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THE PROCEEDING

Grha ITS, December 21-22, 2010

2nd APTECS 2010

International Seminar on Applied Technology, Science, and Arts

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LPPM - ITS

PROCEEDING

2nd INTERNATIONAL SEMINAR ON APPLIED TECHNOLOGY, SCIENCE AND ARTS - APTECS 2010

THEME

EMPOWERING CREATIVITY THROUGH SCIENCE AND TECHNOLOGY TO ENHANCE NATIONS COMPETITIVENESS

GRAHA SEPULUH NOPEMBER, 21-22 December 2010

Organized by :
Institute of Research and Public Services (LPPM)
INSTITUT TEKNOLOGI SEPULUH NOPEMBER
2010

2nd INTERNATIONAL SEMINAR ON APPLIED TECHNOLOGY, SCIENCE, AND ARTS (APTECS 2010)

OPENING SPEECH OF THE RECTOR OF ITS

Assalamu'alaikum Wr.Wb. Good Morning Ladies and Gentlemen, Let me, first, praise the Almighty God for the blessings and mercies that have made all we have today possible.

Distinguished guests, esteemed presenters and participants, I would like to extend the warmest welcome to all of you attending the 2nd ***Internasional Seminar on Applied Technology, Science and Arts*** **(APTECS)**. I would like to express my profound gratitude to Prof. KISHIDA Satoru for his willingness to join this seminar and to deliver his outstanding lecture on the Prospect of High-Tech Superconducting Oxides and their Surface Analysis Superconductivity, Surface Analysis, and Oxide as the Creative Industry for the Future. This speech would be very contributing to all attending this seminar.

Acknowledgement must also be given to all the attending plenary sessions, the Ministry of Marine Affairs and Fisheries Republic of Indonesia, Dr. Ir. H Fadel Muhammad Al-Haddar; the Chief Executive Officer, Mr. Dahlan Iskan; and Prof. Wayan Dibya who are willing to spend some of their time that I know they are quite compact in schedule**.** Thank you for featuring very inspiring experience and insightful notions that would be very contributing to all attending this seminar to build high comprehensive and up to date prior knowledge. Allow me to express my heartfelt gratitude to many sponsors for their generous financial support.

APTECS is an annual seminar hosted by the Institut Teknologi Sepuluh Nopember (ITS) as the forum of academic sharing focusing on various issues in science, technology and arts. As one of the reputable institutions in Indonesia, it is undeniable that active contributions of ITS would be one of the important considerations to deal with the Asean China Free Trade Agreement (ACFTA) that has been launched since the 1st January 2010. At the same time ceasing International competitions would become one of the agenda that must be done by enhancing as well as empowering the national competitiveness in all aspects including engineering, economy, social, and many others. In fact, regarless of the subsequently and surely diminished natural resources, people today need to be able to find brilliant ways to determine success in economy for the future of this beloved country, Indonesia. Dear Audience, the main point of my speech is that this country would take the global challenge only if we are able to develop dynamic cultures and traditions as a nation. And, ITS, in the Golden year anniversary, would become the leading institution to enliven the competition through the development of science, technology, and not to mention cultures and arts.

Now, dear audience, the seminar is all yours. I hope everyone will find the seminar inspiring and enriching, through presentations and discussions on empowering creativity through science and technology to enhance nation competitiveness. Finally, I wish to see you again in the coming 3rd APTECS seminar, December 2011. I wish great happiness, good health, and much success to each of you. Thank you.

Surabaya, 21 Desember 2010

Rector of ITS

Prof. Priyo Suprobo

OPENING SPEECH OF THE CHIEF OF INSTITUTE OF RESEARCH AND PUBLIC SERVICES

First of all, let us praise God whose blessings have enabled us to band together here in the 2nd International APTECS seminar that, this year, is hosted particularly to commemorate the golden year anniversary of the Institut Teknologi Sepuluh Nopember. It is a pleasure for LPPM to welcome you all the professional researchers either from abroad or all over Indonesia. This is the forum where we can meet colleagues from various specialty areas to develop knowledge, technology, and arts that would, of course, contribute to the lives of the mankind

In the attempt to foster the development of science and technology, basic and applied researches, and industrial researches as well are all the major activities need to be conducted to enhance industrial productivity and competitiveness and to advance our nations unchallenged supremacy; therefore, unless there were any publications and disseminations of research findings and discoveries, researches with high sophisticated findings and contributions would have completely no meaning.

