Proceedings of

4ᵀᴴ INTERNATIONAL CONFERENCE ON MATHEMATICS AND STATISTICS (ICOMS 2009)

Jointly Organized By :

UNIVERSITAS MALAHAYATI BANDAR LAMPUNG

Muslim Statisticians and Mathematicians Society in South East Asia (MSMSSEA)

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PREFACE

The Fourth International Conference on Mathematics and Statistics is an annual program belong to MSMSSEA (Muslim Statisticians and Mathematicians Society in South East Asia) in collaboration with Institute Statistics of Malaysia (ISM), Persatuan Matematik Malaysia (PERSAMA), Indonesia Mathematics Society (Indo MS), Universitas Malahayati, and Universiti Malaysia Terengganu.

The Participants of the conference are about 100 coming from more than 20 higher institutions, among others Universitas Gadjah Mada (UGM), Institut Teknologi Bandung (ITB), Universitas Indonesia (UI), Institut Pertanian Bogor (IPB), Universitas Putra Malaysia (UPM), Institut Teknologi Sepuluh Nopember (ITS), Universitas Kebangsaan Malaysia, Waseda University Japan, Chinese Academy of Science Sanghai China, University of Twente Netherland, Nasional University of Malaysia, International Islamic University Malaysia, Universitas Guna Darma, Universiti Islam Antar Bangsa Malaysia, Universitas Sriwijaya, Lembaga Sandi Negara.

I hope this conference will be a big class for professor in Mathematics and Statistics and their students to exchange ideas and share of knowledge and experience. This kind of conference will surely have a positive impact on higher education in general as well as in the development of mathematics and statistics and its applications. In addition the conference will encourage the faculty members to do more and more research.

On behalf of the Steering Committe, we would like to express our deepest gratitude to the Foundation of Alih Teknologi, Rector Universitas Malahayati, International advisory Board Members, and to all participants we are also grateful to all organizing committee members and all the reviewers, without those efforts such a high standard for the conference could not have been achieved.

Bandarlampung, 11 August 2009

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MODEL OF IDENTIFICATION READINESS INDONESIAN CONTRACTORS IN ERA GLOBALIZATION

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Abstract Approaching system and problem solving must help with model. Model can describe the problem must solved. In solving identification readiness Indonesian Contractors, the problem must make in model. Indonesia is the ones of countries agree with AFTA. Constructions market of Indonesia is potential market for foreign contractors in era globalization. Beside those local companies in construction industry of Indonesia they have difficult problems causes' monetary crisis. Although condition Indonesia have crisis, contractors of Indonesia must prepare themselves to competitive in era globalization. The step are identification of internal factors (strength and weak) and external factors (opportunity and threat). With determine parameters of internal and external factors from literature study and do survey to experts that consist owners, consultants and contractor in construction industry. So used Analytical Hierarchy Process (AHP) method and calculated with Microsoft excel can knew preparing Indonesia contractor condition and dominant internal and external factors impact to preparing contractors Indonesia in era globalization.

From research result can concluded that Indonesia contractors were not readiness in era globalization competition. The unreadiness value is 0,6659 and readiness value is 0,3441. The value 0.817 of internal factors decribe the internal factors influence Indonesian contractors were not readiness to compete with foreign companies in Indonesian construction market. Beside that, there are several factors that attenuate Indonesian contractors like less vision and mision Indonesian contractor, not all Indonesian contractors have ISO-9000, lack experince in international project, limited human resouce have good skill, profesional and have international certificate, Indonesian economy, Indonesian market, unstable politic in Indonesia, lack in regulation and changed rules, culture of collusion, corruption and nepotism, higher interest and less government policy in credit, insurance etc. All factors give picture of the facts and Indonesian contractors must make new strategies for competition in Indonesian Market.

Key Words : Era Globalization, Internal Factors, External Factors, Analytical Hierarchy Process (AHP), readiness, competition.

