

Double-Layered Scheme of Protection to Meet Environmental and Business Challenge: A Case Study in MM2100 Industrial Estate (IE)

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Abstract. *The world is in quantum leap. Technology innovations are everywhere. The world is hungry for the production-edge. This is now visible in Southeast Asia, wherein manufacturing facilities of the modern world are like mushrooms as it grows in and out of the metropolitan cities, including Indonesia. Yes, most Southeast Asian countries, especially Indonesia get the benefit of having the jobs as a host country of those manufacturing giants and get better Foreign Direct Investment (FDI), which generally create a better life for the people. However, there are negative impacts when the industrial sectors made a rapid progress. This massive expansion is a threatening scenario to the host community when sustainable developments were not applied. This case study focused on how double-layered scheme of protection meet the environmental and business challenge to sustain and make balancing on this rapid development. It renders solution as to how environment will be protected while businesses will enjoy the benefit of returns. It is true that it is a great challenge to everyone, to all sectors of community, such as the Local Government Units (LGU's) and the private sectors as well, and to all stakeholders to get a sustained development within the host community. The concept of Double-Layered Scheme of Protection is to protect the Environment with the accidental and some intentional discharge of waste water from the businesses that is housed inside the IE and eventually continue with the business operations between regulator-and-locators thus making both in a win-win condition. It is true that the most important component that is always being affected by the technological advances especially in the arena of advance manufacturing is the water in the environment. This nevertheless is always the issue, and this writing is a great contributor to have the double-layered scheme of protection to meet the environmental and business challenge. Findings in this study revealed that most manufacturing companies are being inconsiderate to their factory discharge even they are located outside and inside the IE's. Local government units that regulate and implement the standards sometimes just close their eyes and snub the consequences of negative environmental impacts. It is true in most developing countries. Most of us can see lenient sanctions when the demarcation lines over the regulatory limits are crossed. These kinds of situation usually happen in the developing countries in which the government is the direct regulating institution that supervise, monitor, control and enforce the regulations. If sustainability is not easy, we can still forgo to the rapid industrialization without sacrificing the water pollution from businesses that affect the environment. This writing will meet those environmental and business challenges through an Industrial Estate that has double-layered scheme of protection and enhanced implementing rules and regulations (IRR) which is by now undertaken in MM2100 Industrial Estate. By the time that more IE's will be built here in Indonesia, and company influx is in the IE's, then the enormous benefit from the Double-Layered Scheme of Protection will surely meet the Environmental and Business Challenge.*

Keywords. *technology innovations; industrial estate; foreign direct investment; environmental impacts; industrialization; advance manufacturing.*

I. INTRODUCTION

A. Background of the Study

Water is the most important and the most essential constituent of life support. When there is no water, nobody could live. Almost all of our bodies of water have become polluted due to rapid industrialization. Some of the pollutions are man-made due to human activity and population growth. Contaminated drinking water due to poor sanitation, arising from the activity of human, create serious problem in human health. Most of the sources of pollution in the water are sewage and other waste, effluents from industrial sector, industrial waste from chemical industries and others. Therefore water pollution simply means addition of harmful chemicals to natural waters.

The cause of most diseases is from polluted water source. Most populations are served by surface water such as rivers, lakes, brooks, streams and seas. When the degradation of this surface water is abused, adverse impact in the quality of human drinking water is at risk. (Katmandu University Medical Journal, 2006) As part of the degradation of the water is at the industrial waste sector, then this writing is implying that the industrial estate's double-layered scheme of protection can meet environmental and business challenge.

Since industrial effluent is a part of pollutions mentioned, then an industrial estate has big role to this effect. "Industrial Estate (IE)" refers to a community of industries and companies in a tract of land subdivided and developed, provided with infrastructure, utilities and amenities, with complete and wide array of plans, with an uninterrupted services to businesses inside, under a unified continuous management with or without pre-built standard factory buildings and community facilities for the intended use. (Philippine Economic Zone Authority [PEZA], 1995) As these subdivided tract of land were sold to investors (commonly called Locators), then industrial estate developers are obliged to provide facilities needed to operate a manufacturing plants such as electricity, water, roads, bridges, telephones, internet facility, gas, sewer lines, and other services. As more and more company locates in the Industrial Estate, then, water pollution starts to accumulate.

Subsequently, the companies that were not housed inside IE's do have the contribution to the water pollution. They have more leeway to do business and discharge effluents with less monitoring from the authority. This is nevertheless the effect of a rapid degradation of the surrounding water and the cause of the water pollution that is happening in the environment mostly in rivers, lakes, seas and in all bodies of water. Some call these polluters the footloose companies.

In order to balance the industrial effects to the environment, while businesses will still forgo and operate at the fullest with good profit, the most logical way is to house the manufacturing firms inside the IE thus the Double-Layered Scheme of Protection will be availed by the manufacturers and yet the regulator of the IE will be also a winner to these scheme. Winners are the companies that locate inside IE and regulator as well.