In this global era, without ability to cope with advanced technology and to develop the creativity and innovation, industries would not be able to take part into rigorous competitions. For this reason, then APTECS raises the topic of "***Empowering Creativity through Science and Technology to Enhance Nations Competitiveness".***

APTECS is forwarded to be one of the forums for researchers to disseminate and further discuss the results of researches; furthermore, this forum is promoted to enrich creative and innovative ideas that would be worth considering for further researches. Intensive communication as well as discussions in APTECS would continue the process of advancing science, technology, and arts as well. Moreover, further attempt of this form is to promote the implementation of the research finding to give positive contributions for our beloved country.

All researches and their findings are aimed to keep up and further develop our noble cultural values, arts, and human civilization so that, as a member of world societies, our nation would be much dignified among other nations on earth. By hosting this seminar LPPM-ITS is not only to gain the advancement of the science and technology throughout all the findings offered in this forum but at the same time, to encourage and to enhance the arts and cultural values of this country that would fruitfully signify our existence as a nation.

This academic forum meets annually at the end of the year, and next year we would welcome you to see us again in the 3rd APTECS International Seminar that would offer more laborious topics.

On behalf of LPPM-ITSI would like to express my deepest gratitude to all presenters and participants, and I wish a productive and inspiring seminar.

Surabaya, 21 Desember 2010

Prof. Ir. I Nyoman Sutantra MSc.PhD
The Chief of LPPM-ITS

OPENING SPEECH OF THE COMMITTEE CHAIRMAN

Rector of ITS,
Dr. Ir. H. Fadel Muhammad, Minister of the Ministry of Marine Affairs and Fisheries Ministry
Prof. KISHIDA Satoru from Tottory University Japan
Prof. Wayan Dibya fron Indonesian Arts Institute, Denpasar Bali
Mr. Dahlan Iskan, the Chief Executive Officer of PLN
Distinguished Presenters, all participants, and Colleagues

Assalamualaikum, Wr. Wb.

I am both honored and delighted to welcome you here in this remarkable conference hosted by Institut Teknologi Sepuluh Nopember (ITS) Surabaya in corporation with the Research Institute and Public Services (LPPM) ITS. The conference today takes the topic of "Empowering Creativity through Science and Technology to Enhance Nations Competitiveness".

On behalf of the committee, I would like to thank Prof. Priyo Suprobo, the Rector of ITS, whose full support has enabled all of this possible; Prof. I Nyoman Sutantra, M.Sc, PhD., the head of LPPM who has kept encouraging us in accomplishing all good preparation to welcome you here today until tomorrow; and the support of the board of committee of the golden year anniversary, whose financially support this event. Also, all the sponsors who keep rendering and make today's conference be more easily carried out.

Ladies and Gentlemen,

The interest of the international scientific community is clear, sharing enormous inspiring notions, research findings and innovations. This Conference has attracted 150 domestic and overseas presenters, it means that within two days we will hear 150 oral presentations. The subjects range from descriptions of recent technology, science both natural and social, and arts. So, it is marvelous, isn't it? Only in two days 150 brilliant ideas would have been disseminated and enriched our inventory of knowledge; furthermore, these 150 fresh and prolific ideas will enable this beloved country ready to face the challenge of ACFTA.

Ladies and Gentlemen,

In the middle of us, here we have four notable speakers who would overcome our desire for inputing the latest knowledge delivered in their presentations in the plenary sessions. Therefore, I would like to express my sincere gratitute and warm welcome to Prof. KISHIDA Satoru who comes far away from Tuttori University, Japan; I also feel grateful for the coming of important figures: our Minister, Dr. Ir. H Fadel Muhammad Al-Haddar; Prof. Wayan Dibya from Denpasar-Bali, and Mr. Dahlan Iskan who has been so popular among us, people of Surabaya.

Ladies and gentlemen,
Today's conference is born due to a hard work of all committee and staffs who have spent their time working day by day arranging every detail of the event, so allow me to congratulate their very keen and perfect job that makes me standing up here welcoming all the distinguished guests.

