THE PROPOSITION OF CUSTOM DEVELOPMENT MODEL (CDM) FOR ACCOUNT PAYABLE (AP) IN INTEGRATED MANAGEMENT SYSTEM (IMS) AT INTEGRATED KNOWLEDGE AND CAMPUS MANAGEMENT (IKCM)

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For my beloved mother and father,

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ABSTRACT

The goal of the Technical Report is to analyze and recommend the best practice of Software Development Methodology for the IKCM to develop Account Payable (AP) System using Oracle 9i Forms Developer, and how the software development methodology can be applied to web development organizations to help the software developers increase their productivity to produce better quality software, on time, and on budget. As Web technology shifts its paradigm from static document focused to perform more functionality, Web development is becoming more like other software development. The importance is no longer only on the presentation, organization, and contents. When a site is delivered from a server to a customer, client issues, server issues, database issues, and network issues may influence the user's perception of the Web site. To minimize the possibility of failure, a rigorous approach to site development should be adopted. Web development is no longer completely foreign to the concept of traditional software development. There are many models and ideas in software engineering that can be applied to Web development. Rapid Application Development (RAD) of Custom Development Method (CDM) using Oracle Developer Suite is among the choices. An ideal process model for Web Development environment must be easy to apply and help developers address the complexity of a Web site, minimize the risks, deal with the possibility of change, and deliver the site quickly with a high quality. Every set of software process has strengths and weaknesses. What is desirable is a set of software processes by which a web development organization can benefit the most. This Technical Report presents an approach to evaluation of software engineering processes and their application to web development of Integrated Management System (IMS) at UPSI.

ABSTRAK

Tujuan laporan teknikal ini dihasilkan adalah untuk menganalisa dan memperkenalkan satu metodologi pembangunan perisian yang terbaik yang dapat digunakan untuk membangun satu sistem perisian akaun pembayaran menggunakan *Oracle 9i Developer*. Dan juga, bagaimana metodologi pembangunan perisian ini boleh diadaptasikan kepada pembangunan laman web untuk membantu pembangun meninggikan produktiviti untuk menghasilkan perisian yang berkualiti di dalam masa dan kos yang dirancang. Teknologi laman web sering berubah paradigma daripada statik dokumen ke laman web pelbagai fungsi. Membangunkan laman web pada masa ini tidak jauh bezanya dengan membangunkan sistem-sistem yang lain. Kepentingannya tidak lagi tertumpu kepada persembahan, organisasi, dan isi. Apabila sesuatu laman web itu diserahkan kepada pengguna, masalah klien, masalah pelayan sistem, masalah pengkalan data dan rangkaian boleh mempengaruhi persepsi pengguna terhadap laman web yang dibangunkan. Dalam usaha untuk mengurangkan kemungkinan kegagalan, satu pendekatan tepat perlu diadaptasikan. Pembangunan aplikasi deras (RAD) menggunakan *Oracle* merupakan salah satu pilihan. Sesuatu proses model yang ideal untuk persekitaran pembangunan laman web mestilah mempunyai ciri-ciri seperti mudah untuk diaplikasikan, dapat membantu pembangun dalam mambangunkan laman web yang kompleks, mengurangkan risiko, menghadapi kemungkinan perubahan daripada pengguna dan menghasilkan laman web yang berkualiti tinggi. Setiap proses perisian mempunyai kelemahan dan kelebihan yang tersendiri. Apa yang diperlukan adalah satu set proses perisian yang boleh menguntungkan organisasi pembangun. Laporan teknikal ini mempersembahkan satu pendekatan ke arah evolusi proses kejuruteraan perisian dalam pembangunan aplikasi laman web di dalam sistem maklumat bersepadu di UPSI.

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LIST OF ACRONYMS

AP	:	Account Payable
ADF	:	Application Development Framework
API	:	Application Programming Interface
BPR	:	Business Process Engineering
CADM	:	CASE Application Development Method
CASE	:	Centre of Advanced Software Engineering
CASE	:	Computer-Aided Software Engineering
CDM	:	Custom Development Model
CEO	:	Chief Executive Officer
CMM	:	Capability Maturity Model.
CTO	:	Chief Technology Officer
DoD	:	Department of Defense
DSO	:	Days Sales Outstanding
EFT	:	Electronic Funds Transfers
GUI	:	Graphical User Interface
FI	:	Financial Institution
HTML	:	Hyper Text Markup Language
IKCM	:	Integrated Knowledge and Campus Management
IDE	:	Integrated Development Environment
IMS	:	Integrate Management System
ISO	:	International Standards Organization
JAD	:	Joint Application Development
J2EE	:	JAVA 2 Platform Enterprise Edition
MVC	:	Model-View-Controller
OPRM	:	Organization's Process Reference Model
PBSE	:	Process-Based Software Engineering
PSP	:	Personal Software Process

LIST OF ACRONYMS con't.