B. About the Company

MM2100 Industrial Estate was a fully integrated industrial estate developed by PT. Megalopolis Manunggal Industrial Development (MMID). It was established in 1990 by two well regarded corporation; Marubeni Corporation of Japan and Argo Manunggal Group of Indonesia. As of the time of this project writings, it has 180 manufacturing facilities and supporting companies that were housed inside this MM2100 industrial estate that do their business. So far, with the current situation, this MM2100 industrial estate was well regarded as the best valued industrial estate in Indonesia. The proven management skill and enhanced enforcement of the rule over the monitoring and control of the environment made MM2100 industrial estate the best managed industrial estate. Further, in the year 2015, MMID captured all the best performances in the field of industrial estate management namely:

- ☐ Best performance in management and services 2015
- ☐ Best in environmental management 2015
- ☐ Best performance in infrastructure and facility 2015
- ☐ Green Proper 2013-2014

C. MMID's Vision and Mission

The vision of MMID is “to be Indonesia’s leading industrial provider of superior business environment and services for manufacturing companies and its related operations”.

MMID’s mission is to develop, manage and promote industrial estate for major foreign and local investors to satisfy their needs for operations based on continuous improvement and innovation by:

- ☐ Providing reliable, efficient and environmental friendly facilities and amenities with world standard quality and outstanding support services to customers
- ☐ Establishing and maintaining a safe and harmonious business environment for the customers as well as promoting mutually supportive relationship with the host communities
- ☐ Creating the best value for the shareholders and a rewarding work environment for the employee

D. MMID's Quality Policy

MMID quality policy was to give the best quality of works and services for the customer satisfaction. Environment department was being governed by professional officers and staff of which mostly were accredited by the Ministry of Environment and the government regulating bodies. Environmental quality management was of primary concern. MMID was the first ever and the pioneering company in Indonesia that has Environmental Control Officers (E.C.O.) Association within the estate that hand-in-hand working together as a group to overcome the Industrial Estates Environmental worries.

MMID was now an Integrated Management System (IMS) company, having chosen the field of management integration on ISO: 9001 proving the quality and consistency of management for industrial management and services, ISO: 14001 for providing the quality, systematic and consistent approach of industrial estate management and services in the long term impact of environment, ISO: 18001 for the industrial estates occupational, health and safety services for the employees and for the locators.

E. Infrastructure

Electricity :

Seventy percent of the electricity was supplied by Cikarang Listrindo (CL) which was an excellent private power provider company with almost unlimited capacity for any industrial requirement. This CL has its own dedicated powerlines to the MM2100 IE being generated from a gas-powered power plant just 5 kilometers away. The remaining thirty percent was supplied by PLN with an installed electrical sub-station inside MM2100 IE to ensure the seamless supply of power within the estate.

Telecommunication :

Telecommunication was provided by PT Telekomunikasi Indonesia with availability of up to 10,000 lines. The international direct dialing and data communications for speed internet and voice clarity were available through a leased-line provided by PT Indosat, PT NTT, ICON+ and Telkomsel.

Industrial Water Supply :

MMID has its own industrial water treatment plant with a total capacity of 72,000 m³ per day. The process was a rapid sand filtration system with plate settlers to ensure the quality of water to be at an industrial grade. This water treatment plant was stationed into 3 locations to

make a balance distribution with good supply pressure. The 3 locations have an independent capacity of 12,000 m³ per day (Phase-1), 30,000 m³ per day (Phase-2), and 30,000 m³ per day respectively.

Waste Water Treatment Plant :

As the time of this writing, there were two waste water treatment plants. The conventional process was a 27,000 m³ per day using the surface aeration process. The activated sludge was being processed via dehydrator to produce the sludge cake. These sludge cakes were being transported via licensed transporter, Waste Management Indonesia, to their facility at Bogor. The other 45,000 m³ per day waste water treatment plant was a new and innovated technology called Organica waste water treatment plant. This was a process with a bio-film attached growth to increase the habitat of the bacteria that will further enhance the treatment. These 2 waste water treatment processes cater the second-layer of defense (the vital component of this writing) in case there were breached on the effluent of any locator doing business inside the IE.

Roads and Alleys :

The main road of MM2100 IE has a width of 41 meters up to 50 meters and the secondary road has a width of 18 meters to 20 meters respectively. The center of the road was planted with trees to increase the aesthetic values of the land and make the by-passers feel the comfort of green surroundings. The wide sidewalks were provided for all the employees of the IE to make sure of the safety while they were walking and going to their respective companies.

Other Infra Services:

The area was supplied with a natural gas through an underground pipeline by PT Perusahaan Gas Negara (Persero) (PGN), and the industrial gas was provided by the PT Air Liquide. MMID also construct MM2100 Service Apartment, as seen in Figure 1, with one hundred two (102) rooms available for the expatriates to live.



Fig. 1 - Source: <http://www.mm2100.co.id/>

MMID has developed partially the MM2100 Industrial Town phase-per-phase in 3 segments containing 1,005 hectares and as of this date of writing, the industrial lots herein were already sold out.

F. Objectives Of The Study

The intent is to confirm that the double-layered scheme of protection can meet environmental and business challenge and as to how the IE developers can improve the monitoring and enforcement on the rules and regulations with its available resources, infrastructure and assets on hand. These needs to be funded with limited resources. Since the most logical solution to these issues which has to be carried out was still unclear then, this writing will construe the needs to such improvement.

