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The Understanding Level Towards Ethic Among Malaysian Civil Engineers: A Comparison Between Public and Private Sector

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ABSTRACT

Malaysia aims to become a fully developed country in year 2020 and therefore one of its performance indicators is through the successful of its construction industry. However, many unethical conducts in construction are reported formally and informally which are in a form of unfair conduct, negligence, conflict of interest, collusive tendering, fraud, confidentiality and propriety breach, bribery and violation of environmental ethics. Civil engineer is one of the main construction industry key players in Malaysia who are of public and private sector. They have one of the biggest role, yet a wider chance to involve in ethical conduct. It is hard to judge one as an unethical person without considering the whole element of ethic. However, initial evaluation on the understanding level towards ethic is essential to then describe the ethical behavior of Malaysian civil engineers. Therefore this study is conducted with the main objective to determine and compare the understanding level towards ethics among civil engineers in Malaysia. This study also wants to evaluate the involvement of organization toward ethics application from the civil engineers perception as well as to measure the understanding level, statements adopted from Board of Engineers Malaysia (BEM) Engineers Code of Ethic related to four elements of core ethical values; integrity, honesty, accountability and responsibility were stated in the survey to be scored on the agreement or disagreement by the Malaysian civil engineers. Questionnaire survey was adopted as the main method and was distributed online to 1008 civil engineers equally of public and private sector. The questionnaires were completed by 287 respondents and data acquired was analyzed using Statistical Package for the Social Sciences (SPSS) software. Analysis include descriptive, frequency, comparative and correlation test. The results show that generally civil engineers in Malaysia understand what ethic is all about and manage to distinguish the ethical and unethical conducts in their daily routine. However, public civil engineers seem to have better understanding as compared to those of private. Those respondents agreed that their organization is concern towards ethic application but there is no significance influence from the organization to their engineers in understanding ethic.

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INTRODUCTION

Malaysia is considered as a fully developing country in the world and is aiming to be a developed country according to its own mould on 2020. Malaysia has achieved its goals and success in many fields of industry including constructions sector. However, there are too many constraints and problems in the system construction projects in Malaysia which are able to prevent Malaysia from achieving its Vision 2020 target. The problems and constraints including of delay in many projects to be accomplished, corruption, dispute, bad workmanship and negligence of parties involved in designing and constructing before, during or after the project complete (Ho, 2011). Malaysia still cannot erase the history on 11th December 1993 where the tragedy of one of the building of Highland Towers had collapse. SM (2006) mentioned that it was the first and the worse tragedy that had happened in Malaysia after achieving independence on 1957. The collapse of Stadium Sultan Mizan Zainal Abidin was investigated and the results show that most of the factors are related to the unethical conducts. The main factors of this tragedy are because of the failure in the design and also the poor construction of the roof of this stadium. Furthermore, there is no quality control being done during the construction of this stadium by the

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responsible (Ismail, 2010). To expect those engineers to perform their daily practice and routines ethically, they should understand clearly what ethic is all about.

Construction industry involves many parties including professional such as architects, engineers, quantity surveyors. In Malaysia, the civil engineers who involve in this industry are of two different sectors which are the public and private. The civil engineers from both sectors have their own duty and responsibility in particular projects. The private civil engineers are usually responsible in works of design while the public civil engineers are usually responsible to check or endorse the design, ensuring it is complied with specification and standards.

Unethical conducts in construction industry are believed to occur due to many construction issues related to defects, structural collapse and more were reported in media. Activities of delivering and accomplishing a project not in accordance to the initial drawing, approved bill of quantity (BQ) and specification in order to cut the cost and duration of the projects do happen in the routine (JKR, 2012). Furthermore, fraud and bribery also happen among those industrial key players at different stages and level in order to gain and win for the license, tendering, negotiation, approval of the project or receive until the completion of a project (Chik, 2005). Initial investigation to determine the ethical or non-ethical behavior of a person could be done by evaluating one's understanding level towards ethic. Therefore this study is conducted with the objective to evaluate the involvement and concern of organizations towards ethics application from the perspective of their civil engineers. Furthermore, it is also to investigate and to compare the understanding level towards ethics among civil engineers in Malaysia in public and private sector.

