

THE ADAPTATION OF ISO 9126 AND ISO 17799 STANDARD FOR EVALUATION
OF GOLDEN HOPE ESTATE COMPUTER SYSTEM 4 (GH-ECS4) – OIL PALM AND
PAYROLL MODULE FOR GOLDEN HOPE INTERNAL AUDIT DEPARTMENT

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For my beloved mothers, grandmother, brother and the rest of family,
CASE Part Time Batch 5 and friends.

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ABSTRACT

There are a lot of techniques that can be used for the evaluation of software products. However, Golden Hope Internal Audit Department has yet to use any techniques as to measure its in-house software products especially its newly developed Golden Hope Estate Computer System 4. The technique that is used for this technical report is Factor Criteria Metrics (FCM) that was predefined in the ISO 9126 standard to measure each characteristic of software attributes. This technical report will explain on how to derive with the metrics for software measurement instead of using the abovementioned technique and readers will be guided through the implementation of software product evaluation based on ISO standards i.e. ISO 14598 (Software Engineering - product evaluation process), and ISO 17799 (Information Technology- Code of Practice for Information Security Management). This technical report also describes on how to tailor the abovementioned standards to suit Golden Hope Web Based Estate Computer System evaluations. As business needs and technology evolved, the field of software development keep on introducing new approaches and methodologies in order to produce software project that satisfies or exceeds customer's expectations, developed in a timely and economical fashion, better quality and resilient to change and adaptation. Therefore, Golden Hope Internal Audit Department also has taken one step ahead to ensure its practices in software evaluations are benchmarking International Standards. The tailored process of product evaluation will be developed as a reference for Golden Hope Internal Audit Department to face the challenge in supporting business environment in the future.

ABSTRAK

Terdapat pelbagai kaedah dan teknik untuk menilai produk perisian. Teknik yang digunakan dalam laporan teknikal ini ialah dengan menggunakan pendekatan metrik untuk mengukur ciri-ciri dalam setiap atribut perisian yang di ekstrak dari Faktor, Kriteria, Metriks (FCM) seperti yang telah di cadangkan oleh jawatankuasa piawaian antarabangsa didalam dokumen piawai ISO 9126. Namun, Jabatan Audit Dalaman Golden Hope Plantation Berhad masih belum menggunakan teknik tersebut untuk menilai secara kuantitatif perisian komputernya terutamanya Perisian Sistem Komputer Perladangan 4. Laporan ini akan menjelaskan tentang bagaimana untuk menghasilkan metrik-metrik ukuran perisian ini selain dari menggunakan kaedah yang disebutkan tadi dan pembaca akan dipandu dalam pengimplemantasian penilaian produk perisian berteraskan dua(2) dokumen piawaian antarabangsa i.e. *'ISO 14598 (Software Engineering - product evaluation process), dan ISO 17799 (Information Technology- Code of Practice for Information Security Management)'*. Laporan ini juga akan menerangkan tentang prosedur untuk mengadaptasikan piawaian tersebut bagi memenuhi misi dan visi syarikat yang bersesuaian dengan penilaian Perisian Sistem Komputer Perladangan 4. Keperluan perniagaan dan teknologi sentiasa berubah, pembangunan perisian juga tidak terkecuali dari terus memperkenalkan pendekatan dan kaedah terbaru bagi menghasilkan produk perisian yang memenuhi kemahuan pengguna, dihasilkan dalam jangkamasa yang di peruntukkan, mempunyai kualiti yang baik dan beradaptasi kepada arus perubahan teknologi. Jabatan Audit Dalaman Golden Hope telah mengambil inisiatif bagi memastikan segala prosedur dan kaedah yang digunakan dalam penilaian produk perisian adalah berasaskan kepada piawaian antarabangsa yang sepatutnya. Oleh itu,, proses khusus dalam penilaian produk perisaian dapat di bangunkan dan dengan itu menjadi rujukan kepada Jabatan Audit Dalaman Golden Hope untuk menghadapi cabaran dalam menjalankan fungsinya sebagai sistem sokongan kepada Golden Hope di masa depan.