With these, the main objective of this study therefore was to determine if double-layered scheme of protection can meet the environmental and business challenge in MM2100 Industrial Estate with enhanced enforcement of the rules.

In addition, the following were the specific objectives of this study:

- To determine whether this case study can be a boost to the government to attract businesses using industrial estate as the model of eliminating water pollution problems
- To improve the businesses by locating the manufacturing facility inside the industrial estate thus eliminating the water pollution problem and at the same time enjoying the benefits of the sustainable development with high business returns.
- To determine the factors that can contribute to the realization of improving the current situation of monitoring the businesses that pollutes the environment

G. Significance Of The Study

When the issue to the problem was resolved through the way how this study was presented, this can be generally applied to other industrial estates in Indonesia with the same related operations. Subsequently, implementing institutions can therefore have the full grasp on how the environmental and business challenge is met through the effective use of double-layered scheme of protection inside industrial estate with enhanced enforcement.

Moreover, those businesses that were in footloose can be pulled-in into the industrial estates and warmly join in the clusters of companies that were housed inside the industrial estate hence, improving the effective ways of preventing problems in the environment.

Furthermore, the outcome of this study would be a useful guide in the continuing effort to re-engineer the strength of the IE infrastructure and enhance the existing rules and regulations to fit-in for the needs of the affected environment on resolving the enigma. This study can pave the way as to how the IE's can make the best control and monitoring as many companies that they want with limited resources at hand.

Moreover, this study can lead the IE developers as to how they can intertwine and make the best approach to make the double-layered scheme of protection to meet environmental and business challenge, thus eliminating the enigma to the tributaries and at the same time getting the benefit of these protections through an effective and efficient use of existing rules (IRR) in the industrial estate being carried out in MM2100 Industrial Estate.

II. BUSINESS ISSUE EXPLORATIONS

A. Conceptual Framework

Clean Water and Pollution in Indonesia

With a population of about 250 million, Indonesia ranked number four in the world as the most populated country and the South-east Asia's biggest economy. Due to this magnitude,

the country's water resources are expensive, a little bit far to get, some are contaminated, and sanitation from the private is unaffordable without financing. More than 37 million Indonesians have no such access to safe water, and 102 million has no improve sanitation facilities. (World Bank Country Data, 2016)

In business, clean water act was overturned by the Constitutional Court in February 18, 2015, revoking the 2004 Law on Water resources, but instead re-instating the 1974 Water Law as the controlling legislation until a new measure is adopted (Jakarta Post, 2015). This means that the land, the water and natural resources shall be within the powers of the government and shall be used for the benefit of the people. Private corporations are not allowed to explore such.

In Indonesia, the environmental pollution was defined by Act No. 4 on the basic provisions for the management of living environment (henceforth referred to as Act No. 4) as:

‘the entry or introduction of living organisms, matters, energy, and/or necessary components into the environment, and/or changes in the environmental system due to man's activities or natural processes, resulting in the decline of the environmental quality to such a level which causes the environment to function insufficiently or to lose its proper function.’

There were environmental issues in Indonesia that has been reported alarming and some had violated this rule Act No. 4. To name a few:

Factory of Battery in Cimanggis – Water underneath this battery plant was found containing mercury. This mercury is a poison. The drinking water used by the workers in this factory was contaminated by this mercury and half of these employees suffered disease in the kidney. When the sample was revealed, this contain three times above the limit (0.014 PPM) as standards for the human consumption and permissible limit. (Sunaryo, 1992)

In the year 1980 till 1993, organic waste in Indonesian water was doubled. This volume directly entered to South China Sea. The wasters, also called as waste generators, came from domestic activities that was increasing in the area and from the hotel development activities near the coast. (Chou, 2009)

Citarum River (West Java) A Water Case Pollution – Industrial wasters from the national textile industries and from the chemical wasters account for 80% of discharge to this river which did exceed to standards for the water quality such as but not limited to Zn, Fe, Mn, NH₃, NO₂, H₂S (this was toxic and pose danger to aquatic organism) including Chemical Oxygen Demand (COD) and Biological Oxygen Demand (BOD). (Dhahiyat, 2013)

Flooding - Non-sustainable development of the Jakarta's peripheries was strongly related with the Jakarta's flooding. In the last few decades, IE's large-scale subdivision developers converted water catchment areas to new towns. Many of the green areas and wetlands were converted unto usable lands, and had proliferated in the peripheries of Jakarta. These conversions of land led to increased flooding, and the severity was high. Former Jakarta Governor, Sutiyoso, blamed overbuilding and deforestation in the peripheries of Jakarta which were supposed to be water catchment or flood plain areas as the reasons for the disasters (Rukmana, 2014).

These issues in Indonesia are just but a few and others can be found being reported to the newspapers both local and national. With this current situation, this negative environmental impact made the government in the negative situation and has hard way to pursue environmental improvement.

Additionally, all the rivers in Jakarta were heavily polluted. Rivers in Jakarta have been monitored in a regular basis for the past ten (10) years, and the findings in the last six (6) years consistently showed that it was highly polluted (see Table 1). The sources of Biological Oxygen Demand (BOD) in Jakarta's river system originate from industrial businesses and other waste water (Apip et. al, 2015).

