DESIGN AND IMPLEMENTATION OF A SMART CARD SYSTEM IN SWISS GERMAN UNIVERSITY

By

Kevin Hendrawan

A Bachelor's Thesis Submitted to the Faculty of

INFORMATION TECHNOLOGY

in partial fulfillment of the requirements for the Degree of

BACHELOR OF SCIENCES
WITH A MAJOR IN INFORMATION TECHNOLOGY

SWISS GERM

SWISS GERMAN UNIVERSITY Campus German Centre Bumi Serpong Damai – 15321 Island of Java, Indonesia www.sgu.ac.id

July 2008

Revision after the Thesis Defense on 8 August 2008

STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgment is made in the thesis.

Kevin Hendrawan

line

21 Agustus 2008

Date

Approved by:

Charles Lim Msc.

21 Agums 2008

Date

SI SS Then Inches 1 1 1 1 29 August 2008

Chairman of the Examination Steering Committee

Date

ABSTRACT

DESIGN AND IMPLEMENTATION OF A SMART CARD SYSTEM IN SWISS GERMAN UNIVERSITY

By

Kevin Hendrawan

SWISS GERMAN UNIVERSITY

Bumi Serpong Damai

Charles Lim Msc., Major Lecturer

The purpose of research for this thesis is to explain the impact of a smart card system to the university. The methodologies used to draw conclusion is by analyzing the performance of similar systems in other universities and by interviewing stakeholders.

The focus will be on designing an infrastructure that can best suit the needs of the Swiss German University services. A pilot project will be created in order to justify the benefits that are implied by the infrastructure design.

The conclusion of this thesis is that an E-payment service is the most lucrative smart card based service to be implemented in Swiss German University.

SWISS GERMAN UNIVERSITY



DEDICATION

I dedicate this thesis to my beloved father, mother, and sister



Kevin Hendrawan

ACKNOWLEDGMENTS

The author wishes to express his gratitude to everyone who helped in creating this thesis. A special gratitude goes to the people at PPSI Universitas Indonesia, Mr. Alfredo The from UPH. This thesis would not see the light of day without the guidance and patience of my thesis advisor and co-advisor; Mr. Charles Lim and Mr. James Purnama, thank you.



Kevin Hendrawan

TABLE OF CONTENTS

STATEMENT BY THE AUTHOR	. 3
ABSTRACT	4
DEDICATION	. 5
ACKNOWLEDGMENTS	. 6
CHAPTER I - INTRODUCTION	. 12
1. Background	. 12
General Problem Statement	. 12
3. Objectives	. 13
4. Scope of Analysis	. 13
5. Methodology	
CHAPTER 2 – LITERATURE REVIEW	. 14
2.1 Smart Card Technology Overview	. 14
2.1.1 Smart Card Introduction	
2.1.2 Smart Card Elements	15
2.1.3 Contact-Based Smart Card	. 16
2.1.4 Contactless Smart Card	
2.1.5 Contact-Based Smart Card Reader	
2.1.6 Contactless Smart Card Reader	
2.1.7 Smart Card Operating System	
2.1.8 Smart Card File Management	
2.2 Smart Card Usages	20
2.2.1 Identification	20
2.2.2 Physical Access Control	20
2.2.3 Logical Access Control	
2.2.4 Banking	
2.2.5 Transport	
2.3 Predictive Software Development Life Cycle	
2.3.1 Predictive SDLC Introduction	
2.3.2 SDLC Phases	
2.3.3 Modified Waterfall Approach	
2.4 GlobalPlatform Specifications	24

R

CHAPTER 3 – METHODOLOGY
3.1 Introduction to Pilot Project
3.1.1 Pilot Project Background
3.1.2 Pilot Project Problem 26
3.1.3 Pilot Project Goal
3.1.4 Pilot Project Scope
3.2 Pilot Project Analysis Diagram
3.2.1 Event Table
3.2.2 Use Case Diagram
3.2.3 Activity Diagram
3.2.3.1 Smart Card Management System Activity Diagrams 31
3.2.3.2 E-Payment Management System Activity Diagrams 34
3.2.3.3 E-Payment Terminal Activity Diagrams
3.3 Pilot Project Design Diagram
3.3.1 Pilot Project System Sequence Diagram
3.3.1.1 Smart Card Management System System Sequence Diagram 42
3.3.1.2 E-Payment Management System System Sequence Diagram 44
3.3.1.3 E-Payment Terminal System Sequence Diagram
3.3.2 Pilot Project Design Class Diagram
CHAPTER 4 – RESULT & DISCUSSION 50
4.1 Swiss German University Business Case
4.1.1 Introduction/Background 50
4.1.2 Business Objectives
4.1.3 Current Situation and Problem/Opportunity Statement
4.1.4 Critical Assumption and Constraints
4.1.5 Analysis of Options and Recommendations
4.1.6 Preliminary Project Requirements
4.1.7 Framework Design
4.2 Pilot Project
4.2.1 Pilot Project Assumptions
4.2.2 Pilot Project Limitations
4.2.3 Pilot Project Test 57

Design and Imp	nlementation	of a Smart	Card	System	in	SGI

Page	0	-	17
PAUC	ч	OT	n/
	~	UL	v

CHAPT	TER 5 - CONCLU	ISION AND RECOMMENDATION	60
1.1	Conclusion		60
1.2	Recommendation		60
GLOSS	ARY		61
REFER	ENCES		64
APPEN	DICES		65
CURRI	CULUM VITAE		66



SWISS GERMAN UNIVERSITY