This study is not meant to measure the ethical behavior among civil engineers in Malaysia. The main focus is to evaluate the ethics understanding among those civil engineers of both public and private sector. The civil engineers in Malaysia from randomly selected public and private organizations were given questionnaires consist of ethical or unethical statements that were put into circumstances or situations for them to rank their agreement or disagreement. This study also focused only on four elements of core ethical values which are honesty, integrity, responsibility and accountability. The questionnaire was created and distributed online through www.surveygizmo.com. to 1008 respondents. All of the raw data from the survey were analyzed statistically using SPSS 18.0.

This study is expected to give a better justification on the understanding level towards ethic among Malaysian civil engineers. A higher measurement and evaluation towards Malaysian civil engineers could be done based on the findings of this study. Furthermore, it will also help to enrich the literature review related to ethical concept among engineers generally and in Malaysia specifically. Much importantly, this study is quite significant to be a pilot study for further or upcoming studies related to ethical behavior among civil engineers in Malaysia.

Literature Review:

Civil Engineer and Ethics:

This study focuses more on the civil engineers. The civil engineer is an engineer whose division of work is in designing and maintaining roads, bridges, dams, and buildings and any other similar structures that need to be constructed (ASCE, 2006). A civil engineer can be defined as a person who involve in engineering sector and concern with the analysis, design, methods, and materials of great structures like bridges, highway, traffic, transportation system, buildings, infrastructure such as water treatment facilities, and drainage Rabins (2005). Being in any profession, ethic is not to be taken lightly. Ethics for civil engineers are to be complied when it comes to the matter of design, construction, financial and management.

Rosenthal and Rosnow (1991) define ethics as the system of moral values by which the rights and wrongs of behavior are judged. Not only should ethics refer to values but, in order to secure operation, reference must be made to principles and standards regarding behavior. While Hinman (1997) distinguishes morals and ethics by regarding morals as first order beliefs, and practices about what is good and what is bad which guide behavior and ethics as second order, reflective consideration of moral beliefs and practices. According to Oxford Dictionary, ethics can be defined as moral principles that can help in controlling and managing a person behavior in conducting of an activity. Engineering ethics is important in construction and engineering sector to improve capacities and abilities of an engineers in facing any moral issues that arising from engineering works and activities that he or she being involved. It includes engineering as social experimentation, engineers' responsibility for the safety and rights of engineers.

Code of Ethics:

Code of ethics is a code that states and lists the rights, duties, and responsibilities of professionals. It is written by groups or organization to be use by the members of the group or organization. In Malaysia, BEM Engineers Code of Ethic is mainly the reference. In ethics, there are generally elements of core ethical values to be considered which are integrity**,** honesty, responsibility, accountability, charity, fidelity, trust, social skill, good communication and self discipline (Bucknam, 2002). In this study, only four of these elements of core

ethical values were chosen to evaluated among the civil engineers in Malaysia as due to the familiarity to the engineers, stated in the earlier market survey. Those four elements were integrity, honesty, accountability and also responsibility. Accountability can be defined as a situation or a condition of being accountable where according to this dictionary, accountable a requirement in justifying an action or decision is (Dictionary, n.d.). Responsibility can be defined as the state or fact of having a task or duty to be handled or deal with something or of having control over someone while integrity defined is the state of being whole and undivided. Lastly, honesty is an action of free of deceit, truthful and sincere (Dictionary, n.d.).

Public and Private Civil Engineering Organization:

Civil engineers in Malaysia are mainly of public and private sector. Public engineers' task is much on checking and endorsing the private engineers' job. Public organization is likely related to authority while private organization is more on the consultation and construction. Both sectors are expected to have an equal role and responsibility concerning with ethic application in organizations respectively. An organization concern towards ethic is important where the action and attitude of the top management will be a strong influence to the workers . An unethical company or organization will fail to be competitive (Smith, 2010). A good company or organization must design, spread and also improve the content of code of ethics from time to time (Kang, 2004). McNamara (1999) stated that company or organization also must have a department that responsible towards matter related to ethic. A department of ethics will help to manage the organization or company concern towards ethics. Finally, a company or organization also must consider and concern with the situation of unethical and ethical action among the employee (Suen, 2007). The top management and also the department of ethics must alert, aware and concern on any situation among the employee either it is ethical or unethical.

Methodology:

The main approach of the study is by distributing questionnaires to determined respondents, with the expectation of getting completed questionnaires from more than 200 samples. The results were analyzed using the Statistical Package of Social Science software (SPSS) before discussed.