Table 1 - Quality Status of Rivers in Jakarta, Indonesia

Quality Status	Pollutant Index					
	2004	2005	2006	2007	2008	2009
Good	0%	0%	3%	0%	0%	0%
Low Polluted	3%	5%	9%	0%	0%	9%
Moderate Polluted	16%	16%	10%	6%	12%	9%
High Polluted	81%	79%	78%	94%	88%	82%
Total	100%	100%	100%	100%	100%	100%

B. Condition of Government Control

Common factories in Indonesia operate outside of the IE and the way that the government agencies solve environmental problems tends to protect the factory interest. The impacts were exacerbated by a lack of adequate monitoring and enforcement of environmental regulations (Hadi, 1993). This trend nevertheless was the threatening scenario when government regulators were not on the periphery of the factory. Workers and or company owners sometimes tend to discharge effluents not on standards, or operate some of the equipment without, or not sufficient pre-treatment devices. This made the surrounding environment at threat when government policing was not around.

Mandatory requirement of the government to any industrial developer is to submit a complete environmental impact analysis (EIA) or what is known to be ANDAL (Analisa Dampak Lingkungan) before any development starts. ANDAL is an environmental assessment of the environmental consequences (positive and negative) of a plan, policy, program, or project prior to the decision to move forward with the proposed action (Waren & Elston 1998).

Industrial estate developer is mandatorily required to submit a quarter reporting of environmental management plan (RKL) and environmental monitoring plan (RPL) to the office of the Environment. (Waren & Elston, 1998) The initial advantage of any business doing inside the IE is the exemption from ANDAL. Automatically, all those companies are under the umbrella covered by the ANDAL of IE hence, environmental mitigation and risk are already prepared in the ANDAL of IE. This is part of good come-ons for IE developers, and an advantage to new business.

C. Businesses outside of IE

As this issue about business that abuse the water on environment was critically discussed earlier, that business outside of IE was the major culprit to the environmental problems. This writing expressed that this issue can happen again anywhere, at any given time and in any given company.

The extreme example of such phenomena was the issue created last 2013 by the big garment industry including big multinational not just local, that operate outside of IE. These companies have done the advantage of the loose control and or weak resources and infrastructure of the government of Indonesia to handle such problems.



Figure 2 – Toxic Threads: Polluting Paradise

Source: Greenpeace International Communications, 2013

During the query on the Figure 2, it was established that there were two outfalls in this big and global garment company. The smaller intermittent outfall was found discharging waste water at a receiving river which was high in Alkaline (PH 14). This level of alkalinity posed an acute hazard to the organisms of the tributary river and to the nearest vicinity of the waste water discharge. Anyone that was very close to this outfall that will come into contact might get burnt on the skin due to its caustic effect as a character of PH 14. The waste water can have a severe impact on the organisms and unto the aquatic life within the area and the impact might be fatal also. (Greenpeace International Communications, 2013)

Referring to other businesses which is outside of IE's, a study showed that most polluters in the bodies of water, were mostly the businesses that operate outside the Industrial Estate, as an effect of the deregulation made in 1993 that resulted in the development of manufacturing activities in the Non-Industrial Estate areas especially in the adjacent areas of regional arteries of Tangerang-Jakarta-Bekasi, Jakarta-Bogor and Bandung-Padalarang with 143 investment approvals to non-industrial estate areas given in the year 1992 alone (Firman & Dharmapatni, 1995). Since, there was an increase in the investment approvals during these periods, the industrial estate development begun to start.

Relevant issues from newspapers and complaints from the Local Government Units (LGU) over some of the businesses were obvious but the address to call attentions over the obliterations to environment is on a slow moves. One example of this issue was the "Polluting Paradise: Big brands including big multi-national corporation was exposed in Indonesian toxic water scandal" (Greenpeace International Communications, 2013).



Figure 3 – Toxic Effluent of a Big Company in the Garment Business.

Source: Greenpeace International Communications, 2013

The issue over toxic environmental spills committed in this scenario was a threat to Indonesians. The issue involved a Big Company in the Garment Group. Nevertheless, this handled the most top brands in the world.

Since this issue (Figure 3) did happen outside of the IE, no wonder that government units of the regulating bodies for sure are not prepared to handle such issue at the very instant to prevent escalations, and or company was not yet prepared to handle such environmental discharge thus those river contaminations did occur.

D. IE situation in other ASEAN Region

It is true that in developed country like America, Europe and Japan, the private industrial estate does exist but in a limited number. It is due mainly that they have the capability to build infra facilities such as roads, bridges, powers and vast water supplies to any company operating anywhere in their country. However, in the developing countries in South-east Asia, the momentum of making IE's is popular because the private developers will invest hugely in the infrastructure and the government sector can have the advantage of getting improved foreign direct investments, that improve the gross domestic product, that improve the labor sector as well.

Evaluating one South-east Asian country, specifically in Hoh Chi Minh City of Vietnam, was a little bit different especially in the enforcement and policy guidelines. The year 2007 was the deadline to move out polluting companies from the city itself to the Leh Minh Xuan 3 Industrial Park, this is according to Viet Nam News (2015) Further, Mr. Tat Thanh Cang, Deputy Chairman of the People's Committee of Vietnam had said, "To improve environmental quality, the city must close down all polluting enterprises and tighten management to not allow any new polluting ones". Since then, after the year 2007, the program to move out polluters have ended, the city reported that there were no more polluting companies. However, since then around 835 workshops and companies have been found to cause pollutions (Viet Nam News, 2015).