Last but not least, I would like to ask you all an apology for all incovenience that you might find prior, during, or after the conference; we are all just an ordinary man that won't be able to avoid making mistakes. Thank you and have extraordinarily inspiring seminar.

Wassalamu'alaikum Wr.Wb,

General Chairman of 2nd APTECS 2010
Dr. Bambang Sampurno

ACKNOWLEDGEMENTS

Special gratitude is extended to all of the followings:

RECTOR OF INSTITUT TEKNOLOGI SEPULUH NOPEMBER

INSTITUTE OF RESEARCH AND PUBLIC SERVICES – ITS

THE JOURNAL OF IPTEK ITS

MINISTRY OF MARINE AFFAIR AND FISHERIES

TOTTORI UNIVERSITY, JAPAN

PERUSAHAN LISTRIK NEGARA (PLN)

PT. TELEKOMUNIKASI INDONESIA, TBK

PT. TRUBA JAYA ENGINEERING

PT. NAHARADIA PRAKASA

HOUSE OF BEAUTY CLINIQUE

ELEKTRO BUDOYO – ITS

SMKN IX SURABAYA

for never ending supports that have made the 2nd APTECS 2010 held successfully

SCHEDULE
INTERNATIONAL SEMINAR ON APPLIED TECHNOLOGY, SCIENCE, AND ARTS
2nd APTECS 2010

Monday, 20 December 2010

Time	Activities
19.00 - 22.00	Welcome dinner for overseas participants, officially attended by the mayor, Ir. Tri Rismaharini, MT

Day I: Tuesday 21 December 2010

Time	Activities						
06.45 - 07.30	Registration						
07.30 - 07.40	Indonesian Traditional Musical Instruments- Elektro Budoyo : Ayak Talu						
07.40 - 07.50	Traditional Dancing : Jejer Gandrung Banyuwangi - SMKN 9 Surabaya						
07.50 - 08.00	Welcome to 2nd APTECS : Dr. Bambang Sampurno						
08.00 - 08.05	Ladrang APTECS : Elektro Budoyo						
08.05 - 08.15	Colossal Dancing Remo : Elektro Budoyo						
08.15 - 08.25	Speech from The Chief of Research and Public Services - ITS : Prof. I.N Sutantra						
08.25 - 08.30	Opening Term - Rector ITS : Prof. Priyo Suprobo						
11.30 - 12.30	Theme I : The prospect of High - Superconducting Oxides and Their Surface Analysis Superconductivity, Surface Analysis, and Oxide and The Creative for The Future: by Prof. KISHIDA Satoru – Tottori University, Japan Theme II : Central Roles of The Electricity to Enhance the Quality of Nation Competitiveness: by Mr. Dahlan Iskan – PLN Moderator: Prof. Imam Robandi						
	Break for Lunch and Pray						
	A	B	C	D	E	F	G
12.30 - 12.47	Eng-21	Art-1	Eng-65	Eng-87	Sci-1	Eng-51	Eng-105
12.47 - 13.04	Eng-22	Art-2	Eng-66	Eng-88	Sci-2	Eng-52	Eng-106
13.04 - 13.21	Eng-23	Art-3	Eng-67	Eng-89	Sci-3	Eng-53	Eng-107
13.21 - 13.38	Eng-24	Art-4	Eng-68	Eng-90	Sci-4	Eng-54	Eng-108
13.38 - 13.55	Eng-25	Art-5	Eng-69	Eng-91	Sci-5	Eng-55	Eng-109
13.55 - 14.12	Eng-26	Art-6	Eng-70	Eng-92	Eng-117	Eng-56	Eng-110
14.12 - 14.31	Eng-27	Gen-1	Eng-71	Eng-93	Eng-118	Eng-57	Eng-111
14.31 - 14.48	Eng-28	Gen-2	Eng-72	Eng-94	Eng-119	Eng-58	Eng-112
14.48 - 15.05	Eng-29	Gen-3	Eng-73	Eng-95	Eng-120	Eng-59	Eng-113
15.05 - 15.30	Break						
15.30 - 15.47	Eng-30	Gen-6	Eng-74	Eng-96	Gen-9	Eng-60	Eng-114
15.47 - 16.04	Eng-31	Gen-7	Eng-75	Eng-97	Gen-4	Eng-61	Eng-115
16.04 - 16.21	Eng-32	Gen-8	Eng-76	Eng-98	Gen-5	Eng-62	Eng-116

