will only need to choose company code, business area and date, and then the system will provide the balance sheet based on user's selection. If information user wants to check the latest 5 years' net profit margin, then he will just only need to choose period, the system will then present last 5 years' net profit margin to him/her. If he selects vertical analysis, then the system will present extended vertical data of the latest 5 years' income statement showing why, when, how net profit margin changes during these years.

4.3 Accounts Receivable

The Accounts Receivable (FI-AR) module is used to record and manage accounting data for all customers. It is highly integrated with sales distribution, controlling and cash management. All postings in FI-AR module will be updated automatically in the FI-GL module, meanwhile FI-AR module can automatically carry out debiting and down payments for each payment. (SAP Library 2012c)

There are a range of tools available in documenting AR transactions, including balance lists, journals, balance audit trails, and other standard reports which enables enterprises to comprehensively record accounting data for their customers, maximally control the risk of bad debts. In addition, it also has the functions of account analyses, alarm reports, due date lists, a flexible dunning program and correspondence which enable users to communicate with each other easily. (SAP Library 2012c)

4.3.1 Customer master data

Accounts receivable maintains customer master record which has been divided into three levels to maintain: general level, the company code level and the scope of sales levels. (Curran, T. & Keller, G. 1998, 135, 139.)

Customer information in the general level can be shared among entire group, such as customer number, name, address, bank account number, country, language and so on. Customer information in the company code level is customer's unique information, such as payment term, dunning program, reconciliation and so on, this data links to general ledger. In the sales level, the currency of sales order, the price group, delivery terms and other sales-related information will be created and maintained in the sales level. (Nowak, D. & Hurst, Q. 2000, 298.)

4.3.2 Credit control area – control the risk of bad debits

In AR module, SAP system uses credit control area to manage and monitor customer credit. The setting of customer credit uses the same management principle as the setting customer master data

and has been divided into three levels: group level, company code level, business area level. (SAP Library 2012d)

For instance, the credit for customer Kone in group level is 100 million euros, among which headquarter company in Finland has 50 million euros, 30 million euros for company in China, and 20 million euros for company in America. Then in the business area level, the credit limit for Kone in Finland in the software product is 20 million euros and 30 million euros in IT consultant. Meanwhile SAP system can automatically check the status of customer credit, unfinished payment items, and average payment period in days and so on.

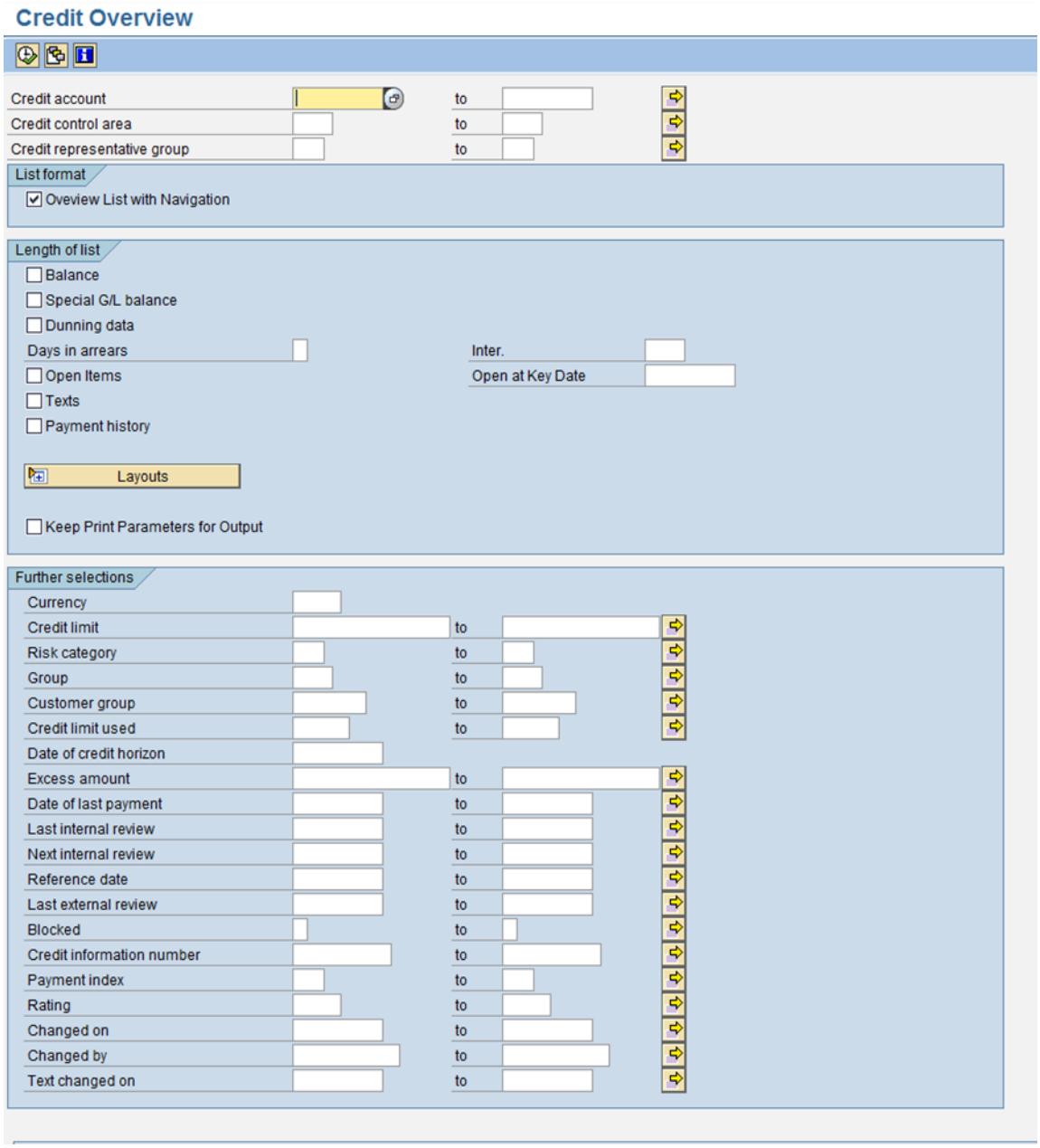

Figure 11. Screen of credit overview in SAP ECC 6.0

In SAP ECC 6.0, system shows customer credit overview as above screen. Customers are assigned to unique credit account, through filling customer's credit account, selecting balance or other parameters in Length of Lists field, and filling currency type credit limit, credit limits used, data of last payment and some other information in Further Selection field, then system will present the detail customer's credit overview to users based on their selections.

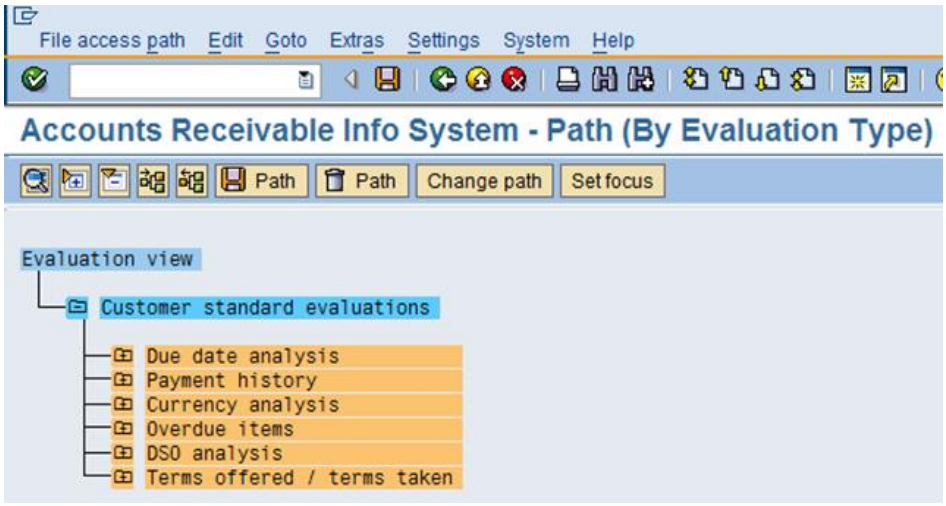

Figure 12. Customer standard evaluations in SAP ECC 6.0

Meanwhile credit control in FI-AR module provides the comprehensive analysis for the customer payment situation. The above figure is AR information system – path which provides information for customer payment, user can find the customer payment history, overdue items, due data analysis, payment terms.