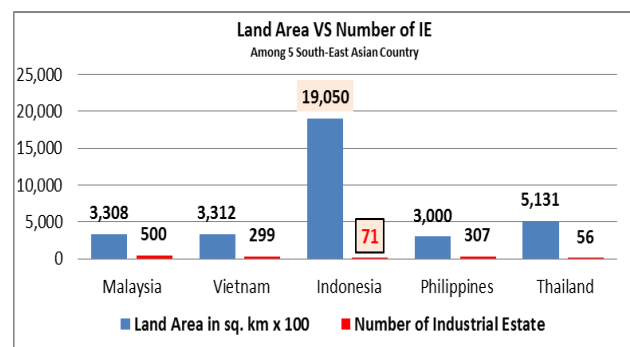


Figure 4 - Land Area vs. Number of Industrial Estate, Analysis for 5 Countries in Southeast Asia Including Indonesia

Referring to Figure 4 above, In Malaysia, the land area was much smaller than that of the Indonesia by almost 6 times. The number of industrial estates in Malaysia was 500. This number of industrial estate was 7 times more than that of Indonesia (71).

Analyzing also the situation between Vietnam and Indonesia, the Vietnam land area was smaller than that of Indonesia by almost 6 times but the number of industrial estate in Vietnam (299) was 4 times more than that of Indonesia (71).

Comparing Philippines and Indonesia, the later has 71 IEs while Philippines have 307. Despite Indonesia was 6 times bigger compared to Philippines in land area, it shows Philippines has attracted more IE developer.

In comparing Thailand and Indonesia, Indonesia was yet higher by 15 IEs versus Thailand. However, the land aggregate area of Indonesia was higher by as much as 4 times Thailand.

Comparative analysis between Indonesia and the 4 countries of Southeast Asia implied that there were many businesses in Indonesia that operates outside of IE. Further, this analysis (Figure 4) may imply that IE in Indonesia was not yet gaining its popularity as the time of this writing.

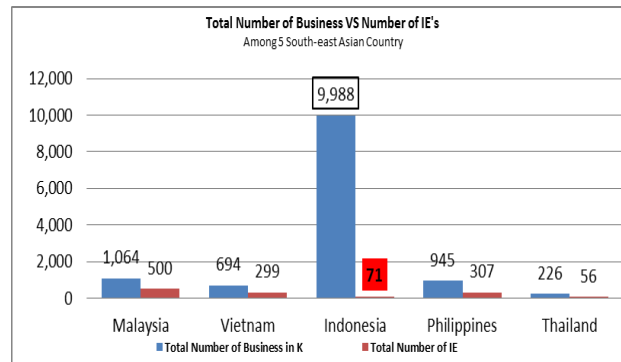


Figure 5 -Number of Businesses VS Number of Industrial Estate. Analysis for 5 Countries in Southeast Asia Including Indonesia

Major comparative analysis in the Figure 5 revealed that Indonesia lagged behind in terms of number of industrial estate against Malaysia. Malaysia has only 1.064 million of businesses but has 500 IEs, while Indonesia has 9.988 million of businesses with only 71 IEs. Further against Vietnam, the total number of businesses in Vietnam was 694,000 but has a total number of IEs of 299, while Indonesia, despite a 9.988 million businesses it has only 71 IEs.

Subsequently against Philippines, Philippines has 945,000 registered businesses but has catered 307 IEs, while Indonesia has attracted 9.988 million businesses with only 71 IEs registered. As against Thailand, the Thailand made businesses of 226,000 with an IE of around 56, while Indonesia has 9.988 million of businesses with only around 71 IEs.

Using this Figure 5, the degree of registration of businesses in Indonesia was so amazing and huge. It was noted that there were 9.988 million registered business enterprises in the field of trade and manufacturing whereas most of it was operating outside of the Industrial Estate (Rukmana, 2014).

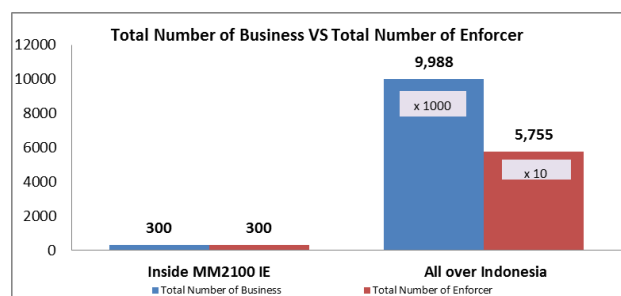


Figure 6 – Total Number of Business VS Total number of Enforcer in Indonesia

In Figure 6, the comparison is between the total numbers of business inside MM2100 IE with the total number of enforcer on the environment.

Since MMID as enforcer, with the organization having doing the enhanced enforcement of IRR, then the total enforcer was 300. This ratio was about 1 locator was being monitored by 1 enforcer. In general it was 1:1 ratio.

Comparing the total number of enforcer in the entire management of environment and forestry in Indonesia, the government has 57,550 enforcers with the businesses to monitor of about 9,988,000. The ratio was about 1:174. This means 1 enforcer for every 174 businesses.