Questionnaires Formulation:

The main method of data collection is through the online questionnaire survey. The questionnaires were distributed randomly according to equal numbers meant for each state and sector, through email. A market survey through www.surveygizmo.com was conducted earlier to assess respondents' preference towards the main questionnaire survey before it took place. In the market survey, four questions were asked related to the respondent's preference on the method of distribution for the questionnaire survey, familiarity to elements of ethical value, to include respondent's name and organization and lastly their preferred correspondence detail.

The online questionnaire body was divided into three sections. The first section namely Part A, contain of questions related to respondent’s personal information. The second section namely Part B consisted of ten (10) questions related to the organization concern towards ethic application from the perception of the engineers. The final section namely Part C consisted of 20 statements group according to the four elements of core ethical value which are honesty, integrity, responsibility and accountability. The statements provided in the questionnaire survey were made based on the fundamental canons in the BEM Engineers Code of Ethics.

Sample Determination and Distribution:

Few methods of determining the sample size were referred. Israel (1992) and Krejcie (1970) suggested a number of sample by referring to table and an equation to be used respectively. According to both reference, the sample size shall be more than 300. However, both method are best used when the exact population is known. In this study, the exact population of civil engineers in Malaysia is not known as BEM did not have the updated data to the date the study was conducted. Then Sekaran (2009) suggested that sample size shall be ten times larger than the variable tested, without considering the exact population. There are six variables in the questionnaire for this study inclusive of organization, integrity, honesty, accountability, responsibility and last variable is Part C which is the total mean of integrity, honesty, accountability and responsibility. Six variables multiply by ten is equal to 60 sample size. Therefore, this study was expected to collect more than 200 completed questionnaires as the targeted sample. Overall, the sample size for this study is 287 which is acceptable. In order to gain the acquired sample size in a short period of time, 1008 numbers of questionnaires in total has been distributed to the targeted email address that had been listed earlier randomly and equally for both sectors. Each sector received 504 questionnaires which then being divided equally into 14 countries in Malaysia. The data collection through online questionnaire started on 1st of March 2013 and ended on 31st March 2013. Due to time constraint, the distribution process took only 1 month of duration before the raw data being analyzed.

RESULT AND DISCUSSION

Data from questionnaires are best analyzed using the statistical analysis which involve the descriptive and frequency analysis and much more (Mustaffar *et al*., 2006). Correlation test was also conducted to see any relationship among variables tested. Statistical analysis will give better justification and interpretation of high samples study. All of the descriptive and frequency analysis in this study were done for the Part B and Part C of the questionnaire, using the SPSS 18.0 instead of the manual calculation.

Demographic Characteristic:

Table 1 shows the frequency analysis of the sample profile which had been filled by the respondents in distributed questionnaire. Part A of the questionnaire is mainly related to the demographic of the respondents. From the total 287 samples, the highest respondents were male which is relevant enough as engineering field is mainly empowered by men rather than women. Majority of the respondents were from public sector and the highest number are of authority type of company, which may suggest that public engineers are more interested to response to any ethical issues or matters and therefore it might indicate the significance of the result regarding the ethic understanding level in which public engineers scores are better than private. Furthermore the highest respondents are from the civil/structural sub-discipline and that is clear enough to show that civil and structural works dominate most of the construction works taken place in Malaysia in which it could be observed directly through all the building and infrastructure development projects.

Those with experience more than 5 years represent the majority of the respondents and it is significance enough as the total respondents of age 31 and above is 169 compared to age 30 and below which are only 118 respondents. This could indicate that engineers of age above 30 are more interested and perhaps sure enough to give views related to ethics due to their higher experience in the engineering world. However, there is no trial made to evaluate the effect of the age and the experience towards the ethic understanding level.

Majority of the respondents are qualified with bachelor degree while only 30% and 4% are qualified with Masters Degree and phD respectively. In Malaysia, it is common for the minimum qualification to be an engineer is to have the bachelor degree. Promotion or job rank is mostly done according to the experience, rather than academic qualification.

Generally there is no intention of looking at any relationship between the demographic data and the ethic understanding level. However, that analysis could be done for further study related to ethic in construction.