1. Introduction

Asean Free Trade Area (AFTA) started at 2003. Indonesia is ones of country have dealed in AFTA. In era globalizatoin era, all of goods, services, money, people and technology free to come every country, not limited in special zone make market to be one and make free opportunities market. Beside that make threatens for companies which did not prepared. So the companies which operated in global market have opportunities to work in not limited economic scale and make threatens to local company (Suwarno, 1998). Era globalizatoin in construction industry gives big opportunities for contractors to expand in new stranger market. In era globalizatoin, construction market allow to local contractors in international competition. Although decision to involved in international construction market to be difficult problem with highest probability. The International projects not only involved highest probabilities in local projects, but the complex risks in international transactions. The failure to understand about politic, economic, culture and law in project can impact to make decision strategic for contractors to involve in a new foreign market (Seung, 2000).

Company of construction service will make foundation of project management for successes in global market in 21 century for completion need the owners. The owners will hope low cost, short period construction, good materials and equipments from the whole world and fast concentration for owner needed. The changes must do with new solution going deep needed to not only in structure organization of company but mind set and critical function for information system, management material supplier and quality assurance (Damorada, 2000). There are changes from the owner in era era globalizatoin which need good solution be included business skill to choose the potentials project to produce profit with decrease risks that predictable with bid save price bidding and can did with comprehensive target that is to make opportunities maximum profit, to make minimalist lost, maintain investment return, achieve absorbed construction market, and defend business with bid competitive price in order to win tender in Indonesia business environment that have multidimensional crisis. Beside to competition in regional and international market, Indonesian contractors must need government support in financing for increased competition, like bank guaranty, interest bank competitiveness and etc. Indonesian contractors have trouble to competition with foreign contractors that have financing with low interest bank (Majalah Konstruksi, 2002).

Indonesian construction market is potential market for foreign contractors in era globalizatoin. Beside that, local contractors in construction Indonesian industry have difficult problem, special human resources not prepare to maintain their capabilities caused monetary crisis. It is proper in era era globalizatoin that becomes opportunity for Indonesian local contractors. But in fact it become new challenge where it make strong pressure of foreign contractors and not capable to adaptation the local contractors with global condition. So construction markets for local contractors become decreased. The problems were faced by local contractor are increasing high technology construction, increasing quality activity, there are no international statements for professional capability of Indonesian contractors and foreign engineers have capability more professional than Indonesian engineers (Majalah Konstruksi,1999).

Although ndonesian condition in multidimensional crisis, and Indonesian contractors did not have government support in financing, they must prepare themselves in era era globalizatoin. Solutions for preparation era globalizatoin competition are identification internal and external factors. Internal factors are strengths and weakness of Indonesia contractors. External factors are opportunities and threats of Indonesian contractors. All of factors identified for research condition of Indonesian contractors to compete with foreign contractors in competition Indonesian construction market. The factors evaluated for input Indonesian contractors to increase capacity of Indonesian contractors in era era globalizatoin.

1. Era globalizatoin in Construction Industries

Alteration economic global give opportunity business for construction companies in whole of the world. Consequences, all contruction companies expand the international construction market. Hastak (2000) research that characteristic construction companies in era globalizatoin are compete to take new project and increase profit for construction companies without zone boundary. To success competition in long period, Torbica (2001) determined 6 (six) parts for construction companies will excellent in served constumer in global are:

1. Companies must adapt their expertise with effective cost apporiate with need customer in era globalizatoin.
2. Companies have technology information sytem for fasted to transfer data that can relied on all of purpose in the world.
3. Staf have skill to thinking global in delegation design function to engineers on different location.
4. Companies used material supplier effectively from various location in the whole world for take the profit from less fabrication cost and nearer with construction location.
5. Companies have knowledges in using local material and local technology contruction for minimize the cost and take the profit.
6. Companies will guarantee that quality requirement can achieve in final contruction produc without take note of location.

2.1. Indonesian Construction Industries In Era globalizatoin

In free trade in the future, Indonesia agreed to Agreement Stabling the World Trade Organization and ratified on 2 December 1994. As consequences, Indonesia government made commitment to international for open the Indonesian trade access. In trade sector, Indonesia government did deregulation five service sectors include monetary service, telecommunication service, relationship ocean service, construction service and tourism service. So, industries construction Indonesia will open with competition foreign industries construction. Prabono (1999) divided Indonesian construction market in two parts:

1. Domestic markets are market that followed only Indonesian contractors.
2. International markets are market that followed by foreign contractors and not all Indonesian contractors followed the market.