The major blind assumption stated herein in the number of enforcer on government of Indonesia is 513 regions with 100 enforcers per region, plus 35 provinces with 150 enforcers per province and plus the central office with 1,000 enforcers. This translates to a total enforcer of 57,550 as estimated by an expert Sri Suryanti, a license environmental pollution control manager of MMID.

After analyzing Figure 4, Figure 5, and Figure 6, there were some items which have to be noted, to be studied carefully and adjusted.

1. Most business still tends to hugely operate outside of industrial estate with something advantageous for the owners as hereto reflected in the magnitude of entry of businesses outside of IE (Figure 5)
2. The influx of business outside IE was high because of the less capacity of the government enforcer (Figure 6), thus these companies that do registered in Indonesia were doing business outside of IE.
3. Though doing businesses inside IE was more effective compared outside of the industrial estate, still most business tends to operate outside of IE.
4. There was no such proven data that business outside of IE has advantage over the businesses inside of IE especially in the supply of workforce needed, the wages, the incentives of tax holidays, supply chain and others. Yet still most business operates outside of IE.

To go further on the discussion and to establish the further data that will enhance the probable making on the business solutions, this paper gathered the number of total companies housed inside the MM2110 Industrial Estate, which was about 300 in 2015. This was including the four major IE companies inside MM2100 Industrial Estate. There were also some supporting facilities inside the estate such as banks, restaurants, shopping center such as Lotte Mart, commercial center for some 30 tenants coping for the sales of supplies for locators, food courts, driving range and others.

Reflecting the data of the total waste water that was treated within this MM2100 Industrial Estate for the entire year of the 2015, this writings do come up to the Figure 7. This information was taken from the year-end management report of MMID in 2015.

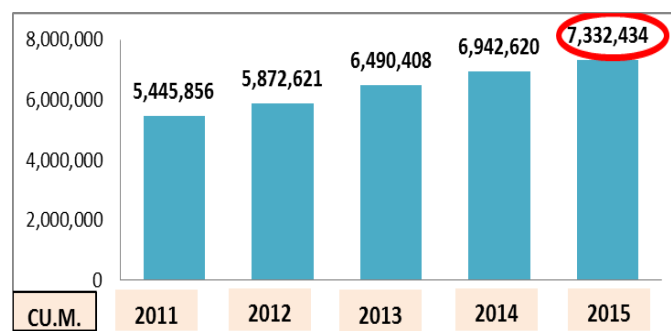


Figure 7 - Total Cubic Meter of Waste Water that was treated by MMID in the last five (5) years covering approximately 300 companies/locators

The total volume of waste water treated within MM2100 Industrial Estate was increasing from the last 5 years (2011-2015). In the last data of 2015, it had reached to the totality of about 7,332,434 m³.

The total number of companies inside MM2100 IE was 300 and the reflected data of the total treated waste water within the period of 2015 was 7,332,434 m³. If the total number of companies registered in Indonesia operating outside of IE was about 9,988,000 companies, then the waste water discharge of these 9,988,000 companies direct to the tributaries was about 244,121,169,000 m³ of waste water which was not totally monitored by the government enforcer.

It was noted and analyzed in this writing that the total discharge of these companies operating outside of the Industrial Estate to the tributaries such as rivers, brooks, streams, lakes and seas in a year was almost 100 times the volume of the Jatiluhur Reservoir/Dam with a volume of 2,448,000,000 m³ (Yoshida et.al, 2013).

E. Literature Review

Environment

Environment was the sum total of all surroundings of the living organism, including natural forces, and other living things, which provides conditions for development and growth as well as of danger and damage. Since this definition implied both the positive (development and growth) and negative aspect of development (danger and damage), it was to the hands of mankind as to how he can deal with the situation. Needless to say that, any development shall have the balancing mitigation if decision is negative to the environment. Subsequently, those that were making positive action shall have the reward for helping to improve the growth of the mother Gaia.

The world do continue to grow faster and faster in terms of technology. The innovations were widespread and there were a lot of breakthroughs. The globe never sleeps for improvement. This was now visible in South-east Asia, wherein technology of the west and facilities of the modern world were scrambling here in South-east Asia as it grows in.

All metropolitan cities were beginning to feel the ripples of these massive developments. Now it was here in Indonesia. Thus the government of Indonesia should carry out all the necessary platforms to improve environment controls over the businesses that are flocking in, especially near the radius of Jakarta.

Water Pollution within MM2100 IE

POLLUTION as defined internally by the management of MMID is any alteration of the physical, chemical, biological properties of any water, air and/or land resource inside MM2100 Industrial Estate or any discharge thereto of any liquid, gaseous or solid waste, or any production of unnecessary noise, or any emission of objectionable odor, as will or is likely to create or to render such water, air and/or land resources, harmful, detrimental, or injurious to public health, safety or welfare, or which will adversely affect their utilization for domestic, industrial, agricultural, recreational or other legitimate purposes. (MMID IRR, 2014 u.d.)