Through using the customer credit control, SAP FI-AR can efficiently control the risk of bad debts and enhances the cash flow management.

4.3.3 Other functions

In AR module, it has the same functions in GL module: the dunning and automatic correspondence. When the system detects the customer's overdue payment, then user can use the dunning program to remind customer to make payment. And the correspondence communication with customer will enable user to make balance confirmation and other accounting

communications. Additionally AR has the functions of automatic interest calculation of overdue accounts and the automatic provision of bad debts.

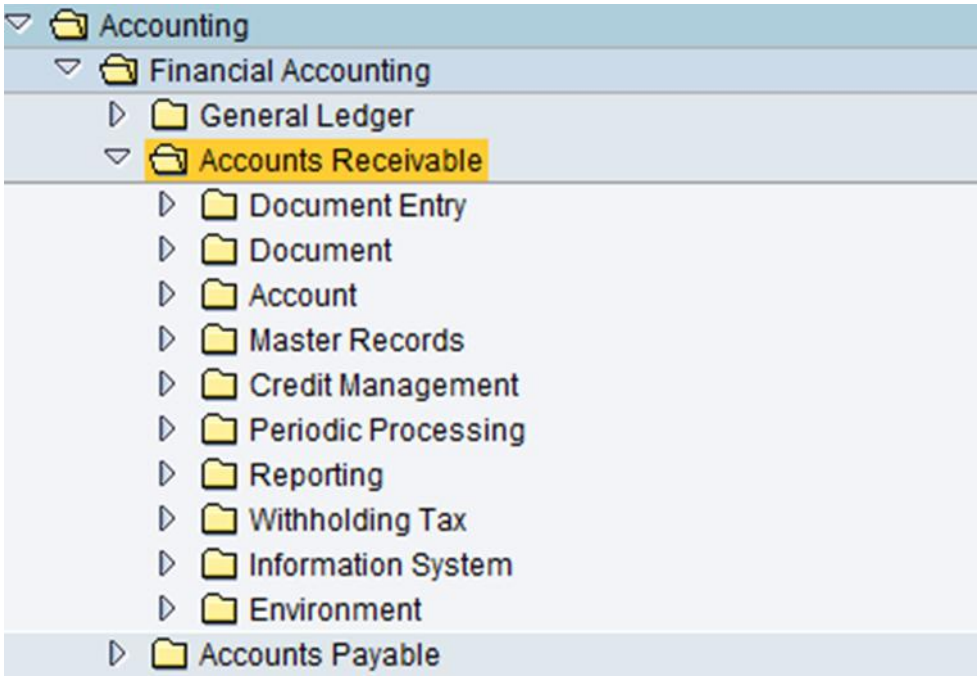

Figure 13. Accounts receivable in SAP ECC 6.0 menu

The above figure shows the function menu of AR in SAP ECC 6.0, except the master data and credit management, it also has functions of document entry, document, account, periodic processing, corrections and versatile reporting and analysis tools.

4.3.4 Summary

Accounts Receivable module forms the basis of adequate and orderly accounting and enables enterprise to carry out detailed management in accounting data of all customers. Furthermore, it provides the information for customer credit management which helps company in the greatest degree to control the risk of bad debts, as well as provides information for the optimization of liquidity management measured by key ratio receivable collection period in days.

As introduced in financial accounting theory part, accounts receivable collection period in days is one of the key ratios to measure company liquidity performance. A shorter receivable collection period indicates a better ability to collect cash from customers, while a longer collection period, especially when longer than average collection period (45 days in industry), will make a company

lose benefits. Therefore, the real-time collection period provided by SAP system is an important business index to assist manager to make right decisions and improve company liquidity performance.

4.4 Accounts Payable

The object of Accounts Payable (FI-AP) module is to record and manage the accounting information for all vendors. The FI-AP module has the similar functions and settings as FI-AR module, such as customer/vendor master data, balance lists, journals, balance audit trails, and other standard report, account analyses, alarm reports, due date lists, automatically recorded posted AP data in GL and so on. Of course the integral part of FI-AP module is the purchasing system rather than sales system.

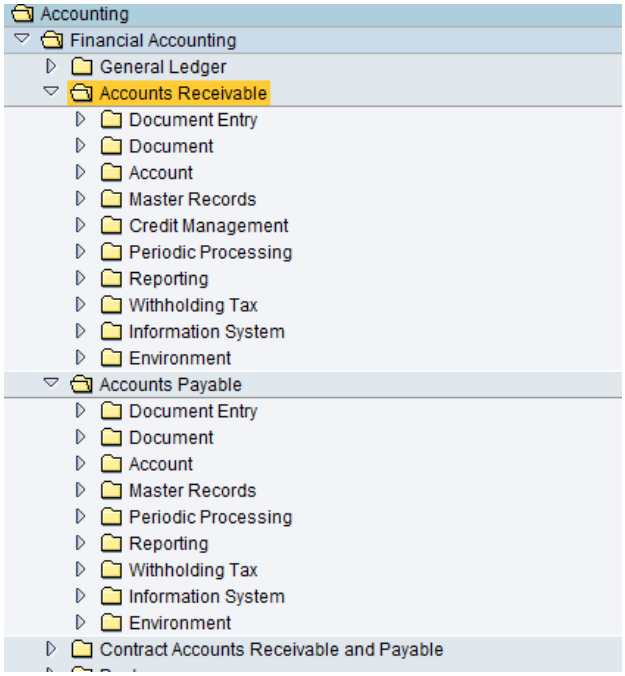

Figure 14. Accounts receivable and accounts payable in SAP ECC 6.0 menu

As shown in the above graph, AP module has the same sub module as FI-AR module. The main difference is that AP has no credit management and the reason will be explained in the next part.

4.4.1 Vendor master data

Accounts payable maintains vendor master record which has been divided into three levels to maintain: general level, the company code level and the scope of purchase organization level. (Curran, T. & Keller, G. 1998, 135.)

Vendor information in the general level can be shared among entire group, such as vendor number, name, address, bank account number, country and so on. Vendor information in the company code level is vendor's unique information, such as payment term, dunning program, reconciliation and so on, company code data link to general ledger. In the sales level, the currency of purchase order, delivery terms and other purchase related information will be created and maintained in the purchase organization level. (Curran, T. & Keller, G. 1998, 135-136.)

4.4.2 Internal payment control points - Control the payment risk

The main difference between FI-AR module and FI-AP module is that the FI-AR should effectively manage customer credit and control the risk of bad debts, while the AP should control the payment risk when improving the efficiency of payment.

Usually company payment transactions are extremely versatile and numerous. The function of automatic payment in the SAP system can regulate the payment process and accelerate business processing. However, since payment is a very sensitive process, the difference with FI-AR module is that FI-AP module has no credit control, and instead it sets internal payment control points. Generally the payment for the accounting payable has two risk control points, one is the control of payment documents which must be approved and stamped before it becomes valid. Another is that the payment should be audited and approved by managers in upper layer. Only passing these controls, the payment can be then implemented.