Table 1: Frequency analysis on samples profile

Variable		Frequency (No.)	Percentage (%)
Gender	Male	186	64.8
	Female	101	35.2
Working sector	Public	163	56.8
	Private	124	43.2
Years of experience	< 5 years	108	37.6
	≥ 5 years	179	62.4
Type of company	Contractor	34	11.8
	Sub-contractor	7	2.4
	Authority	111	38.7
	Consultant	73	25.4
	Developer	12	4.2
	Other	50	17.4
Sub-discipline	Civil/structural	197	68.6
	Environmental	10	3.5
	Water/ hydrology	15	5.2
	Geotechnical	22	7.7
	Highway & Transportation	34	11.8
	Other	9	3.1
Level of education	Diploma	2	.7
	Bachelor Degree	192	66.9
	Master Degree	86	30.0
	PhD	7	2.4
Monthly income	Less than RM2000	11	3.8
	RM2001-RM3000	51	17.8
	RM3001-RM4000	75	26.1
	RM4001-RM5000	45	15.7
	Above RM5000	105	36.6
Age	25-30 years old	118	41.1
	31-35 years old	61	21.3
	36-40 years old	36	12.5
	Above 40 years old	72	25.1

Organization Concern and Civil Engineers Understanding Level Towards Ethic:

Table 2 shows the Independent Sample T-test for significance difference between variables. "Organization" is the variable for organizational concern while "Overall" is the total mean of integrity, honesty, accountability and responsibility The result indicates that respondents of both sectors are close to agree that their organization is concern about the ethical value and application. There is no significant difference between the sectors. The organizations happen to realize the importance of ethical value to be applied in managing a company and employees. The organizations believe that to form a good employee and workplace, it has to start from the organization, especially the top management in being the role model to the employees. This finding is supported by a study that said a majority (77.3%) of the respondents' firms practice their own code of ethics (Yap, 2010). Vee and Skitmore (2003) found that 45% of the construction companies in Australia have an Ethical Code of Conduct in their organizations.

The result also shows the civil engineers in Malaysia of both private and public sector are having an appropriate and reasonable level of understanding towards ethical values based on the four elements of core ethical values. Civil engineers in Malaysia seem are able to distinguish between the dos and don'ts in conducting their job. This finding is supported by the 70% of agreement from the professional that integrity, accountability, responsibility and honesty in order to avoid unethical conducts (Rahman, 2008). Matters which are in accordance to the main code of ethics are understood well by the Malaysian civil engineers, which the scenario is reflected by the shown result. To be able to understand the actual meaning of ethical behavior is important before one is to be evaluated as being ethical or not.

However, the result shows that there is a significance difference in the understanding level towards ethic between public and private civil engineers. The results suggests that public engineers are more clear and aware in understanding the ethical behaviour during delivering their job. As most of public engineers in Malaysia are related to the authority group in which among their main task of works are to evaluate and to endorse the works done by the private engineer, this result gives a relevant resemblance to how the public engineers are clear enough of what ethical understanding is all about. Private engineers in contra, being in various types group of company, might have a different view and perception in understanding ethic.

Table 2: Independent Sample T-test for significance difference

Variables	Public (n:163)	Private (n:124)	Mean Difference	t	df	T-test (Sig)	Significant Difference
Organization	3.6150	3.7325	-.1174	-1.575	285	.116	NO
Integrity	2.0699	2.5871	-.5171	-5.270	210.789	.000***	YES
Accountability	1.9448	2.3000	-.3552	-3.858	227.832	.000***	YES
Honesty	2.2356	2.4000	-.1644	-1.917	231.132	.057	NO
Responsibility	2.4785	2.5613	-.0828	-.942	208.452	.347	NO
Overall	2.1822	2.4621	-.2799	-3.665	199.654	.000***	YES

*. Difference is significant at the 0.05 level (2-tailed).
**. Difference is significant at the 0.01 level (2-tailed).
***. Difference is significant at the 0.001 level (2-tailed).

Correlation Between Organization Concern and Engineers Understanding Level Towards Ethic:

The results in Table 3, 4, 5 shows the correlation between organization and the understanding level towards ethic of civil engineers as a whole, between organization and the understanding level towards ethic of public civil engineers and between organization and the understanding level towards ethic of private civil engineers respectively. The results shows that that there are significant inter-correlations in some paired factors and not others. Based on the results, the factors integrity, accountability, honesty and responsibility have significantly positive relationship with each other. It means with an increasing in one of these factors, the other factors will rise too. On the other hand, organization correlates negatively with the other research factors, so that with an increase in organization ethical behaviour concern, the other factors will decrease.