Since most of the company operating inside MM2100 IE was recorded to have industrial waste, this waste was referred to as the by-products, including human by-products, side-products, process residues, or other substances from the locator's operations and effluents and as consumer's discards of manufactured products which presents reasonable risks and/or injury to health and safety to the environment. Further, as the locators of MM2100 start to operate, this locator also starts to discharge also the waste water. This waste water is called

effluent. The effluent is a general term denoting any waste water from the locator, partially or completely treated, or in its natural state, flowing out from locator's premises. This effluent goes to the MMID's waste water treatment plant of which this treatment plant is termed in this writing as the second-layer of defense.

Environmental Management Plan in Indonesia

There was an enactment of law in Indonesia which pertains to the environmental management, and environmental protection plan. It was mandated in the Article 11 of Law No. 32 of 2009. The purpose of this law was to support the systematic management and environmental protection. The Government of Indonesia (GOI) named this law the "Environmental Law". (Global Business Guide Indonesia, 2016)

Further, the GOI had integrated the two Ministries (Ministry of Environment and Ministry of Forestry) into one group of Ministry which was now called the Ministry of Environment and Forest (MOEF). The governor and or the mayor of this MOEF have the respective authority to formulate their own environmental and management protection plan consisting of, as to how the usage of the natural resources would be utilized, supervised and monitored to adhere the quality of the environment. Further was the quality of environmental functions to mitigate the problems. (Global Business Indonesia, 2016)

F. Research Approach

This writing had used the research approach called interpretivism, which means the methodology of seeking out the answers and finding out the results of this writings were qualitative, through interviews of the people working inside the MM2100 IE, observations of the gathered data from the enforcer especially from the government regulators, a document review of the past and present scenario in the basis of historical records. The facts about the knowledge were taken unto the full observations, revalidations, and interpretations of all the data that were collected. These data and observations were presumably true from the trustworthy element of components, and the valid reasons of the interviewee. The model framework of this writings was limited to data collections of the present and the past, and gathering of true ideas via interviews and interpretation of the generated information.

Subsequently, the approach of inductive method was integrated hereto also to conquer the bottom-to-up approach. The data that was observed and the specific information that was gathered and identified will be pushed-through and driven up towards the findings of the results.

G. Research Method

The method that was used in this writing was focused on a simple case study. The case study that was reported was made not to create the hypothesis, but rather made to realize the work for the models presented.

The output of this writing had been improvised through an observations and interviews from the people mostly working inside of the IE and those also working outside of IE. A simple case study was made to develop a comprehensive and comparative situation of the businesses in and out of IE.

Interview

In conducting interview, there were questions that were needed to be answered:

1. Why is it that most businesses do tend to operate outside of industrial estate? Is there something advantageous?

2. Is it because of the good incentives of the government why these companies registered in Indonesia are doing business outside of industrial estate?
3. Is the supply chain outside of industrial estate is more effective outside of the industrial estate? Thus these companies do operate outside of IE?
4. Is the supply of workforce needed and the wages is advantageous outside of the industrial estate?

An interview was conducted during the time of this writings using these simple four questions above and an opinionated conclusion from the interviewee.

The interviewee was informed about the basics of industrial estate as how the business was being governed. The simple information about the business operation of the locator inside MM2100 IE was also revealed. Simultaneously, the interviewee was informed about most businesses that operate outside of the industrial estate then, the issue about the environment of Indonesia was also instilled unto them then, questionnaires was given to fill-in.

The people that were interviewed were mostly employees within the industrial estate of MM2100. Most of them were not experts, but has the capability to answer the 4 questions above. These people were a mixture of genders, with different ages, different level of maturity and in different walks of life. However all of them were in legal age to answer such 4 questions.

III. BUSINESS SOLUTION

The double-layered scheme of protection and Control (Figure 8)

In the discussed part of the business issue exploration, there was relevant information that business manufacturers had breached the standard effluent to the environment and discharging toxics either intentional or unintentional. If these manufacturers were inside the Industrial estate, that has double-layered scheme of protection, then things will not come into a halt.

It is true that double layered scheme of protection can meet environmental and business challenge. Exact procedures can be attained and can be balanced gradually to a sustainable development if government can attract more the presence of private developers of industrial estates. Conclusive elements that will surely pre-empt the problems over the imbalances in the Industrial Estate was the double-layered scheme of control over the environment which was convey above. This if applied in the Deed of Restrictions, then welfare of the people will be protected.

In the Industrial Estate, water was produced by private developers. Roads and alleys were constructed and funded by the private developers too, and all the basic infra necessities such as water treatment plant, waste water treatment plant, telephone data lines, voice lines, gas lines are instilled. Government has a very limited investment cost in a privately owned and managed industrial estates. This was relatively good in the developing country like Indonesia.

Ultimately, the job creations remain at high within the surrounding host communities. Therefore the pros reside to both government and private developers with less on cons. As the tandem between the government and the private developers were intact, there was less error on the locators compliances. It was true because, the private developers will control the pollutions of the Locators (layer-1), and then the government will control the private

developers (layer-2). This was called the double-layered scheme of protection and control (Figure 8)

For the water pollution discharges, the anguish method were hurting the environment. It was because of the continued operating the dysfunctional pollution control device and or not operating the device by some erring companies. Relating this to the double-layered scheme of protection with enforcement and control, as referred to in Figure 8, the industrial estate developers enforced, and control the locators and then the government enforcing units will enforce and control the industrial estate developer. This enhanced concept of industrial estate management and enforcement that has double-layered scheme of protection will meet the environmental business challenge here in Indonesia.