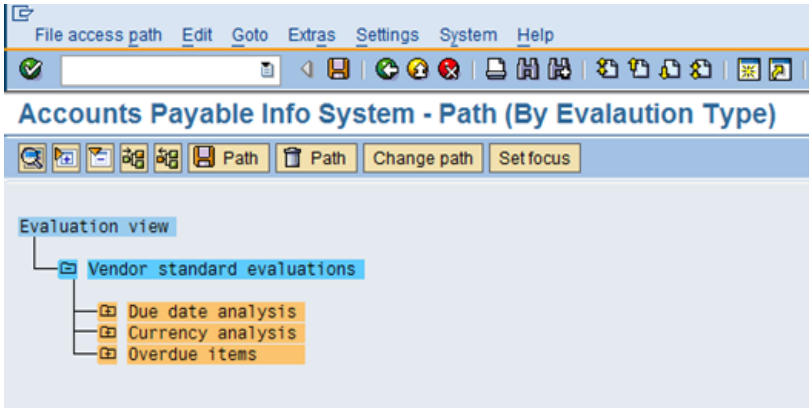

Figure 15. Vendor standard evaluations in SAP ECC 6.0

Similar function as AR information system – path, the above figure is AP information system – path which provides comprehensive analysis of vendor payment situation, information user can find the due data analysis, currency analysis and overdue items for the payment situation to vendors.

4.4.3 Summary

AP module forms the basis of adequate and orderly accounting, and enables enterprise to carry out detailed management in accounting data of all vendors. At the same time, it provides the information required for vendor payment management which helps company in the greatest degree to control the payment risk and make a full use of the credit terms.

Similar to the function of accounts receivable collection period, payables outstanding period is one of the most important ratios to measure company liquidity performance. A longer payable outstanding period indicates a better ability to use credit terms, while a too long or too short payable outstanding period is not good to a company since too long payables outstanding period will make company lost good suppliers and vice versa a company itself will lose benefits from making too quick payment to vendors.

Therefore, the real-time payables outstanding period provided by SAP system is an important business index to assist manager to make right decisions and improve company liquidity performance.

4.5 Assets accounts

The Asset Accounting (FI-AA) module is used to record and manage fixed assets and provides detailed information for the transactions of fixed assets. (SAP Library 2012e)

An enterprise purchased one item, for example plant or machine, if the value of this item exceeds a certain limit and economic benefits brought by this item is over one year, and then a company need to proportion the total value of this product or service throughout its using period. This proportion are recorded and calculated in a specific method in FI-AA module, which is called as depreciation. Therefore, the depreciation management is a key part in FI-AA module, which will be introduced in this chapter later.

Meanwhile FI-AA module is highly integrated with other modules and all postings in FI-AA module can be automatically updated in the General Ledger module. FI-AA data can be directly posted to or got from other related modules. For example, when LO module records the receipt of purchased Kone elevator, then this elevator will be automatically recorded in FI-AA module, AP will be automatically updated as well. When operating depreciation solutions, system will record related depreciation into accumulated depreciation account and cost center.

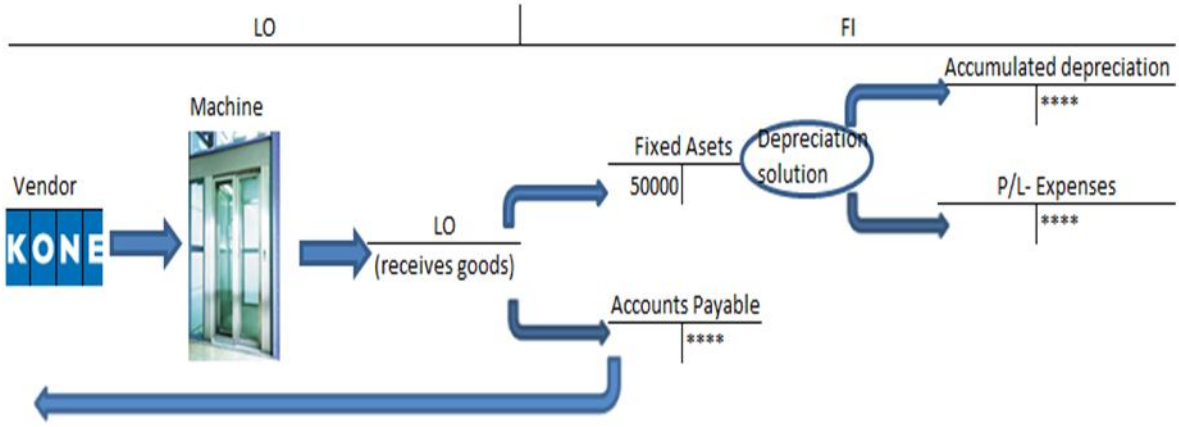

Figure 16. Assets accounting integration process

As shown in the above figure, through the high integration, the FI-AA can correctly records and presents the detail information of fixed assets in real time. The user will then easily find out comprehensive information of fixed asset in the system, like vendor information, accounts payable, accumulated depreciation, cost center and so on.

4.5.1 Assets master data

The responsibility of assets master record is to record the detailed information of fixed assets, like purchasing time, purchasing value, depreciation period, depreciation calculation method and account assignment, and provides a sound and complete information for each fixed asset.

In SAP system, fixed assets can be divided into construction in progress, leased assets, technical assets, real estate and intangible assets and so on, each of which should be clearly assigned to the organizational unit. (SAP Library 2012e)

Generally the content of assets master record can be maintained in two layers: general data layer and assets value calculation layer. General data layer maintains description of the asset, asset type, asset number, asset cost center and asset business area; while value calculation layer can be divided into depreciation layer and value layer. The depreciation area, depreciation code, using period, depreciation start date and others related depreciation are maintained in deprecation layer, while the original value of the assets, depreciation expense, accumulated depreciation, residual value, current net value, and other such kinds of values of fixed assets are maintained in value layer. (SAP Library 2012e)

4.5.2 Depreciation management – paralleled reporting

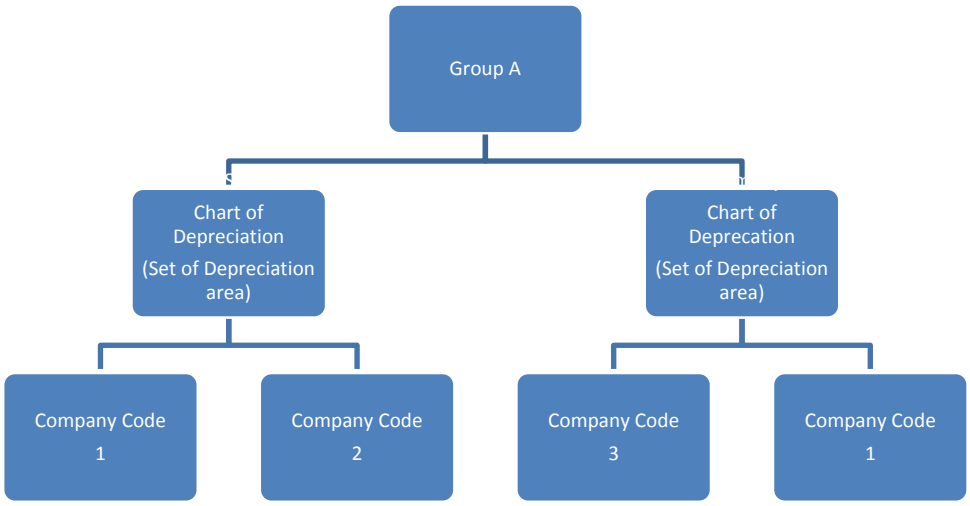

Figure 17. Country-specific chart of Depreciation in R/3

SAP system uses the chart of depreciation to manage depreciation, the same organizational structure as chart of account. The chart of depreciation is the collection of depreciation area set according to the customer's business needs, defines depreciation area, depreciation calculation method, for the case of straight-line, double declining balance. In SAP R/3, chart of depreciation is country-specific, for example US chart of depreciation, Finland chart of depreciation. The system also provides depreciation methods, depreciation period and some other depreciation related parameters and tools to manage depreciation. Different subsidiaries in the same country can use the same depreciation chart and each company code only has one chart of depreciation. (SAP Library 2012e)