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A LIST OF ACRONYMS

CBA-IPI	:	CMM®-Based Appraisal for Internal Process Improvement
CMM	:	Capability Maturity Model.
CMMI	:	Capability Maturity Model. –Integration
COBIT	:	Control Objective in Information Technology
DOD	:	Department of Defense.
ECS	:	Estate Computer System.
EOD	:	Estate Operation Department.
ERP	:	Enterprise Resource Planning
FCM	:	Factor, Criteria Metric
GHECS4	:	Golden Hope Estate Computer 4
GHIAD	:	Golden Hope Internal Audit Department
GHICT	:	Golden Hope Information, Communication Technology Group.
GH-FM	:	Golden Hope - Factor Metrics
GHPB	:	Golde Hope Plantations Berhad
GQM	:	Goal , Question Metrics
H&C	:	Harrison & Crossfield
H&K	:	Hudson & Knights
ICM	:	Issue, Criteria , Measure
ISO	:	International Standard Organisation
IEC	:	International Electronic Committee
ISO12207	:	Information Technology- Software Life Cycle Processes Standard
ISO 14598	:	Information Technology- Software Product Evaluation Standard
ISO 17799	:	Information Technology- Code of Practice for Information Security Management Standard
ISO 15504	:	Information Technology - Software Process Assessment (ISO

	15504) Standard
ISO 9126	: Product Quality Characteristics Model
KLSE	: Kuala Lumpur Stock Exchange
MTBF	: Mean Time Between Failure
ODBC	: Open Database Connectivity (ODBC);
PNB	: Permodalan Nasional Berhad
PSM	: Practical Software Measurement
QA	: Quality Assurance.
QFD	: Quality Function Deployment Approach
SCAMPI	: Standard CMMI Appraisal Method for Process Improvement
SDLC	: Software Development Life Cycle.
SDP	: Software Development Plan.
SRS	: Software Requirement Specification.
UNEP	: United Nations Environment Programme

LIST OF SYMBOLS

NF	:	quality of the product
N	:	number of metrics implemented
Qi	:	% of quantitative value of the product derived from the metrics
Pi	:	weight corresponding to item i

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CHAPTER 1

INTRODUCTION

1.1 Introduction

It is undeniable that the growths of information technology applications became very crucial in assisted business activities. Information Technology and business are complementing each other in many aspects for profitable advantages. As for Golden Hope Plantations Berhad, there are several GHICT projects that take place in its GHICT Master Blue Print for five years planning. This includes Golden Hope Web based computer system 4, e-library, Enterprise Resource Planning (ERP), etc. Information and Communication technology applications are expected to bring a beneficial purpose for the operational of any different site of business areas. However, as for Golden Hope Internal Audit Department the problems are on how to evaluate (measure) the GHICT products. The evaluation of the application system can be measure by different type of software engineering principles. The most concerns going deeply on cost allocation, time management and the quality of the software product. At Golden Hope there is no formal method exists in evaluating software product. The product quality characteristics should be the prime drivers when assessing and improving the quality of software development process as the user are concerned with the product quality. This chapter shall describes the study on product evaluation methods and techniques that are currently available and acceptable by International Standard Organizations. The study will also focusing on what ways Golden Hope Plantations Berhad as an organization can manipulate those methods and techniques to assist Golden Hope Internal Audit Department in evaluating (measure) its IT software i.e. GHECS4 (currently on trial running at

Sepang Estate). The overview of this project to the target organization's project shall be stated along with its' objectives and scope afterwards.

1.2 Company Profile

Golden Hope Plantations Berhad (GHPB), is a leading Malaysian company listed on Kuala Lumpur Stock Exchange (KLSE) with more than 17, 000 shareholders and over 21,000 employees. GHPB was established in 1844 under the name Harrison and Crossfield (H&C).