NOTE :

A : Room Argopuro 1
B : Room Argopuro 2
C : Room Kawi
D : Room Lawu
E : Room Semeru 1
F : Room Semeru 2
G : Room Utama

Day II: Wednesday, 22 December 2010

Time	Activities						
06.45 - 08.00	Registration						
08.00 - 08.10	Indonesian Traditional Musical Instrument- Elektro Budoyo : Ojo dipleroki & Kelinciku Ucul						
08.10 - 08.20	Traditional Dancing Pendet - TPKH ITS						
08.20 - 08.30	Indonesian Traditional Musical Instrument - Elektro Budoyo : Ketawang						
08.30 - 10.30	Keynote Speaker III and IV Panel : Theme III: Resilience of National Arts and Culture to Enhance Nation Competitiveness: By Prof. Wayan Dibia – Indonesian Arts Institute, Bali Theme IV : Empowering Marine Resources to Enhance Nation Competitiveness: Dr. Ir. H Fadel Muhammad Al-Haddar – Ministry of Marine Affairs and Fisheries Moderator: Prof. I Ketut Aria Pria Utama						
	A	B	C	D	E	F	G
10.30 - 10.47	Eng-1	Eng-9	Eng-17	Eng-46	Eng-39	Eng-78	Eng-33
10.47 - 11.04	Eng-2	Eng-10	Eng-18	Eng-47	Eng-40	Eng-79	Eng-34
11.04 - 11.21	Eng-3	Eng-11	Eng-19	Eng-48	Eng-41	Eng-80	Eng-50
11.21 - 11.38	Eng-4	Eng-12	Eng-20	Eng-49	Eng-63	Eng-81	Eng-100
11.38 - 11.55	Eng-5	Eng-13	Eng-42	Eng-35	Eng-64	Eng-82	Eng-101
11.55 - 12.12	Eng-6	Eng-14	Eng-43	Eng-36	Eng-85	Eng-83	Eng-102
12.12 - 12.39	Eng-7	Eng-15	Eng-44	Eng-37	Eng-86	Eng-84	Eng-103
12.39-12.58	Eng-8	Eng-16	Eng-45	Eng-38	Eng-77	Eng-99	Eng-104
12.58 - 13.45	Break for Lunch and pray						
13.45- 14.00	Closing Ceremony and Awarding Certificate						
14.00 - 14.30	Preparation for City Tour (Cancelled)						
14.30 - 17.30	City Tour (Cancelled)						
17.00 - ...	See you on 3rd APTECS						

NOTE :

A : Room Argopuro 1
B : Room Argopuro 2
C : Room Kawi
D : Room Lawu
E : Room Semeru 1
F : Room Semeru 2
G : Room Utama

Moderator Day I

A	Room : Argopuro 1	A: Prof. Ir. Noor Endah Mochtar, M.Sc., Ph.D.
B	Room : Argopuro II	B: Prof. Ir. Happy Ratna Sumartinah, M.Sc., Ph.D.
C	Room : Kawi	C: Prof. Dr. Ir. Mauridhi Hery Purnomo, M.Eng.
D	Room : Lawu	D: Prof. Ir. Gamantyo Hendrantono, M.Eng., Ph.D.
E	Room : Semeru 1	E: Prof. Dr. R. Y. Perry Burhan, M.Sc.
F	Room : Semeru 2	F: Prof. Dr. Ir. Suprapto, M.Sc.
G	Room : Utama	G: Dr. Maria Anityasari,ST.,ME.

Moderator Day II

A	Room : Argopuro 1	A: Dr. rer.nat Fredy Kurniawan, MSi
B	Room : Argopuro II	BDr. Ir. A. A. Masroeri, M.Eng.
C	Room : Kawi	C: Prof. Ir. Sutardi, M.Eng., Ph.D.
D	Room : Lawu	D: Prof. Ir. Djauhar Manfaat, M.Sc., Ph.D.
E	Room : Semeru 1	E: Prof. Dr. Ir. Adi Soeprijanto, M.T.
F	Room : Semeru 2	F: Prof. Dr. Ir. Dra. Danawati Hari Prajitno, SE,M.Pd.
G	Room : Utama	G: Dr. Ir. Ria Asih Soemitro, M.Eng., DEA.