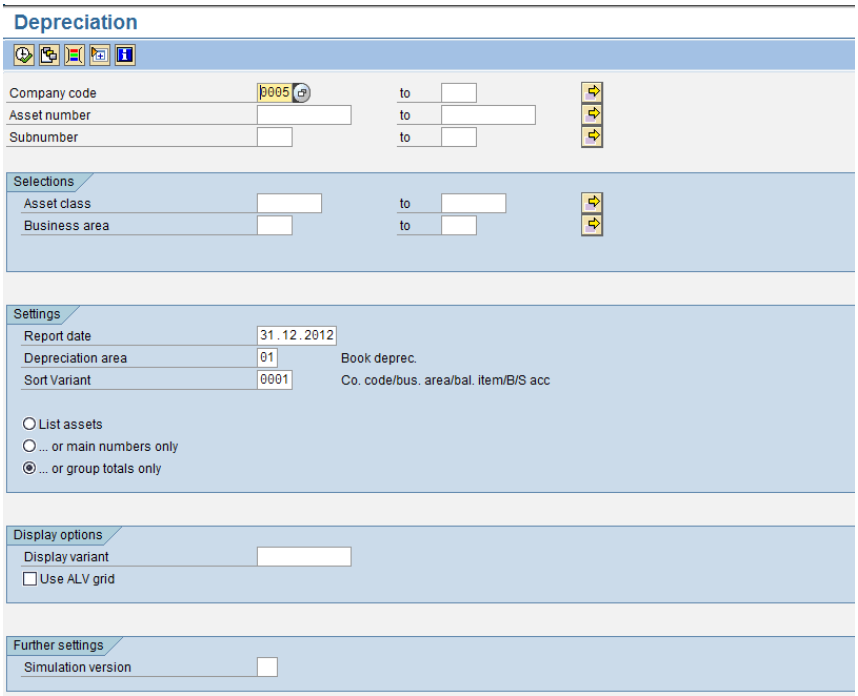

Figure 18. Screen of depreciation in SAP ECC 6.0

As shown in the above figure, first users input general data of fixed-asset, like company code, asset number, asset address, business area, then select depreciation area, sort variant and click implementation, ECC 6.0 presents the deprecation information of the selected asset to users.

Furthermore, the deprecation management in FI-AA can fulfill the international accounting standards and the local accounting requirements of many countries as well. As the example of "Paralleled Reporting", through the feature of paralleled reporting, SAP system can provide not only IFRS depreciation solution, but also country-specific depreciation solution through selecting different deprecation method together.

4.5.3 Summary

Figure 19. Fixed Assets in SAP ECC 6.0 menu

As we know that the main functions of FI-AA are to record and report the detailed information of fixed assets. In ECC6.0, the master data of fixed-assets are maintained and kept in asset sub module. The sub module of periodic processing is mainly responsible for depreciation management and calculation, while the sub module of information system is responsible for reports and presents the fixed assets' information to user. In addition, FI-AA can also provide versatile reporting tools to meet the different users' needs.

Debit ratio is one of the key ratios to measure company solvency performance and fixed asset is one of the largest parts in total assets. Too large investment in fixed assets will lead to high debit ratio indicating high risk. The FI-AA module helps decision makers to efficiently arrange the investment of fixed assets and assists users to manage well fixed assets as well.

5 Research results

Before the analysis of research results of SAP FI module, "Closed-Loop business analytics process" will be described first in order to assist the analysis of the research results.

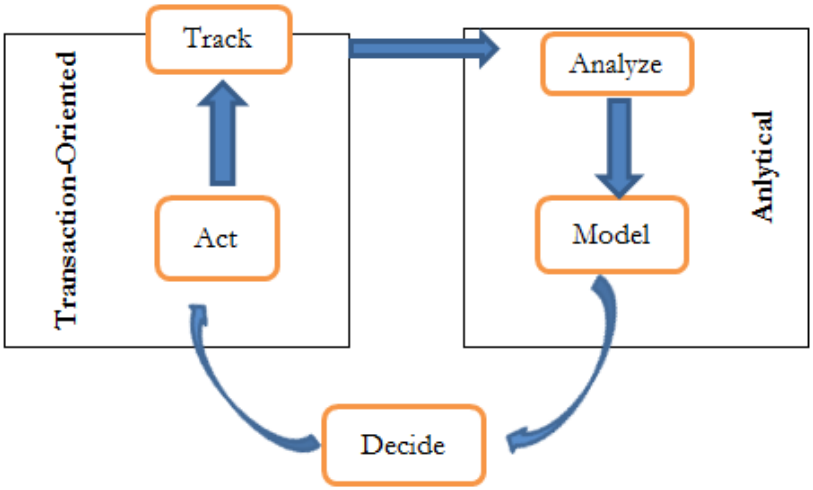

Figure 20. Closed-Loop business analytics process (Egger, N., Fiechter, J., & Kramer, S. 2007, 29.)

Closed-loop business analytics process can be also called as SAP business intelligence process. There are five steps in closed-loop business analytics process, and the first step is to acquire and store data. The second step is to analyze the data that have been acquired and stored in the first step, usually decision-makers and information users can find out that how, when, when, where and why it happens during multi-dimensional analysis. The third step, Model, is advanced analysis to further support decision-making, usually in this stage decision-maker and information users can know what are their decisions and what benefits and risks of each decision. Then next two steps are decide and act, the decisions are made based on analyzed result in step 2 and step 3 and corresponding actions will be implemented after decisions. (Egger, N. et al. 2007, 29-32.)

Apparently the high quality data in the first step is the foundation of later steps and the comprehensive and multidimensional analysis results obtained from step 2 and step 3 are the basis of understanding current situations and making right decisions. Additionally the speed of business analysis process is another vital factor to produce a competitive advantage for the company.

From the research of SAP FI module, we know that FI module collects data from operating layers through recording business transactions, and these data are then transformed and stored through the information technology data ware house, which is invisible in operating layer. Meanwhile FI module provides multi-dimensional analysis and reporting tools to analyze these data and present results to decision-makers, and decision makers make decisions according to the above-mentioned analysis and report results.

Therefore, after the research of SAP FI module, the SAP FI is found to optimize accounting financial performance from three angles: it provides high quality accounting data, comprehensive and multidimensional analysis results to information users and accelerates financial decision process.

5.1 SAP FI provides high quality accounting information

The integrated and configurable SAP ERP system provides correct and real-time accounting information to information users.

The function of automatic checking business transaction documents (accounting documents) in the system helps users efficiently avoid manual mistakes and ensures the correct journal data. For example if the input unit price of raw material in purchase invoice is not the same as the unit price in purchase order, the system will then alarm and remind user of wrong information. In addition, high integration with other sub modules provides real-time accounting information to SAP users.

Additionally, SAP ERP is a configurable system and based on best practices enabling companies to centrally manage financial accounting in multi languages, currencies and fulfills the requirements of IFRS and country-specific GAAP as well. It provides versatile resolutions, like different kinds of depreciation and multi-currency resolutions, different companies can choose different settings according to their different needs. The configuration is usually jointly determined by senior SAP consultants and company's senior business managers. Obviously, this determination further ensures the correctness of the FI module's accounting calculation methods and business processes. During the daily work, SAP users only work in operating layer and input basic information. For example, if user needs monthly income statement in Euro and US dollar separately, he or she just only inputs data and selects currency type, system will automatically and correctly prompt out income statement in these two currencies; if user needs to provide financial report both for IFRS and German GAAP requirements, then he or she just needs to select right accounting principle, then system will presents the qualified financial reports to user immediately.