PTPM	:	Project's Tailored Process Model
QA	:	Quality Assurance
RAD	:	Rapid Application Development
RDMS	:	Relational Database Management System
SDLC	:	Software Development Life Cycle.
SDP	:	Software Development Plan.
SE	:	Software Engineering
SQL	:	Structured Query Language
SR	:	Senior
SRS	:	Software Requirement Specification.
UID	:	Unique Identifiers
UPSI	:	Universiti Pendidikan Sultan Idris

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Built upon strong management and financial tools from budgeting and general ledger to vendor management and reporting, IMS Financial is a complete integrated financial solution enabling the deployment of effective financial processing to deliver convenient, secure and efficient campus supplementary services to students, faculty and staff. It enables reusability of forms and sharing of content, which can be easily and securely accessed from a central database.

1.2 Company Profile

The rapid growths of information technologies have created unprecedented challenges as well as opportunities for educational institutions. These technologies are no longer just supporting educational organizations; they are transforming processes, organizational structures, and the industry of education as a whole.

Integrated Knowledge & Campus Management Berhad (IKCM) was incorporated in 2002 and located at Petaling Jaya, Selangor Darul Ehsan. IKCM instantly found its role in the education industry when it realized the opportunities present in the market of campus management systems.

Since its initiation, IKCM strives to develop a world-class, total integrated Campus and Knowledge Management System. Extensive research was conducted on the requirements for the management of campuses in Malaysia. Based on the research and the expertise of professionals in the education industry, IKCM developed IMS Education, the Integrated Management System (IMS) Education.

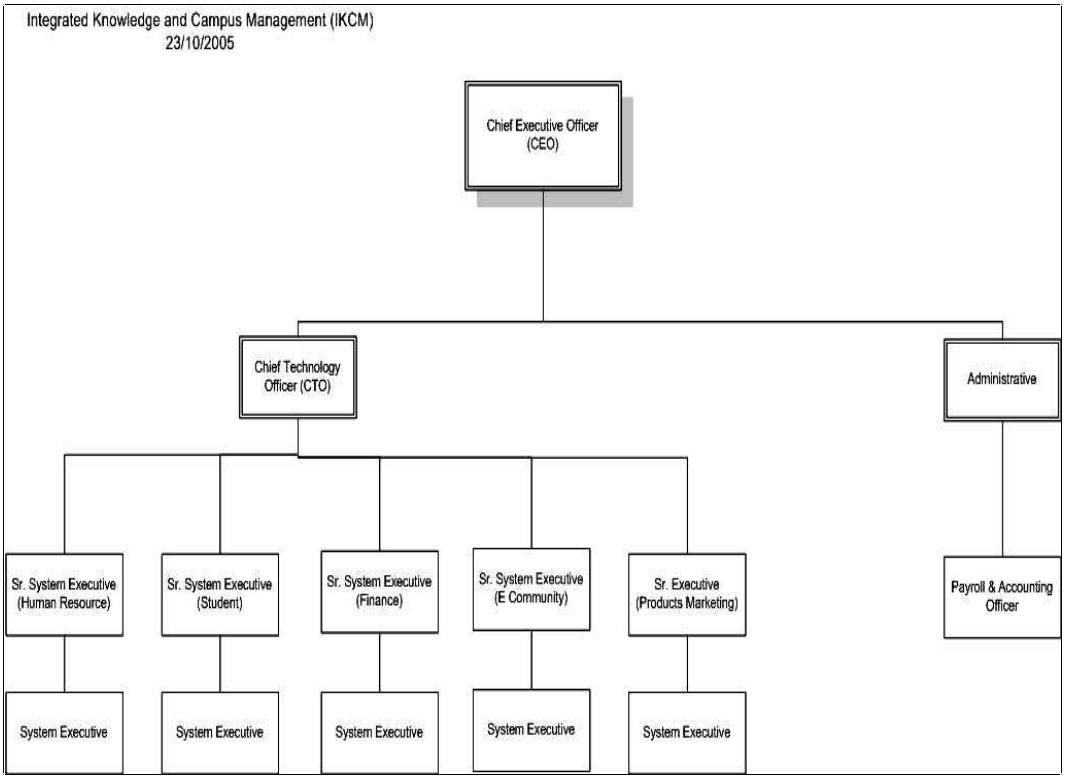

Figure 1.2 IKCM‘s Organization Chart

Source: (IKCM Organization Chart).