Rules of Paper Presentation

1. The allotted time for presentation and question-answer session is 15 minutes for each presenter

2. To keep prompt presentation, bell would ring three times to remind the presenter's available time for presentation. It rings every eight minutes of the allotted time, ten minutes, and the last 15 minutes.

3. It is mandatory that the presenter promptly uses the time allotted.

4. The timekeeper would also strictly watch the time allotted to each presenter.

List of Abstracts:

Effect of Information Technology Maturity Model Process by using Domain Information Technology Acquisition and Implementation in Higher Education

ALEXANDER SETIAWAN

Department of Informatic Engineering,
Faculty of Industrial Technology, Universitas Kristen Petra Surabaya, 60236, Indonesia
email: alexander@peter.petra.ac.id

Abstract— **Utilization of information technology are needed by the institution generally in institutions of higher education in particular are used to exploit information technology in business process, learning process and provide optimal support to higher education institutions. Therefore, it should be managed with goodness the maturity level of information technology in educational institution. In this study, it will apply information technology maturity model using domain Acquisition and Implementation (AI) to show the success of information technology in higher education achieved and according to the target control of higher education. The results of the analysis were used as materials for constructing and factor the maturity of information technology in the higher education institution. Results showed that the application of information technology maturity model can be applied to institutions of higher education by examining the validity and reliabiltas towards maturity model proposed information technology. The results showed that the maturity model as needed. Tests carried out using alpha reliability coefficient 0.75 (75%).**

Keywords— **information technology, maturity model, domain acquisition and implementation, institutions of higher education**

I. INTRODUCTION

In this era of globalization of information technology can be used to deliver learning materials by means of CAI (Computer-Assisted Instruction), for the distribution of learning materials through the Internet, and media communication with experts. Organization of information technology are used to facilitate data acquisition and storage, which by using various software functions, can then be interpreted and transformed into meaningful information, and enables the delivery of this information to users so that it help them to achieve the goals and objectives of higher education institutions in general [2].

Globalization is also supported by the increasingly widespread use of smart technology (computers, telecommunications and electronic office equipment) in all arenas of life. This situation has forced the management company in Indonesia to re-engineer their management systems that have been used to produce products and services [5]. The results of researchs carried out by Choe Min showed a positive correlation between the performance of the information technology and the influence of factors such as the participation of users, the ability of information technology staff, and the size of the Organization [4]. Elements of information technology which are including hardware, software, communications and data availability, based on some empirical studies, information technology has benefits for the working integration both vertically and horizontally, to help companies gain competitive information [3], presents information in a useful form and to send information to other parties as well as other locations [6].

II. FUNDAMENTAL THEORY

Maturity Model Information Technology

The needs of application and maturity of information technology in higher education institutions require the integration of technology and information. This need will be seen in the top-level decisions that must be supported by information technology. General process of information technology can be seen in Fig. 1.

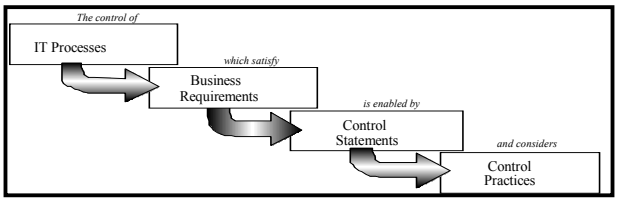

Figure 1. Information Technology Processes

The use of information technology to support the organization or institution in response to the pressure of business / government and to achieve its goal has been regarded as a necessity by each organizations government and corporations. Increasing complexity, interconnectedness, and globalization makes developers of information technology requires huge costs and also cause a variety of risks. At the same time, information

technology also offers tremendous opportunities as a business enabler and change the business pattern of higher education institutions. In Fig. 2. is a pattern of business in higher education institutions.