So, Indonesian construction market give opportunities for Indonesiaan contractors and give challenges for Indonesian contractors compete in Indonesia.

2.2. Era globalizatoin Risk in Construction Industries

In last decade, companies less focus in international trading. Companies more focus in local market approximately. The various foreign companies aggresive came to the other country with their products. There are foreign companies come to the other country, companies had lost opportunities to come the another market. Era globalizatoin in construction industries is giving big opportunities for contractors to expand the new foreign market. Although international construction market increase uncertainty in domestic construction project and have complex risks for international transaction. Failure to understanding condition project in politic, economic, culture and rule could effect to strategic companies to took decision for enter the new foreign market. Seung (2000) devided risks in every countries are not the same. Companies must learned risks for enter construction market every nation. Total risks in international construction project as following figure 1.
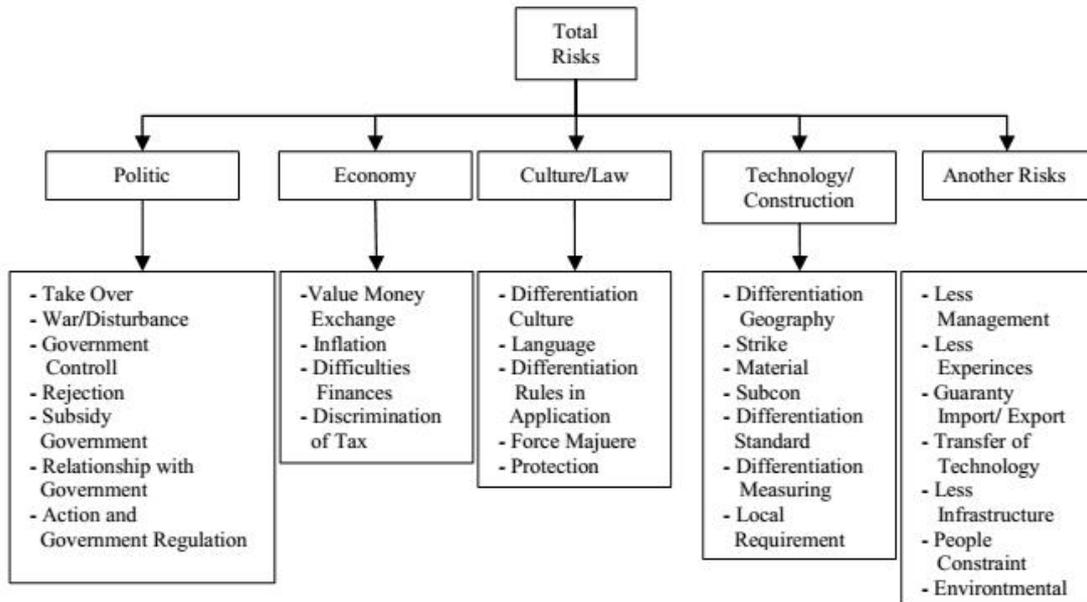
Figure 1 Total Risks in International Construction Project

2.3. Competition Contractors In Era globalizatoin

Era globalizatoin started with orientation companies from domestic market to international market, development technology and communication device and agrement in free trading international. Without constraint in era globalizatoin, market become open and opportunities to enter market become wide. Construction industries in all of country in the world is ones of industries have high competition with high risk and have low profit margin. Mochtar (2000) evaluted the principle price strategy used in construction industries that based cost. Special procedure in price that based cost included estimated project cost that aplicated with mark-up for take profit.

2..4. Defence Strategy in Era globalizatoin

Johnson (2001) have opinion that the succes companies in future are companies that take decision now for follow in global business and familiar with what the companies do today. For competition in global, companies must do plan to determine companies goal. Wee (2002) determine that companies must know themselves, competitior and enverientment that effect to companies. Wee cite quotation from war strategy Sun Tzu that is "You knew your enemy and yourself, You did not loose your victory. You know the field and situation, your victory can completely.