5.2 SAP FI provides multi-dimensional analysis and report tools

SAP FI module has versatile analysis and report tools and can provides multi-dimensional analysis results to information users.

As found in the research of FI-GL, FI-AR, FI-AP, the common sub modules of reporting and information system provide multi-dimensional reports for multi-angle requirements, such as account balance, balance sheet, income statement and cash flow statements for different company code at different period, the customer receivable collection period of different products in different area, the extended vertical analysis figure of last years' net profit margin, quick ratio, debit ratio and so on.

In SAP FI-GL information system module, if information users want to look at the balance sheet with any kinds of combinations of the company code, business area and period, the only thing they need to do is to select company code, business area and date, the system will then present the balance sheet based on their selections.

In FI-AP and FI-AR modules, they provide comprehensive analysis of customer evaluation and vendor evaluation, customer evaluation card provides the customer payment history, overdue items, due data analysis, payment terms and vendor evaluation card provides due data analysis, currency analysis and overdue items.

As introduced in financial theory part, a sudden increase or drop in any ratio may mean that something is going wrong, but changed ratio itself cannot identify the problems. However, the ratios presented by SAP FI can identify the problems since SAP FI can present the extended and breakdown information of these ratios which can assist information users to find out that how, when, when, where and why these problems happen.

5.3 SAP FI accelerates accounting process

As LUHNS Gmbh said, SAP ERP system visualizes the business processes, resulting in improvement of communication and higher transparency. (Curran, T. & Keller, G. with Ladd, A. 1998, xxviii.)

"Track – analyze – model – decide – act, it is objective of each organization to accelerate the process to attain a completive advantages." (Egger, N. et al. 2007, 32.)

SAP FI module enhances and accelerates the decision-making process by providing high quality accounting data and presenting multi-dimensional analysis results. It might be necessary to shrink customer credit amount based on accounts receivable period and bad debt analysis, still another decision might start of new investment project based on low debit ratio or increased net profit rate in these years.

Meanwhile SAP FI accelerates daily accounting process. The application of SAP ERP greatly changes the company's business process since the business operation and confirmation can be visualized in SAP system.

For the case of procurement process, the information of purchase order, order confirmation, goods receipt confirmation can be directly reflected in the system, then purchase order and receipt documents do not need to send to the finance department and purchase invoices are submitted directly to financial department. The accountant enters purchase invoice into system, then system will automatically check the information in purchase order, reception and purchase invoice to confirm whether the information of unit price, quantity, date and some other common information are the same in these three documents, if they are not the same, the system will inform the incorrect information to user; if they are the same, then invoice will pass the check and enter into payment status. The related data can be shared in all business parts and accountant does not need to check invoice information with purchase and warehouse manually.

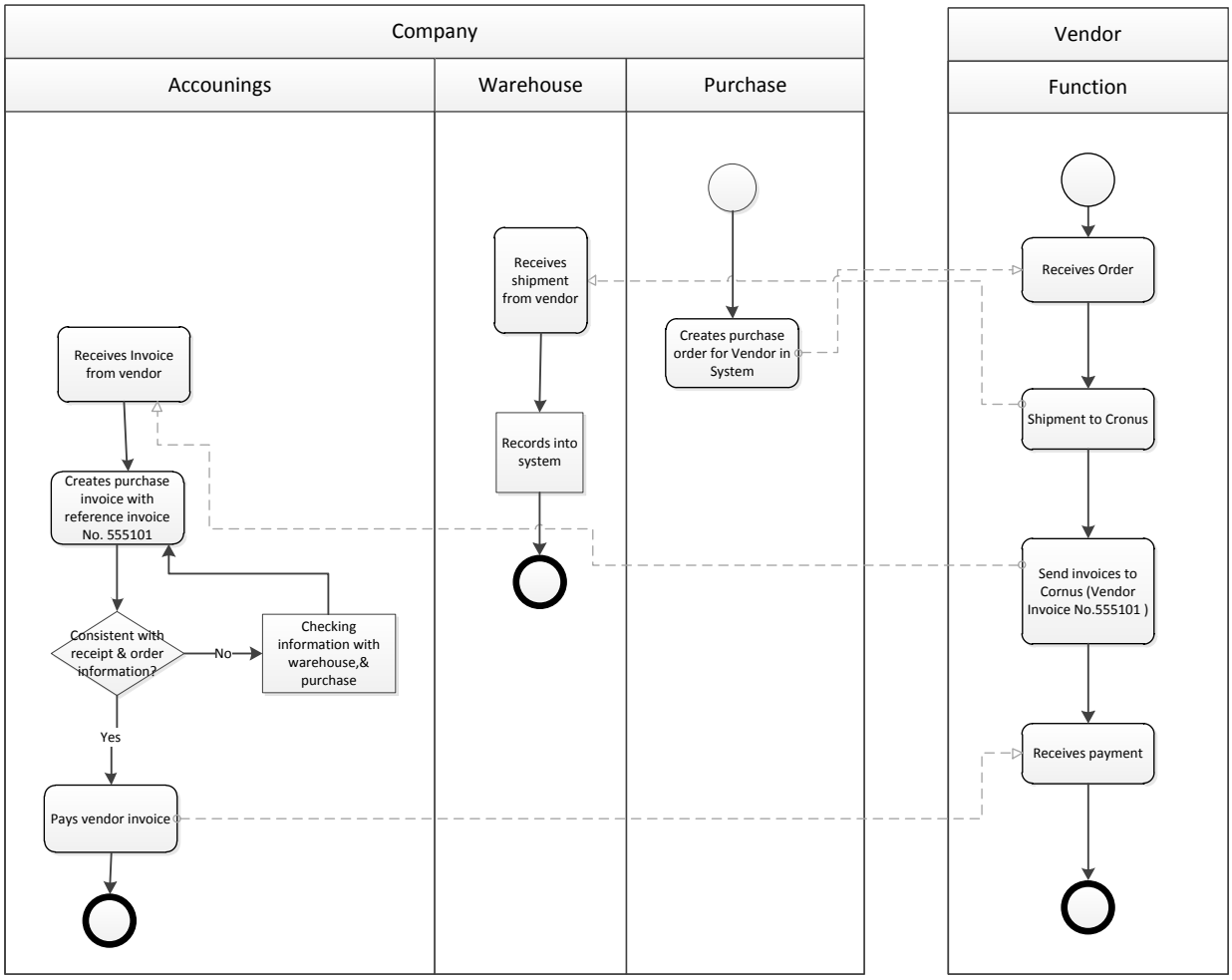

Figure 21. Payment business process

As shown in above payment business process, above business events and status are visualized in operating layer and are real-time reflected in SAP system which is because of SAP high integration, then this visualization and real-time reflection greatly improve the communication and simplify accounting process as well.

6 Conclusions

In this chapter, the research results and the limitations are summarized, and some suggestions for the future research are given here.

6.1 Main results of this research

SAP ERP's highly integration enables FI module to provide real-time data to information users and the configurable and based on best practices enable FI module to provide correct data to

information users. Meanwhile the versatile analysis and reporting tools supported by the SAP information technology present comprehensive and multidimensional analysis results to users, and SAP FI module provides a platform to visualize the business transactions in operating layer and results in a higher transparent and quicker accounting process.

Therefore the finding of this thesis is that SAP FI module optimizes financial accounting performances through providing precise and real-time data and presenting comprehensive and multidimensional analysis results to information users and decision-makers Furthermore, SAP FI module provides competitive advantage for the SAP FI users through accelerating accounting process.