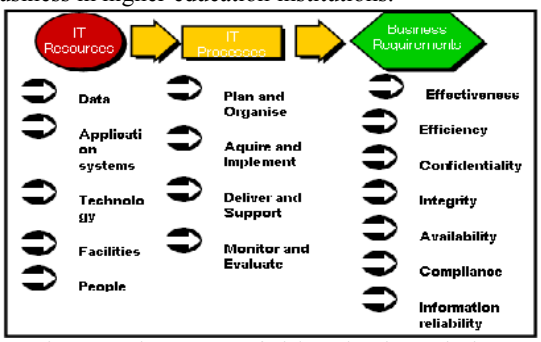

Figure 2.Business Pattern of Higher Education Institutions

III. METHODS

Development of information technology is a process to plan and restructure the technological information that has been implemented and constructed according to the needs of information on an institution. The purpose of the development of information technology is to make use of and development of information technology as a profitable container investment and provide benefits to higher education institutions.Maturity Model allows an organization to measure itself from nothing to be optimized, so the organization can perform measurements on the maturity level there to know the progress of the internal control of the system [6].

Scale maturity model will help professional to explain to the management of higher education where the shortage of information technology management is and to determine targets to compare the organizational control practices against best practice examples. The advantage of the maturity model approach is that it's easy for management to put higher education institutions on a scale and pay attention to what is involved whether they would improve the performance [6]. Process maturity model can be seen in Fig. 3.

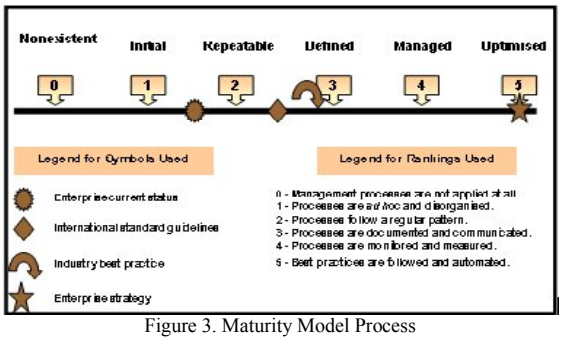

Figure 3. Maturity Model Process

The concept of maturity of information technology is used to determine the extent to which managers use computer-based information technology. The use of information technology will improve the efficiency of effectiveness, quality, and consumer response. Infrastructure differences can impede or accelerate the activities of the organization in responding to the environment.

According to Chenhall and Morris says that the reliability of information is determined by a broad-scope information, which is information technology which represent the focus dimension, time horizon, and quantification, and timeliness of information, the accuracy of information to support the managers face the uncertainty that occurs in the workplace [1]

IV. EXPERIMENTAL RESULTS

In the domain Acquisition & Implementation (AI) encompassing functional purpose in Higher Education in developing studies organization in achieving its outcome of the process of information technology. In addition, developing the policy to provide information technology and procurement procedures in accordance with procurement policies in Higher Education. In the assessment process of maturity level in higher education institutions which is based on domain information criterion Acquisition & Implementation (AI), are including, efficiency effectiveness, acquisition, implementation, compliance, availability, and management of information technology applications and information technology infrastructure. In Figure 5 is a process maturity level assessment in higher education institutions

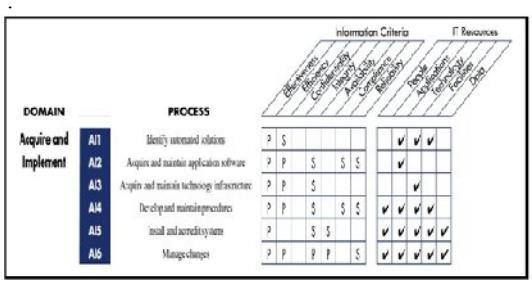

Figure 5. Assessment Process Maturity Level of Higher Education

In Fig. 6. This is an example of a table showing the maturity model which show the statement on the level of maturity. This can be seen in the table there are three statements, each of which has a weight value and weight to a level of maturity is the amount of weight that is worth three. On every question will be given four choices that determine the maturity value statement, namely:

- *Not at all* (Weight = 0), if none of the statement are not met
- *A Little* (Weight = 0,33), if the statement are met only slightly.
- *To some degree* (Weight = 0,66), if the statement are met but not perfect.
- *Completely* (Weight = 1), if the statement are suited with actual circumstances.