3. Methodology Research

In the research, the method that used is survey method for take primer data with give quisioner to respondents. The respondent are experts in construction industries that consist owners, consultants and contractors. In collecting data research, there are three step collecting data:
1. The first step are step for identification parameters for internal and external factors that effects to preparation Indonesian contractors.

2. The second step are step for analysis dominant internal and external factors that effect to preparation Indonesian contractors compete in Indonesia based value that used in Analytical Hierarchy Process (AHP).
3. The third step are step for cross check about parameters dominan internal and external factors that effect to Indonesian contractors compete in era globalizatoin.

The first and the second step colleting data did to nine expert from companies and institution. So the third step, survey did to expert and the members of Asosiasi Kontraktor Indonesia (AKI).

For solve this research, the research used Analytical Hierachy Process (AHP). Skibniewski (1992) discover AHP is a logic framework and problem solving that attain with opinion, feeling, decision, and remember capacity in a hierarchy of strength that effect to result. With this technical, the complex decision problem can divided in small parts appropriate with focus of goal parts that want decision maker. In a structure hierarchy, the goals see in on top of the structure. Every strength elemen made in a matrix:

$$A = \begin{bmatrix} w_1/w_1 & .. & w_1/w_n \\ .. & .. & .. \\ w_n/w_1 & .. & w_n/w_n \end{bmatrix}$$

Where as:

w_1/w_j = i factor more important then j factor.

n = sum of factor that divided

n factors more important can difine:

$$AW = \lambda_{maks}.W$$

Where as:

$W = (w_1,...,w_n)^T$ = the vector relative bigger

λ_{maks} = the biggest eigen value from matrix A.

In decesion maker, to be important to know how good consistency the respondent. AHP calculated all consistency from various opinion in consistency rasio. Value consistency ratio (CR) must ≤ 10 %. If value CR more from 10 %, that opinion maybe approximately random and maybe necessary correted. Saaty (1986) correted CR with equation:

$$CI = (\lambda maks - n)/(n-1)$$

$$CR = CI / I$$

Where as:

λ_{maks} = E-Value

n = Sum of matrix

I = Index of random consistency (according with table Index of random consistency)

4. Model of Identification preparation Indonesian Contractors in Era Era globalization

Parameters of internal and external factors that effect preparation Indonesian contractors in era globalizatoin obtained from quisioner in the first step. So, the result survey made the model for identification preparation Indonesian contractors in era globalization to answer preparation level Indonesian contractors in era globalization. This model is hierarchy model preparation level Indonesia contractors in era globalization. To answer goal of model, it used metode Analytical Hierarchy Process (AHP). There are several things that must attention i.e. goal the model, criteria of model, sub criteria of model, factors of model and alternative preparation level (preparation or not preparation). The model of

identification preparation Indonesian contractors in era globalization sees in figure 2. So used Analytical Hierarchy Process (AHP) method and calculated with Microsoft excel can knew readiness Indonesian contractors condition and dominant internal and external factors impact to preparing Indonesia contractors in era globalization. The result of model can see in table 1, table2, and table 3.

Tabel 1. Normalized Matrix and Eigen Vector Criteria

Criteria	Internal	External	Sum	E-Vector
Internal	0,8175	0.817	1.634	0.817
External	0.183	0.183	0.366	0.183
Sum	1.000	1.000	2.000	1.000

Tabel 2. Matrix Eigen Value Maximum and Index Consistency Critera

Criteria	Internal	External	Sum of Row	Sum of Row/ E-Vector
Internal	0,8175	0.817	1.634	2.000
External	0.183	0.183	0.366	2.000
Sum	1.000	1.000	2.000	4.000
			E-Value	2.000

CI = 0.000
CR = 0.000

Goal	Preparation Indonesian Contractors in Era Globalization
Criteria of Model	Internal Factors — External Factors
Sub Criteria of Model	Strength — Weakness — Opportunity — Threat
Factors Model	
Level of Readiness	Prepared/Not Prepared

Strength:
- Vision
- Culture
- Controll

Weakness:
- ISO 9000
- Project
- Language
- Manage
- Funding
- HRD
- Riset Institution
- IT
- Price