6.2 Limitations of this research

The most theoretical knowledge of SAP ERP in this thesis are based on R/3 knowledge, while the implementations of FI-G/L, FI-AP, FI-AR, FI-AA are in ECC 6.0 operating layer. Even though the business modules in R/3 and ECC are almost the same, there are still some differences. Since the introduction of FI-GL organization structure, the components of mast data of FI-GL, FI-AP, FI-AR and FI-AA are based on the knowledge of R/3, these parts of content might be slightly different from the contents of ECC 6.0.

When implementing the research of SAP FI, if I can take a business case as an example and design the configuring settings for each sub module to complete this case work, then the current research results will be more persuasive and more practical results will be found.

6.3 Future research

In the future research, the SAP ERP theoretical knowledge should be mainly based on the knowledge of ECC 6.0 or later version.

During the research of this thesis, we know that FI-GL, FI-AP, FI-AR, FI-AA are just main four sub modules in FI module, except FI-GL, FI-AP, FI-AR, FI-AA, there are still some other modules: funds management, bank accounts, etc., they are very interesting too, the research of these modules which makes the research of FI module more sound.

In addition, the FI module is found to be highly integrated with controlling module, which is one of the most important sub-modules within SAP accounting module and is a very interesting topic and worthy to be studied in the future.

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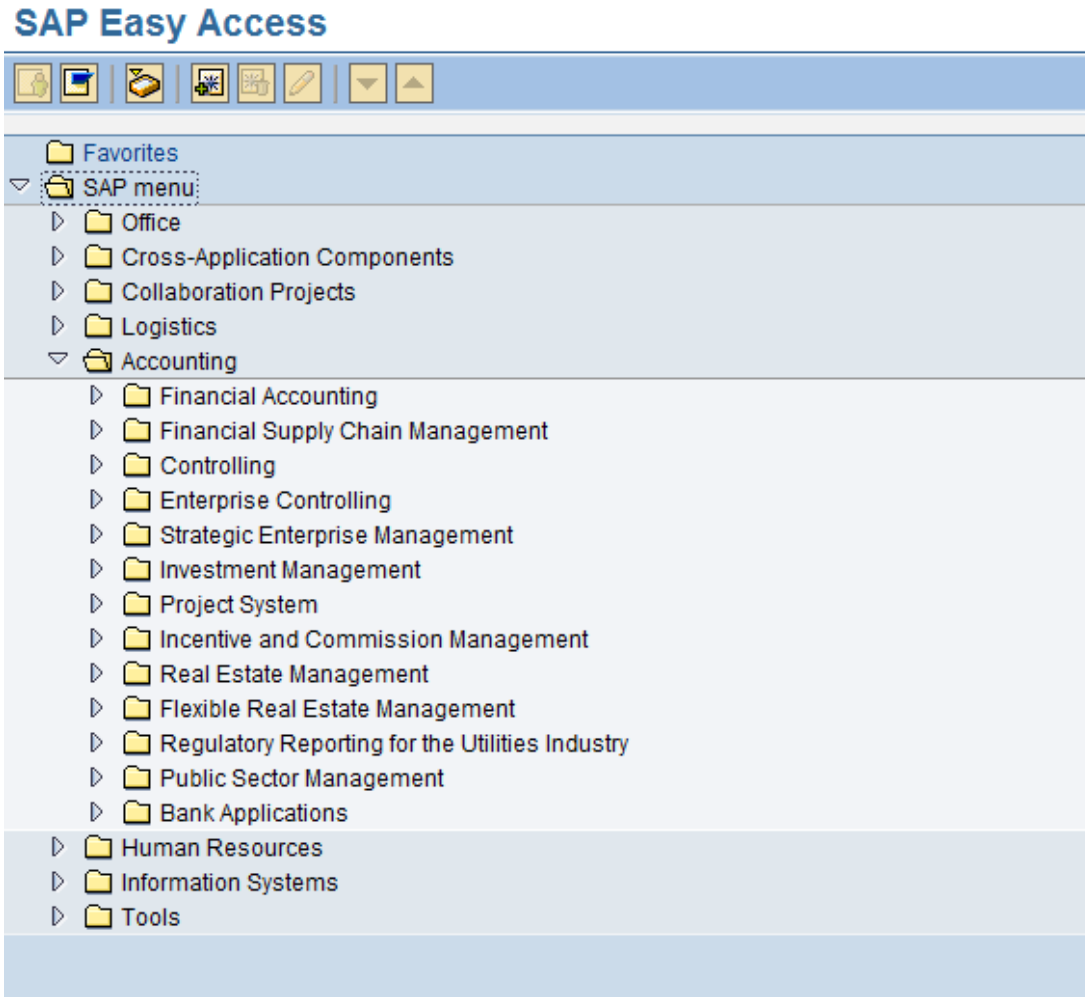
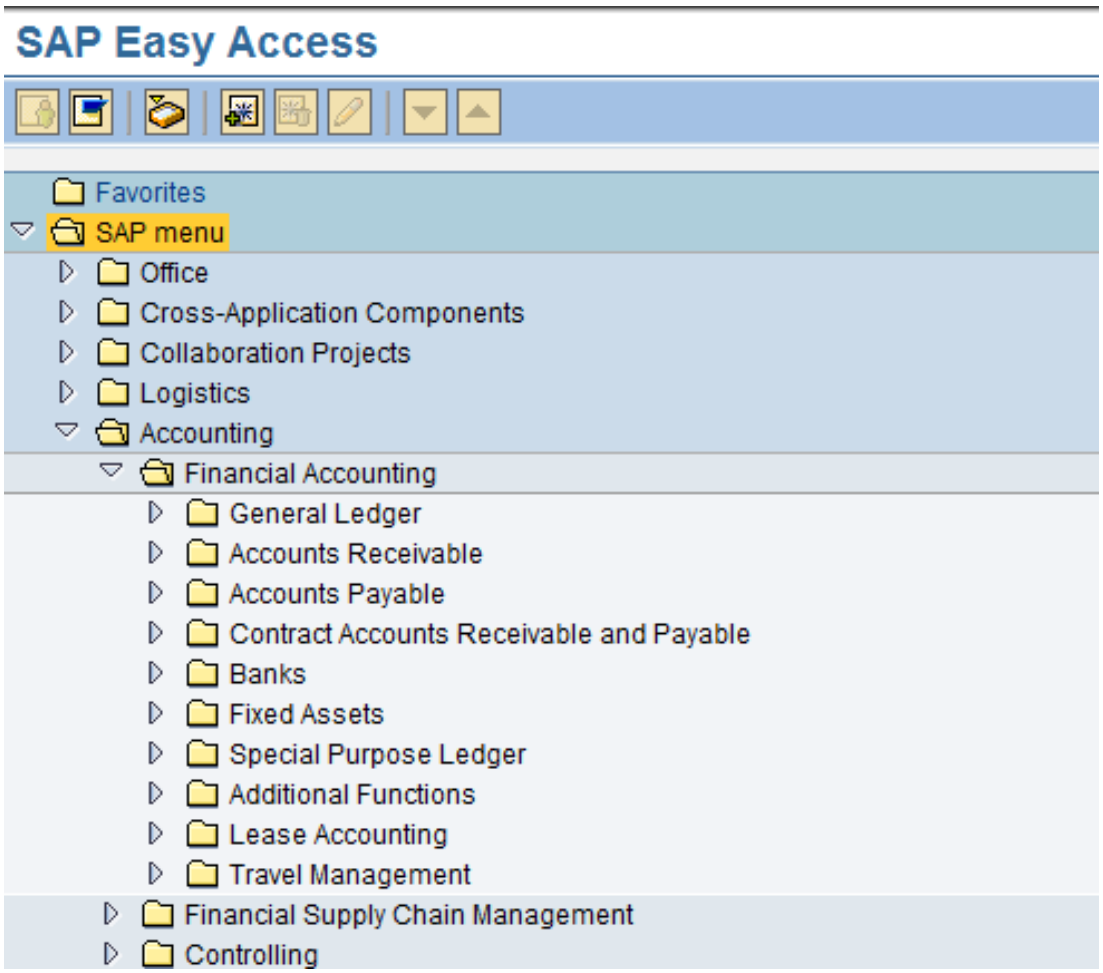
Appendices