	Maturity Level	1
Nr	Statement	Weight
1	The level awareness of the need to manage service levels, b the process is informal and reactive.	1
2	The responsibility and accountability for defining and managing service levels not defined.	1
3	If performance measurements do exist, they are qualitative only with imprecisely defined levels. Reporting is informal, inconsistent and incomplete.	1
	Total Weight	3

Figure 6. Maturity Model Table

The value of each statement in the maturity level will be added and divided by the level of maturity, so we can obtain compliance for every level of maturity. Fig. 7. is showing the calculation due on the maturity level of information technology

Not at all	A little	To some degree	Completely	VALUE
0.00	0.33	0.66	1.00	
		■		11,88
			■	1,101
			■	1,00
			Compliance	0,0067

Figure 7. Calculation of Maturity Model Table

The value of compliance at each level will processed to get the IT process maturity. Each value of compliance will be multiplied by the contribution of each maturity level. The value of this contribution for each level of maturity varies in accordance with the provisions of COBIT, the higher the level of maturity, the higher its contribution.

The calculation process for measuring the maturity level domain based Acquisition & Implementation (AI) can be seen in Fig. 8. In this case the maturity value to process that information technology maturity level is 2.828. It has been noted previously that the maturity value of an information technology process are beetwen 0-5, but not necessarily the whole process of institutions of higher education information technology has a perfect maturity value.

Maturity level (ML)	Sum of statements compliance values (A)	Number of maturity level statements (B)	Not normalized compliance (C=A/B)	Normalized compliance values [D=C/sum(C)]	Contribution (ML*D)
0	0.00	2	0.000	0.000	0.000
1	1.98	4	0.495	0.195	0.195
2	2.32	3	0.773	0.304	0.608
3	1.98	5	0.396	0.156	0.468
4	1.32	3	0.440	0.173	0.692
5	2.64	6	0.440	0.173	0.865
		Total	**2.544**	Maturity Values	**2.828**

Figure 8. Result of calculation of Maturity Level on the Domain AI

Further testing conducted are using the Cronbach Alpha reliability test-(1). Questionnaire testing has satisfactory reliability if it have Alpha-Cronbach reliability coefficient greater than 0.6. The formula used to calculate the Alpha-Cronbach [7]. The results of the test reliability and validity of domain acquisition and implementation (AI) can be seen in Fig. 9.

$$r_i = \frac{k}{(k-1)}\left\{1 - \frac{\sum S_i^{\,2}}{S_t^{\,2}}\right\} \quad \text{..... (1)}$$

$$S_t^{\,2} = \frac{\sum X_t^{\,2}}{n} - \frac{\left(\sum X_t\right)^2}{n^2} \quad \text{..... (2)}$$

$$S_i^{\,2} = \frac{JKi}{n} - \frac{JKs}{n^2} \quad \text{..... (3)}$$

Information:
k = amount of item
$\sum S_i$ = sum of varian item
S_t^2 = total varian
JK_i = sum of squares of all score items
JK_s = sum of squares subject

Item	*Cronbach's Alpha*	*Critical Value*	Result
AI1	0,902	0,75	Reliabel
AI2	0,921	0,75	Reliabel
AI3	0,885	0,75	Reliabel
AI4	0,919	0,75	Reliabel
AI5	0,855	0,75	Reliabel
AI6	0,918	0,75	Reliabel
AI7	0,920	0,75	Reliabel

Figure 9. Result of Reliability and Validity Test on the Domain AI

AI-1 Identify Automated Solutions :
- Define business functional and technical requirements
- Establish processes for integrity/currency of requirements
- Identify, document and analyse business process risk
- Conduct a feasibility study/impact assessment in respect of implementing proposed business requirements
- Assess IT operational benefits of proposed solutions
- Assess business benefits of proposed solutions
- Develop a requirements approval process
- Approve and sign off on solutions proposed

AI-2 Acquire and Maintain Application Software :
- Translate business requirements into high level design specification
- Prepare detailed design and technical software application requirements
- Specify application controls within the design
- Customise and implement acquired automated functionality
- Develop formalised methodologies and processes to manage the application development process