Opportunity:
- LPJK
- Economy
- Market
- Material
- Autonomy
- Joint Venture
- Rupiah

Threat:
- Politic
- Regulation
- Foreign Company
- Collusion, Corruption And Nepotism
- Tax and Custom
- Credit
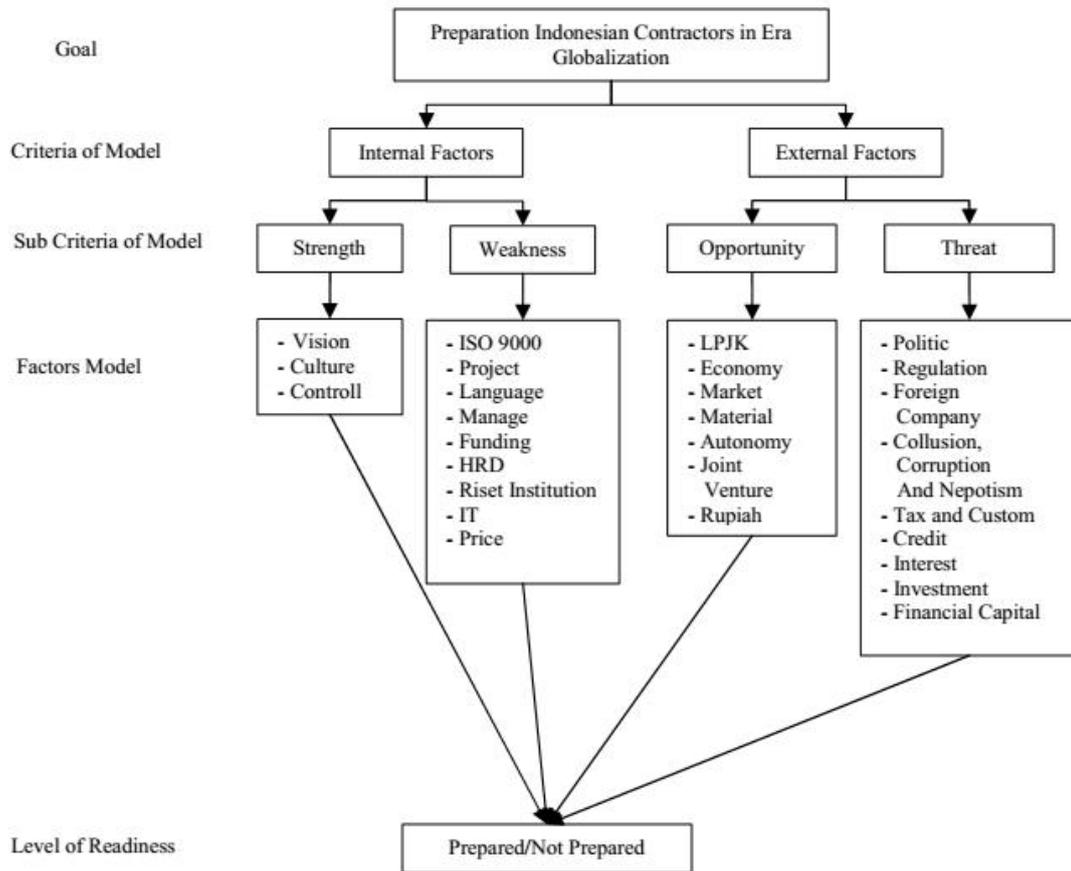- Interest
- Investment
- Financial Capital

Figure 2 Model of Identification preparation Indonesian Contractors in Era globalizatoin

The result describe the value 0.6659 from total factors that explained Indonesian contractors were not ready for compete in era globalization to compete with foreign companies in Indonesian construction market and 0.3344 from total factor that explain Indonesian contractors were ready for compete in era globalization to compete with foreign companies in Indonesian construction market. There are several dominant factor that effect in Era Globalization. Several dominant factor cross checked with the members of Asosiasi Kontraktor Indonesia (AKI) in third step. The result dominant factors can sees in table 4.