The above figure 1.2 (IKCM Organization Chart) shows that Chief Executive Officer or CEO is the highest ranking officer in IKCM. The CEO oversees the IKCM's finances and strategic planning. CEO reports to the board of directors and is responsible for carrying out the board's policies. This executive officer has day-to-day management responsibility. Currently Mr. Richard Azlan Abas is appointing as CEO of IKCM.

The Chief Technology Officer (CTO) is the person responsible for accomplishing the project objectives. He is examining, evaluating, and assessing the impact of potential changes in the market. CTO is constantly evaluating ways to improve the skill set of the development team. That can be through the use of a new tool or technique, or additional training on fundamental skills that the team already knows but doesn't execute consistently. CTO also is often the cheerleader that pumps up the development team, encouraging them to remember the company vision, to be a part of greatness and competitive IT company player in the market. Currently Mr. Amir bin Ayub is appointing as CTO of IKCM.

Senior System Executive is the ones who delivers solutions develops functional requirements from business requirement specifications, coordinates user requirements, reports project progress to management, manages tasks, controls expenses and improves project quality results. He also participates in establishing organization-wide project standards and best practices including developing repeatable processes, policies and procedures, Develops detailed, realistic, and comprehensive plans that support the Software Development Life Cycle and organizational objectives. Each Oracle application will have a dedicated team assigned to design, build, test, deploy and stabilize the applications.

From a technical perspective the System Executive is at the most basic level expected to be able to translate algorithms and technical specifications into code that can be executed on a computer system. System Executive also involve in any of activities regarding business liaisons and product acceptance.

A Marketing Officer finding out what customers want then sets out to meet their needs, provided it can be done at a profit. Marketing officer making customers aware of products and services, attracting new customers to a product or service, keeping existing customers interested in a product or service, building and maintaining a customer base for a product or service.

Last but not least, Administrative officer works activities in IKCM relating to planning, organizing, directing, controlling, supervising and budgeting of day to day operations

1.3 Project background

IMS Education comprises of 5 complete integrated systems, which are designed to support both client and web based applications with a 3-tier architectures: -

1.3.1 IMS e-Community
1.3.2 IMS Student Information System
1.3.3 IMS Integrated Financial System
1.3.4 IMS Human Resource & Administration System
1.3.5 IMS e-Learning

Table 1.3 IMS Financial module functionalities

Modules	Functionality of Modules
Budgeting	Budgeting module is the basis for almost all financial activities. Purchasing, overtime payment, traveling claims, stationary request and petty claims is checked against budget balance. The budget structure is

Table 1.3 IMS Financial module functionalities

Modules	Functionality of Modules
	tracked according to account type, cost center and account code. Virement between funds can also be done by approval and is limited to the budget balance of the transferring funds. Managers may monitor the movement of the budget for future planning.
Purchasing	Purchasing module starts with vendor management where the vendor information and job scope registration is maintained. Errant vendors can be blacklisted. The purchasing process starts with purchasing request from each cost center and approved by the head of department. Any purchase must be within the cost center budget and it is automatically checked by the system. Upon approval, purchase order will be created and approved by IMS Finance system. The order will be printed and sent out to vendors.
Account Payable	Account Payable module manages payment by the institution to its vendors and staff. It also keeps records of the receipt of goods purchased and vendor invoices as well as vouchers from subsystem e.g. payroll, advance claim and traveling claims. Voucher is prepared through this system and bank transactions can be imported for reconciliation. This system also manages the petty cash for each cost center.
Account Receivable	Account Receivable manages payments from customers. Finance officer will be able to view students' invoices and create other types of invoices. Upon payment, receipt will be created and printed and the invoice knocked off. It also record payment from sponsor and knock off students' invoices. Aging

Table 1.3 IMS Financial module functionalities

Modules	Functionality of Modules
	reports can be printed for credit management analysis.
Inventory	Inventory module manages inventory item. Starting from setting up the store until distribution of store item.
Fixed Asset	These module main functions are to register and manage fixed asset records. It also capable to calculate depreciation based on straight-line method.
General Ledger	These module main functions are to keep all entries from all subsystem and also producing financial reports such as Trial Balance, Balance Sheet, and Profit and Loss.
Salary Processing	The Salary Processing system manages the data that relate to staff payroll processes such as bank account, EPF account, Tax account, allowance, deduction and overtime payment. The system allows user to maintain their income information and update the staff allowance and deduction from time to time. The system simplifies the payroll processing by doing all processes and calculation until it gets the net salary for each staff. The system allows staff to view the monthly payroll online. Details and summary payroll reports are also provided. The system also allows users to retrieve all payroll details for previous months and years.
Student Financial Info	Manages student invoices and keep track student ledger.