- Create a software quality assurance plan for the project
- Track and manage application requirements
- Develop a plan for the maintenance of software applications

AI-3 Acquire and Maintain Technology Infrastructure :
- Define acquisition procedure/process
- Negotiate acquisition and acquire required infrastructure with (approved) vendors
- Define strategy and plan maintenance for infrastructure
- Configure infrastructure components

AI-4 Enable Operation and Use :
- Develop strategy to operationalise the solution
- Develop knowledge transfer methodology
- Develop end user procedure manuals
- Develop technical support documentation for operations and support staff
- Develop and deliver training
- Evaluate training results and enhance documentation as required

AI-5 Procure IT Resources :
- Develop IT procurement policies and procedures aligned with procurement policies at the corporate level
- Establish/maintain a list of accredited suppliers
- Evaluate and select suppliers through a request for proposal (RFP) process
- Develop contracts that protect the organisation's interests
- Procure in compliance with established procedures

AI-6 Manage Changes :
- Develop and implement a process to consistently record, assess and prioritise change requests
- Assess impact and prioritise changes based on business needs
- Assure that any emergency and critical change follows the approved process
- Authorise changes
- Manage and disseminate relevant information regarding changes

AI-7 Install and Accredit Solutions and Changes :
- Build and review implementation plans
- Define and review a test strategy (entry and exit criteria) and an operational test plan methodology
- Build and maintain a business and technical requirements repository and test cases for accredited systems
- Authorise changes Perform system conversion and integration tests on test environment
- Deploy test environment and conduct final acceptance tests
- Recommend promotion to production based on agreed accreditation criteria

Based on the recapitulation and the test results, we obtained results on the maturity level domain Acquisition & Implementation (AI) is located at around 2828 â 3459, the highest value lies in the AI-2 (Obtain and Maintain Application Software), and AI-7 (Install and Accreditation Solutions and changes). Results summary of mature domain Acquisition & Implementation (AI) can be seen in Fig. 10.

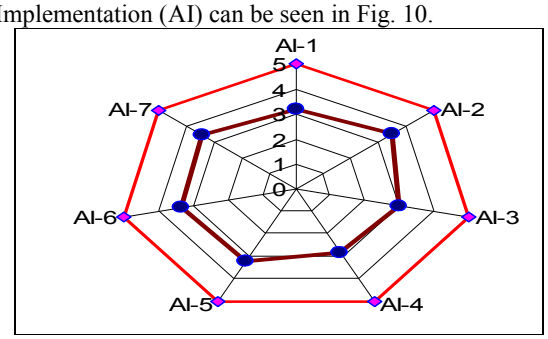

Figure 10. Result of Maturity Domain Aquire & Implement (AI)

The overall result of the maturity of information technology of higher level education institution is presented in graphical form, and can be seen in Fig. 11. which indicates that the presence of information technology and good infrastructure contribute to higher education institutions, students and lecturers. Fig. 11 is a graph of the maturity level of information technology, higher education institutions.

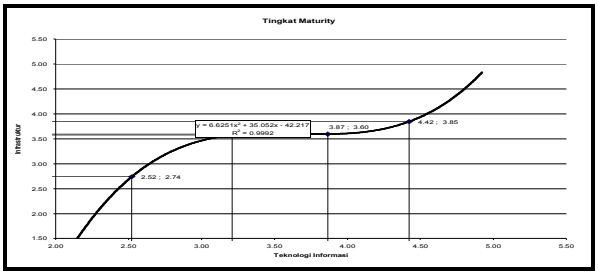

Figure 11. Graphic of information technology maturity level higher education institutions

V. CONCLUSIONS

Conclusions that can be drawn from this study are as follows:

- From the measurement results using maturity model, it is known that the level of information technology in higher education institutions at the recurrent level with an average score of 2828. In general, to achieve a further level of maturity models it need to manage and regulate the process of information technology services, applications and internal information technology infrastructure.
- From the results of mapping the level maturity model, that the process of information

technology and information technology management needs to make adjustments and modifications to information technology, so it can be applied widely to institutions of higher education.

Based on the reliability and validity test, it is shown that maturity model can be accepted by the institution with a measurement with trust level (cronbachâs alpha) of 0921 and the level of validity of 0.75 (75%).

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