Tabel 3. Level Readiness Indonesian Contractors In Era Globalization

	Criteria E-Vector (1)	E-Vector Sub-Criteria (2) (1)xE-Vector	E-Vector Factor (3) (2)xE-Vector	E-Vector Ready (4)	E-Vector Not Ready (5)	Level Readiness (6) (3)x(4)	Level Not Readiness (7) (3)x(5)
Internal Factors	0.817						
- Strength		0,1281					
Vision			0.0843	0.7777	0..2223	**0.0655**	**0.0187**
Controll			0.0148	0.7679	0.2321	0.0114	0.0034
Culture			0.0290	0.8405	0.1595	0.0244	0.0046
- Weakness		0,6888					
ISO-9000			0.1943	0.2132	0.7868	**0.0414**	**0.1528**
Project			0.1652	0.2982	0.7018	**0.0493**	**0.1159**
Funding			0.0324	0.2759	0.7241	0.0089	0.0235
Manage			0.0694	0.2918	0.7082	0.0202	0.0491
HRD			0.0850	0.1935	0.8065	0.0164	0.0685
IT			0.0599	0.2918	0.7082	0.0175	0.0424
Language			0.0235	0.2620	0.7380	0.0061	0.0173
Riset Institution			0.0322	0.2266	0.7734	0.0073	0.0249
Price			0.0271	0.2711	0.7289	0.0073	0.0197
Total Internal Factors						**0.2759**	**0.5411**
External Factors	0.1830						
- Opportunities		0.0403					
LPJK			0.0032	0.7865	0.2135	0.0025	0.0007
Economy			0.0161	0.7475	0.2525	**0.0121**	**0.0041**
Market			0.0101	0.8371	0.1629	**0.0084**	**0.0016**
Material			0.0019	0.7991	0.2009	0.0015	0.0004
Autonomy			0.0036	0.7474	0.2525	0.0027	0.0009
Joint Venture			0.0017	0.7642	0.2358	0.0013	0.0004
Rupiah			0.0036	0.7642	0.2358	0.0027	0.0008
- Threats		0.1428					
Politic			0.0397	0.2296	0.7704	**0.0091**	**0.0306**
Regulation			0.0266	0.1701	0.8299	**0.0045**	**0.0220**
Foreign Companies			0.0039	0.2982	0.7018	0.0012	0.0028
Collusion, Corruption and Nepotism			0.0260	0.1540	0.8460	**0.0040**	**0.0220**
Tax and Custom			0.0079	0.1632	0.8368	0.0013	0.0066
Credit			0.0118	0.1568	0.8432	**0.0018**	**0.0099**
Interest			0.0153	0.1540	0.8460	**0.0024**	**0.0130**
Invesment			0.0065	0.2101	0.7899	0.0014	0.0051
Financial Capital			0.0051	0.2378	0.7622	0.0012	0.0039
Total External Factors						**0.0582**	**0.1249**
Total Factors						**0.3341**	**0.6659**

Table 4. Dominant Factors that Effect in Era Globalization

No.	Dominant Factors			
	Strength	**Weakness**	**Oppotunities**	**Threats**
1.	Vision	ISO-9000	Economy	Politic
2.		Project	Market	Regulation
3.		HRD		Collusion, Corruption And Nepotism
4.				Interest
5.				Credit

Conclusion

From the result above, Indonesian contractors were not ready compete in era globalization. The value 0.6659 describe the Indonesian contractors were not ready compete in era globalization to compete with foreign companies in Indonesian construction market. The value 0.3441 describe the Indonesian contractors were not ready compete in era globalization to compete with foreign companies in Indonesian construction market. The internal factor more dominant than external factor to effect the Indonesian contractors were not readiness compete in Indonesian construction market. The value 0.817 of internal factors decribe the internal factors influence Indonesian contractors were not readiness to compete with foreign companies in Indonesian construction market. Beside that, there are several factors that attenuate Indonesian contractors like less vision and mision Indonesian contractor, not all Indonesian contractors have ISO-9000, lack experince in international project, limited human resouce have good skill, profesional and have international certificate, Indonesian economy, Indonesian market, unstable politic in Indonesia, lack in regulation and changed rules, culture of collusion, corruption and nepotism, higher interest and less government policy in credit, insurance etc.

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