In 1990 Harrison and Crossfield (H&C) has been renamed as GHPB to reflect change in management when Permodalan Nasional Berhad (PNB) took majority equity of the company. The company has 160 years of plantations development, management and consultancy experience worldwide and 30 years of property development, management and consultancy experience in Malaysia.

GHPB is also the first Malaysian public listed group with downstream refineries and activities in oils and fats industry in Europe, China, Vietnam, Bangladesh and South Africa. The company is also one of the top 30 companies listed on the Kuala Lumpur Stock Exchange in terms of market capitalization. GHPB is the largest plantations company listed in Bursa Malaysia with more than 180,000 plantation landbank. The Group activities cover three business sectors - plantations, oils and fats and other businesses.

In 2002, GHPB acquired Unimills B.V, second largest refinery in Europe, from Unilever positioning and in 2004, Golden Hope to own one of the very few refineries in Europe that has full product traceability. In 2004, GHPB entry into South African market following the acquisition of the margarine and bakery fats manufacturing business from Unilever. The acquisition included Unilever's refining and blending facilities in Johannesburg. The Group's South African portfolio would be operated by Hudson and Knight Pty Ltd (H&K), Currently, GHPB venture into the healthcare industry with the production of its Tocotrienol product, Tri - E.

Golden Hope produces and processes palm oil, palm kernel oil, rubber and fruits and its processing centre at various locations nationwide.

1.3 Golden Hope Internal Audit Department (GHIAD) Roles

As the contribution for the groups' vision to excel as a global world class organization focused on business activities i.e. plantations and oleochemicals, GHIAD provides recommendations on the company business units over internal business improvements and other internal controls for the Groups. From the Audit Charter, amongst others GHIAD role is to support company's ICT vision and leadership for developing and implementing GHICT strategies and policies. Besides, GHIAD responsible to monitor the implementation of GHICT projects as well as ensuring that business objectives of enterprise are best ICT driven as stated in the GHICT Operational Manual.

1.4 GHIAD Products And Services

To compete in today's global economic market; the group shall be well prepared in managing their business and corporate activities effectively. Besides, in view of the Malaysian Corporate Governance requirements, the group shall ensure that all stake holder investments are managed in transparent and proper manner. GHIAD supporting Golden Hope business functions in several ways i.e. by inspecting the Estate's and subsidiaries compliance against company's policies, procedures and guidelines, reviewing and enhancing the Group's business process, strengthened companies internal controls, safeguarded companies assets, etc. GHIAD was formed in 1982 to handle the abovementioned responsibilities. Products of GHIAD are as follows:

- Special Internal Audit Report
- Routine Internal Audit Report
- Risk Assessment Reports

1.4.1 Golden Hope Estate Computer System (GH-ECS)

GHECS4 is a comprehensive and integrated management information system that caters to the requirement of oil palm/rubber estates, oil mills and rubber factories to help in address the management concerns. Used since 1982, was brought several benefits to estates as well as head office. The benefits of using the system are as follows:

- i. Relieves field supervisory staff of check roll calculation.
- ii. Increases field supervision time for field staff.
- iii. Reduces clerical workload.
- iv. Reporting on timely basis.
- v. Standardizes computations and returns.
- vi. Provides security and controls.
- vii. Provides accurate, up-to-date information.
- viii. Provides cost monitoring tools.
- ix. Provides historical data inquiries.

1.5 Project Objectives

The Industrial Attachment program fulfils part of the requirement in pursuing the Master of Computer Science (Real Time Software Engineering) in Universiti Teknologi Malaysia Kuala Lumpur. The project may expose the student in Software Quality knowledge area of Software Engineering and quality management discipline as prescribed by IEEE computer society in the Guide to the Software Engineering Body of Knowledge.

Besides, the proposal is focusing on product evaluation i.e. GH-ECS4 which based on the ISO 9126 quality model and ISO 17799 which provide standards on comprehensive set of controls comprising best practices in information security. However, the abovementioned standards will be customised or tailored by student using the adaptive processes to suit Golden Hope business processes:

This project is also aim to produce a product evaluation framework model that will enable GHIAD processes on evaluating any new system. The framework may guide the Auditors from various backgrounds (ICT, Finance, Engineering, and Agriculture) on how to perform any ICT product evaluation at the Estate or Headquarter level.