Appendix 1: SAP menu in ECC 6.0




SAP Easy Access
Favorites
SAP menu
Office
Cross-Application Components
Collaboration Projects
Logistics
Accounting
Financial Accounting
General Ledger
Accounts Receivable
Accounts Payable
Contract Accounts Receivable and Payable
Banks
Fixed Assets
Special Purpose Ledger
Additional Functions
Lease Accounting
Travel Management
Financial Supply Chain Management
Controlling

Appendix 2: Financial Statement Analysis (Horizontal analysis and vertical analysis)

EXHIBIT 13-2 | Horizontal Analysis—Income Statement

Nokia Corporation
Consolidated Profit and Loss Accounts (Adapted)
Financial Year Ended December 31

(in millions € Euros)	2008	2007	Increase (decrease) Amount	Percentage
Net sales	€50,710	€51,058	€ (348)	-0.68%
Cost of sales	(33,337)	(33,781)	(444)	-1.31%
Gross profit	17,373	17,277	96	0.56%
Research and development expenses	(5,968)	(5,636)	332	5.89%
Selling and marketing expenses	(4,380)	(4,379)	1	0.02%
Administrative and general expenses	(1,284)	(1,165)	119	10.21%
Other income	420	2,312	(1,892)	-81.83%
Other expenses	(1,195)	(424)	771	181.84%
Operating profit	4,966	7,985	(3,019)	-37.81%
Share of results of associated companies	6	44	(38)	-86.36%
Financial income and expenses	(2)	239	(237)	-99.16%
Profit before tax	4,970	8,268	(3,298)	-39.89%
Tax	(1,081)	(1,522)	(441)	-28.98%
Profit for the year	3,889	6,746	(2,857)	-42.35%
Basic earnings per share	€ 1.07	€ 1.85	€(0.78)	-42.16%

Example of Horizontal Analysis (Harrison, W. et al. 2011, 787.)

EXHIBIT 13-4 | Vertical Analysis—Income Statement

Nokia Corporation
Consolidated Profit and Loss Accounts (Adapted)
Financial Year Ended December 31

(in millions € Euros)	2008	% of total	2007	% of total
Net sales	€50,710	100.0%	€51,058	100.0%
Cost of sales	(33,337)	-65.7%	(33,781)	-66.2%
Gross profit	17,373	34.3%	17,277	33.8%
Research and development expenses	(5,968)	-11.8%	(5,636)	-11.0%
Selling and marketing expenses	(4,380)	-8.6%	(4,379)	-8.6%
Administrative and general expenses	(1,284)	-2.5%	(1,165)	-2.3%
Other income	420	0.8%	2,312	4.5%
Other expenses	(1,195)	-2.4%	(424)	-0.8%
Operating profit	4,966	9.8%	7,985	15.6%
Share of results of associated companies	6	0.0%	44	0.1%
Financial income and expenses	(2)	0.0%	239	0.5%
Profit before tax	4,970	9.8%	8,268	16.2%
Tax	(1,081)	-2.1%	1,622	-3.0%
Profit for the year	€ 3,889	7.7%	€ 6,746	13.2%

Example of Vertical Analysis (Harrison, W. et al. 2011, 791.)

Chart of Accounts

SAP PRESS

A reference to the accounts used in chapter 5 of Roland Fischer's book, *Business Planning with SAP SEM*

Account category 0	Account category 1	Account category 2	Account category 3	Account category 4
ASSETS			LIABILITIES	
Fixed Assets		Current Assets		
0 Tangible and intangible assets	**1 Financial assets**	**2 Current assets and accrued income**	**3 Capital and reserves**	**4 Liabilities and deferred income**
00 Unpaid equity contributions 000000 Unpaid equity contributions	10–12 Not assigned	20 Raw materials and supplies 200000 Raw materials/production material 200100 Delivery costs 200200 Discounts 201000 Preliminary products/third-party components 201100 Delivery costs 201200 Discounts 202000 Auxiliary material 202100 Delivery costs 202200 Discounts 203000 Expendable supply 203100 Delivery costs 203200 Discounts 207000 Other materials 207100 Delivery costs 207200 Discounts	30 Capital Sole proprietorship: 300000 Proprietary capital 300100 Private account Partnership: 300000 Capital of partner A 300100 Private account A 301000 Capital of partner B 301100 Private account B 307000 Limited liability capital of partner C 308000 Limited liability capital of partner D Joint stock company: 300000 Capital subscribed	40 Not assigned
01 Not assigned	13 Investments 130000 Investments			41 Bonds 410000 Bonds
02 Concessions and Licenses 020000 Concessions	14 Not assigned			42 Bank loans 420000 Short-term bank loans 425000 Long-term bank loans
03 Goodwill 030000 Goodwill	15 Fixed asset securities 150000 Fixed asset securities			43 Down payments received 430000 Down payments received
04 Not assigned	16 Other financial assets 160000 Other financial assets			44 Payables from goods and services 440000 Payables from goods and services
05 Real estate and similar rights 050000 Undeveloped property 051000 Developed property 053000 Plant 054000 Administration buildings 055000 Other buildings 056000 Fixtures and fittings (property) 057000 Fixtures and fittings (buildings)	17–19 Not assigned	21 Unfinished products and services 210000 Unfinished products 219000 Unfinished services	31 Capital reserve 310000 Capital reserve	45 Bill of exchange liabilities 450000 Bill of exchange payable
06 Not assigned		22 Finished products 220000 Finished products 228000 Goods (trading goods) 228100 Delivery costs 228200 Discounts	32 Retained earnings 321000 Legal appropriation 323000 Appropriation based on company bylaws 324000 Other retained earnings	46–47 Not assigned
07 Machinery and equipment 070000 Power supply equipment 071000 Material storage and provision equipment 072000 Mechanical material processing equipment 073000 Hot, cold and chemical process equipment 074000 Equipment for operational safety and environmental protection 075000 Transportation and similar machinery 076000 Packaging machinery 077000 Other machinery 078000 Spares 079000 Low-value machinery and equipment		23 Down payments made for supplies 230000 Down payments made for supplies	33 Financial statement usage 331000 Annual result previous year 332000 Unappropriated retained earnings of previous periods 334000 Change in retained earnings prior to net result 335000 Retained earnings/retained losses 336000 Profit distribution 339000 Unappropriated retained earnings used for new calculation	48 Other liabilities 480000 Sales tax 483000 Other liabilities to tax authorities 484000 Liabilities to social insurance agency 485000 Liabilities to employees 486000 Liabilities from capital formation savings payments 487000 Liabilities to companies (dividend) 489000 Other liabilities
08 Other machinery and factory equipment 080000 Other equipment 081000 Facility equipment 082000 Tools, devices, models, measuring and test equipment 083000 Storage and transport devices 084000 Vehicles 085000 Other equipment 086000 Business machines, organizational aid, communication systems 087000 Office furniture and fittings 088000 Spares for plant and office equipment 089000 Low-value plant and office equipment assets	**0 Tangible and intangible assets (cont.)** 09 Down payments made and assets under construction 090000 Down payments made for tangible assets 095000 Assets under construction	24 Receivables from goods and services 240000 Receivables from goods and services 245000 Bill of exchange receivables from goods and services 247000 Doubtful debts 248000 Protested bill	34 Annual net income/loss 340000 Annual net income/loss	49 Deferred income 490000 Deferred income
		25 Not assigned	35 Special items with reserve 350000 Special items with reserve	**3 Capital and reserves (cont.)**
		26 Other assets 260000 Input tax 263000 Other receivables from tax authorities 265000 Receivables from employees 269000 Other receivables	36 Value adjustments 361000 for tangible assets 365000 for financial assets	367000 Individual value adjustment of liabilities 368000 Flat-rate value adjustment of liabilities 37 Provisions for pension fund and similar liabilities 370000 Provisions for pension fund and similar liabilities
		27 Current asset securities 270000 Current asset securities	**2 Current assets and accrued income (cont.)**	38 Provisions for taxation 380000 Provisions for taxation
		28 Liquid funds 280000–284000 Bank balance 285000 Post office bank account 286000 Checks 288000 Cash 289000 Petty cash	29 Accrued income 290000 Yearly accrual 291000 Sales tax on down payments received 299000 (Deficit not covered by equity capital)	39 Other provisions 391000 - for warranty 393000 - for other incalculable payables 397000 - for loss occurring from uncompleted transactions 399000 - for expenses

A reference to the accounts used in chapter 5 of Roland Fischer's book, *Business Planning with SAP SEM* (cont.)