This result may suggest to us that the organization concern towards ethics does not influence the understanding level and perception of ethics among civil engineers in Malaysia. Ethical values can be taught and exposed to individual. However, the exact understanding and application do not wholly depend on the surrounding factors but also on the individual personal value which is called as personal ethic. This is also proven by the result in Table 4.5 which shows that the private organization is more concern towards ethics application and understanding than the public company. However, the result in Table 4.5 shows that the understanding level of public civil engineers is better than the private civil engineers.

The correlation test also shows the four elements of core ethical values are correlated to each other for both public and private civil engineer. Each of these variables are correlated positively and significantly based on the r values close to 1 and the p-values of lower than 0.05. The result indicates that a civil engineer with an appropriate understanding of a particular ethic element will have a good understanding on other elements either. For instance, a civil engineer who has a reasonable understanding of what integrity is in performing his works will also has a reasonable understanding of what being honest, accountable and responsible is. Theoretically, the

result is relevant as the understanding of ethic means the understanding of those elements comprise in the ethical concept.

Table 3: Correlation value between variables for both groups as a whole

	Organization	Integrity	Accountability	Honesty	Responsibility	Part C	
Organization		.996	.328	.465	.947	.623	Sig. (2-tailed)
Integrity	.000		.000	.000	.000	.000	
Accountability	-.058	.686**		.000	.000	.000	
Honesty	-.043	.560**	.649**		.000	.000	
Responsibility	.004	.496**	.536**	.547**		.000	
Overall	-.029	.843**	.872**	.824**	.768**		
	Pearson Correlation (r)						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
***. Correlation is significant at the 0.001 level (2-tailed).

Table 4: Correlation value between variables for Public Engineer

	Organization	Integrity	Accountability	Honesty	Responsibility	Part C	
Organization		.542	.048*	.503	.869	.461	Sig. (2-tailed)
Integrity	.048		.000	.000	.000	.000	
Accountability	-.155*	.569**		.000	.000	.000	
Honesty	-.053	.438**	.559**		.000	.000	
Responsibility	-.013	.320**	.360**	.364**		.000	
Overall	-.058	.776**	.829**	.777**	.653**		
	Pearson Correlation (r)						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
***. Correlation is significant at the 0.001 level (2-tailed).

Table 5: Correlation value between variables for private sector

	Organization	Integrity	Accountability	Honesty	Responsibility	Part C	
Organization		.302	.847	.534	.934	.602	Sig. (2-tailed)
Integrity	-.093		.000	.000	.000	.000	
Accountability	-.018	.737**		.000	.000	.000	
Honesty	-.056	.645**	.715**		.000	.000	
Responsibility	.007	.622**	.667**	.681**		.000	
Overall	-.047	.872**	.896**	.865**	.850**		
	Pearson Correlation (r)						

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
***. Correlation is significant at the 0.001 level (2-tailed).

Conclusion:

From this result, it can be concluded that both private and public organization are concern about ethics application generally. Specifically, the concern level towards ethic application from the perspective of civil engineers of private organization is better as compared to the public organization. According to the result, the public company might improve the effort to portray a better concern on the ethics application from the perspective of their engineers in managing the organization. This finding has fulfilled the first objective of the study.

The results conclude that both private and public civil engineers are generally having an appropriate understanding level towards ethics in delivering their works and tasks. Civil engineers in Malaysia seem to be able to differentiate the dos and don'ts stated in the code of ethic statement, given in situations and events that are faced by them in daily works. This is then concluding that the second objective of the study is fulfilled.

The final objective is achieved by comparing the understanding level towards ethic between public and private civil engineers in Malaysia which is the key finding of this study. The results shows that though both public and private civil engineers have an adequate understanding level towards ethic, the public civil engineers understanding level seems to be better than the private civil engineers. Given any situation or events related to ethical or unethical behavior, public civil engineers aware and understand more as compared to private. The result is however contradicted to the finding of organization concern towards ethic from the engineers' perception which the private company seems to apply and concern more as compared to public. This come to another conclusion that company concern and application towards ethic behavior do not affect the understanding level of ethics of their engineers as ethical behavior is also influenced by one's attitude.

As a whole, all objectives are fulfilled and it can be said that the understanding level towards ethics among our civil engineers are important before they are assessed as an ethical or unethical person. To simply judge people being unethical is unfair enough if they themselves could not distinguish their understanding between the

dos and don'ts. Therefore, this study has given a better explanation and comparison on the understanding level towards ethic among civil engineers in Malaysia.

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