Besides the basic version of IMS Education, IKCM offers customization to meet different clients' needs. Apart from that, IKCM also provides extensive user training, ensuring clients of the fullest deployment of the system. Figure 1.3 below shows the overall architecture of IMS Financial System.

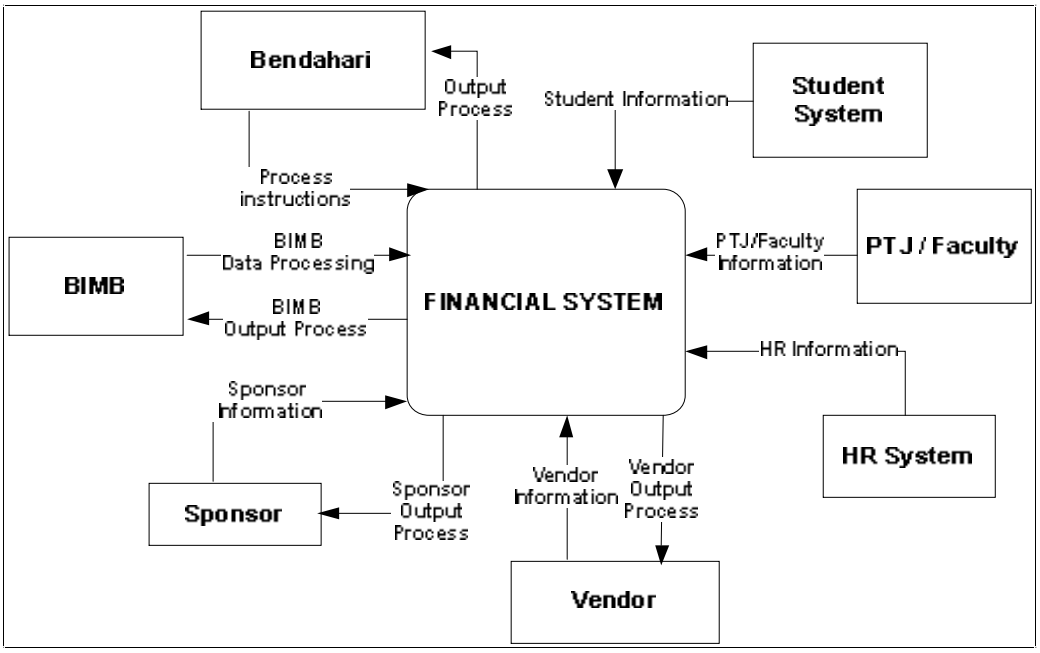

Figure 1.3: Overall architecture of IMS Financial System

As above figure 1.3, accounts payable is a series of accounting transactions covering payments to suppliers' owed money for goods and services. Accounts Payable system is more than just paying bills. The system help build supplier relationships by ensuring that all delivery, payment, and contractual conditions are fulfilled. The system is capable to manage the flow of invoice processing to ensure prompt and accurate processing. The system will add value to the bottom line with targeted use of invoice discounts and tactical timing of cash flow disbursements (Refer to Appendix D for Data Flow Diagram of Account Payable System). Effectively balancing supplier needs,

payment terms, discounts, and cash management requires a flexible and adaptable system that optimizes the entire accounts payable process.

1.4 Importance to company

Account Payable (AP) system will be one of the product in IKCM. IKCM's IMS Financial designed to support and improves company financial (e.g. UPSI) by providing a comprehensive and integrated system for the entire community. AP system is needed to provide IKCM’s high profits and completed the entire educational component system. AP system also will be a proven product that is developed in quality, cost effective and can be delivered to customer as required on time. This will be a benchmarking for IKCM to tender any contract at educational institute in the future.

CHAPTER 6

CONCLUSION

First of all, being able to work in IKCM enabled the trainer to be exposed to the real software development and gain professional experience in software engineering area. As a software consultant for UPSI, not only knowledge in technical and business process is critical, having knowledge in software engineering is a must to every developer to ensure the system can be deliver on time, on budget and with high quality. Software developer must have a broad knowledge in a software process, software tools that support the process and the risk of using the software process. What is really important, the developer must know when to adapt the right software process at the right time.

The trainer also took the opportunity to contribute the good ideas and become active player in team of organization. This is shown with the methodology recommended for IKCM, RAD-CDM which is believed the appropriate methodology to develop iterative development of Account Payable module. RAD-CDM is a solution where a project is having problem with the changing of user requirements and thus will resulting project to be infinite period.

The industrial attachment program has given the trainer an opportunity to work on a full-fledged application, valuable exposure to many developing technologies outside the scope of course study and an insightful experience of working life. The industrial attachment at IKCM has proven to be relevant and vital in the software engineering field.

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