1.6 Specific Objectives

Based on the meeting with the Academic Mentor and has been approved by Director of Internal Audit, there are three (3) main objectives of the project. The objectives are as follows:

1. To produce a framework model for product evaluation specifically for web based Estate Computer System (GH-ECS4) based on ISO9126 and ISO 17799 standards to ensure the product is governed by comprehensive set of controls comprising best practices in information security and the quality of the product is adequately measured.
2. To perform evaluation of GH ECS4 by using the newly produced framework model that was derived from ISO 17799 and ISO 9126 standards to ensure GHECS4 is governed by comprehensive set of controls comprising best practices in information security and the quality of the product is adequately measured.
3. To report the evaluation of GH-ECS4 to the Audit Committee to address any issues arose during the product evaluation activities

Any recommendation and process improvement will be professionally compiled as Internal Audit Report namely Evaluation of Web Based Estate Computer System for Golden Hope Plantations Berhad

1.7 Scope of the review

The evaluation may focused primarily on web based Estate Computer system (GH-ECS4) system and will be guided by the Software product evaluation standard (ISO 9126) and Code of Practice for Information Security Management (ISO 17799) which provide standard on comprehensive set of controls comprising best practices in information security.

Participants in the study were consists of GHICT personnel (Head of Department, Senior Manager, Manager, System Analyst, programmer), Estate's Manager, Assistant Manager, Computer Operator, Chief Clerk, Second Clerk and Internal Audit Team (Director Internal Audit, Senior Manager Internal Audit, IT auditor, Executive, Internal Audit).

1.8 Requester's (GHICT) responsibilities

During the evaluation of GHECS4 the requester i.e. GHICT has agreed to be responsible for the following:

- to establish necessary legal rights in the software product for the purpose of the evaluation, - to provide information necessary for identification and description of the product,
- to state initial evaluation requirements and to negotiate with the evaluator to determine the actual evaluation requirements; these requirements for the evaluation should comply with relevant regulations and standards,
- to state confidentiality requirements concerning the information submitted to the evaluation, to act, whenever necessary, as an intermediary between the developer and the evaluator,
- to provide the evaluator, whenever necessary, with suitable access to computers and other equipment used for development and for operational use of the software product,
- to provide, whenever necessary, support to the evaluator, including training and access to suitable staff,
- to ensure the timely supply, whenever necessary, of the software product, its description and components, including documentation and other material,

- to inform, whenever necessary, the evaluator of any factor that might invalidate the evaluation results.

1.9 Evaluator's (GHIAD) responsibilities

The responsibility of the evaluator i.e. GHIAD during the evaluation project are as follows:

- to check that the requester has the sufficient legal rights in the software product for the evaluation to be performed; to do so, the evaluator may require an attestation from the requester,
- to keep the confidentiality as required, of all the information provided by the requester, including, for example, the product under evaluation, the evaluation records and the evaluation report,
- to provide qualified and trained staff to conduct the evaluation,
- to provide the evaluation tools and technology,
- to conduct the evaluation in accordance with the evaluation requirements,
- to maintain records of any work performed during the evaluation which has an impact on the evaluation results
- to ensure timely delivery of the evaluation report to the requester,
- to provide the visibility into the conduct of the evaluation to the extent requested by the requester.

1.10 Main Deliverables

1. Quantitative Evaluation Plan
2. Records of Evaluation actions i.e. tailoring documents, test cases
3. Draft Evaluation report inclusive evaluation requirements, evaluation specifications and synthesized evaluation results
4. The Reviewed evaluation report

5. Framework model on product evaluation process for any software produced or acquired by Golden Hope Plantations Bhd.

1.11 Project Plan

The project plan is as per *Appendix 1*

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