Account category 5	Account category 6	Account category 7
INCOME	**EXPENSES**	
5 Income	**6 Operating expenses**	**7 Other expenses**
50 Sales revenues from own products and other own services 500000 Sales revenues from own products 500100 Revenue adjustments 505000 Sales revenues from other own services 505100 Revenue adjustments	60 Expenses for raw materials, supplies and purchased goods 600000 Expenses for raw materials/ production material 601000 Expenses for preliminary products/third-party components 602000 Expenses for auxiliary material 603000 Expenses for expendable supply/tools 604000 Packaging material 606000 Repair materials 607000 Expenses for other materials 608000 Expenses for goods	70 Taxes 700000 Trade capital tax 701000 Capital tax 702000 Property tax 703000 Motor vehicle tax 705000 Bill of exchange tax 707000 Export duty 708000 Excise duty 709000 Other taxes
51 Sales revenues from goods and other sales revenues 510000Sales revenues from goods 510100 Revenue adjustments 519000 Other sales revenues 519100 Revenue adjustments	61 External procurement costs 610000 External services for products and other services 611000 Energy 612000 Gas 613000 Water 614000 Freight and additional costs 615000 Sales commissions 616000 Maintenance services 617000 Other expenses for external services	71–73 Not assigned
52 Inventory change (unfinished and finished products) 520000 Inventory changes 520100 Inventory change – unfinished products and not billed services 520200 Inventory changes – finished products	62 Wages 620000 Wages, including extra pay (acc. to collective agreement; as contracted) 621000 Vacation and Christmas bonus 622000 Other payments (acc. to collective agreement; as contracted) 623000 Voluntary bonus 625000 Payment in kind 626000 Payment for industrial trainees	74 Amortization of financial assets and current asset securities and losses on sale of the same 740000 Amortization of financial assets 742000 Amortization of current asset securities 745000 Loss on sale of financial assets 746000 Loss on sale of current asset securities
53 Other capitalized goods on own account 530000 Capitalized goods on own account	63 Salaries 630000 Salaries and extra pay 631000 Vacation and Christmas bonus 632000 Other payments (acc. to collective agreement; as contracted 633000 Voluntary bonus 635000 Payment in kind 636000 Payment for technical/ commercial trainees	75 Interest and similar expenses 751000 Interest expenses 753000 Discount expenses 759000 Other similar expenses
54 Other operating income 540000 Rent revenue 541000 Commissions earned 542000 Own consumption 543000 Other operating income 544000 Income from value increase of fixed assets 545000 Income from write-offs or reductions of value adjustments for receivables 546000 Income from sale of fixed assets 548000 Income from reduction of provisions 548100 Income from reduction of other provisions 549000 Income from other accounting periods	**5 Income (cont.)** 58 Extraordinary income 580000 Extraordinary income 59 Not assigned	76 Extraordinary expenses 760000 Extraordinary expenses
55 Income from investments 550000 Income from investments		77 Corporate income tax expenses 770000 Trade income tax 771000 Corporate income tax 772000 Capital gains tax
56 Income from other securities and loans receivable 560000 Income from other financial assets		78–79 Not assigned
57 Other interest and similar income 571000 Interest revenue 572000 Discount revenue 578000 Revenues from current asset securities 579000 Other similar income	64 Benefits-related deductions and expenses for pensions 640000 Employer's social insurance contribution (wages) 641000 Employer's social insurance contribution (salaries) 642000 Workers' compensation association contributions 644000 Expenses for pensions 649000 Expenses for benefits	**6 Operating expenses (cont.)**
	65 Amortization 651000 Amortization of intangible assets 652000 Amortization of tangible assets (account based) 652001 Amortization of tangible assets (costing based) 654000 Amortization of low-value assets 655000 Extraordinary amortization of tangible assets 657000 Unusually high amortization of current assets	685000 Travel expenses 686000 Entertainment and presentation expenses 687000 Advertising 688000 Contributions
	66 Other personnel expenses 660000 Hiring expenses 661000 Travel expenses assumed 662000 Expenses for internal medical service and industrial safety 663000 Personal insurances 664000 Expenses for further training 665000 Expenses for anniversaries of years of service 666000 Expenses for staff events 667000 Cafeteria expenses 668000 Equalization levy 669000 Other personnel expenses	69 Expenses for contributions, premiums, and value adjustments 690000 Insurance contributions 692000 Contributions to trade associations 693000 Losses on claims 694000 Other expenses 695000 Amortization of receivables 696000 Loss on sale of fixed assets 698000 Appropriation to provisions for warranty 699000 Expenses relating to other periods
	67 Expenses for utilization of rights and services 670000 Rent, lease 671000 Leasing 672000 Licenses and Concessions 673000 Fees 675000 Expenses for monetary transactions 676000 Expenses for commissions (except for sales commissions) 677000 Fees for legal services and consultancy	
	68 Communication expenses 680000 Office supplies 681000 Phone communication 682000 Postal charges	

SAP Chart of accounts (Fisher, R. 2004, attached COA.)

Appendix 4: Tables in SAP R/3 FI module

Table	Description
T001	Company Code
T005	Countries
TCURC	currency dodes
TCURR	exchange rate
TCURT	currency name
T077S	account group (G/L accounts)
T009	fiscal year variants
T880	global company data
T014	credit control area
T004	chart of accounts
T010O	posting period variant
T010P	posting period variant names
T001B	permitted posting periods
T003	document types
T012	house banks

FI-ES tables (S. N. Padhi, 2011. 291-292)

Table	Description
SK1	G/L master-chart of accounts segment
SKB1	G/L master-company code segment
BNKA	Bank master record
BKPF	accounting documents header
BSEG	accounting documents item level
BSAD	accounting: index for customers (clear items)
BSAK	accounting: index for vendors (clear items)
BSAS	accounting: index for G/L accounts (clear item

FI-G/L tables (S. N. Padhi, 2011. 292-293)

Table	Description
KNA 1	customer master -general data
KNB 1	customer master-company code data
KNVV	customer master -sales data
KNBK	bank details
KNVH	customer hierarchy
KNVP	customer partners
KNVS	shipment data for customer
KNVK	contact persons
KNVI	customer master tax indicator

FI-AR tables(S. N. Padhi, 2011. 293)

Table	Description
LFA1	vendor master - general data
LFB1	vendor master -company code data
LFM1	purchasing organization data
LFM2	purchasing data
LFB5	vendor dunning data
LFBK	bank details

FI-AP tables (S. N. Padhi, 2011. 294)

Table	Description
ANKA	asset classes: general data
ANKT	asset classes: description
ANLU	asset master recorde user fields
ANLZ	time-dependent asset allocations
ANEK	document header asset posting
ANEP	asset line items
ANKB	asset classes: depreciation area

FI-AA tables(S. N. Padhi, 2011. 294)