This method of double-layered scheme of protection can be available only to industrial estates. Those companies that operate outside of industrial estate have no second layer of protection.

Furthermore, considering the effective use of the IRR in the industrial estate, then finding solutions to the aching environment thru this double layered scheme of protection was not hard.

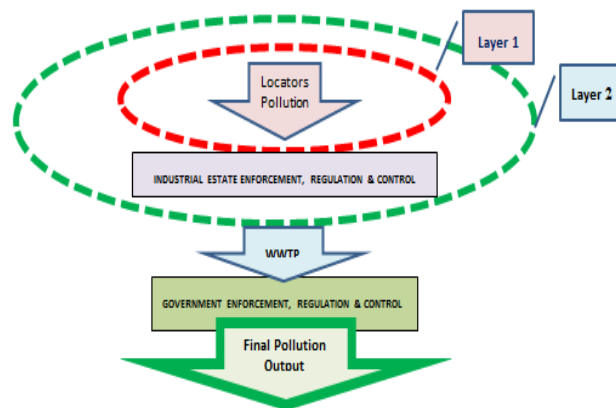


Figure 8 – Double-Layered Scheme of Protection

A. Business Advantage inside IE

At the beginning of any business, the need to do the AMDAL is mandatory. This is a lengthily process that requires Consultants and so much interventions. The Cost of doing one AMDAL for any given company is about 500,000,000 Rupiah (according to Expert-Pak Agus Subiyakto – an ITB graduate of Environment Engineering). However, as the company will start his business inside IE, then this company has the initial advantage of not making the ANDAL because this company is housed inside IE. It was one of the advantages that company already saved 500,000,000 Rupiah in the very beginning.

Business that chooses to operate inside of IE is no longer has to put up his roads as an ingress and egress. So therefore, his initial cost is almost nil in the infra-road development.

Business that chooses to operate inside of IE is no longer has to put up his water piping and do not have to drill and or treat for the water. He is already provided with complete water facility for his production.

Business that chooses to operate inside of IE is no longer has to put up his electricity lines and stations. He is already provided with a non-interrupted supply of power while he is inside the IE

Subsequently, company that chooses to operate inside IE is already provided with the Supply of Gas through underground pipelines. The availability of such supply is already in-place. Means the business will not think of this feature.

Moreover, the basic infra facility of telephone lines for data and voice are already in the area. No need to think more of it. No need to spend money for it.

The advantages above are just a few, and more packages are at stake. The government institutions that will help to promote the business inside IE are always at present. The department of customs, the department of police, the local government units, the Desa, the Bupati is always just at the front that gives assistance and help.

B. Business Gains on Sharing Cost

The continuity of the business is always at the mindset of every investor. A sustainable growth, with a better management performance on financials is a must. In MMID while implementing the IRR, the positive effect to business challenge and the positive effect to environment go simultaneously. For these reason, hereto below are the aspects as to how these financial gains is helping MMID to do more on implementing the double-layered scheme of protection.

- Data gathered on this writings on Total Revenues from the Sharing Cost (Summons) for ten months (January-September 2015) was totaled to about 2,778,272,000 Rupiah averaging 277,827,200 Rupiah per month.

- Data gathered on Total Revenues from works on Laboratory Analysis is about 335,650,000 for ten months (January-September 2015). The Total average is about 33,565,000 Rupiah per month
- Waste water treated volume did increase (7,332,464 m3 – data on Y-2015) then for sure the revenue will increase. Since the tariff of treatment for waste water effluent from every company is 0.60 USD then, the Total Revenue will reach to about 4,399,788.4 USD for the year 2015. This is a perfect business therefore.

IV. CONCLUSION AND RECOMMENDATION

A. Conclusion

Saving mother earth was our ultimate obligation. It was an every individual's duty to protect the mother Gaia. It was our absolute responsibility to keep our own environment in a well-balanced condition. In a global perspective, each country and its government had each own sets of rules to protect his citizens free from harm and danger. It was the government's total duty to enact laws and implement the rules and regulations to be abided by his citizens to assure of safe society. Nevertheless if these laws were violated by the citizens, a

corresponding penalty, and or punishment shall have to be imposed to individual that violates such.

In return, each and every individual was required by these laws to follow such guidelines. The citizen of every country shall have to acknowledge and protect those laws that was enacted and diligently observed the contents of it. Ignorance of the law was not an excuse. It was binding without due remorse.

Subsequently, businesses shall have the same attitude towards saving mother earth. As businesses were represented by an individual as an entity, then businesses were not at liberty to avoid laws that was enacted. As we can see in today's business perspective, most of the vision and mission includes the care to an environment as a decisive corporate social responsibility.

Moreover, the world now was facing consequences over the eventual disasters made to nature by the people. Destructions to environment are everywhere and unstoppable. It was due mainly on the hunger for technology and too much millennium activities. Advancement as some decay as the factor that was affecting the environment. This advancement to technology was truly created by the businesses that inclined profits more than that of the responsibility to mother Gaia.

This writing was a simple pitch to the solution to take care of the environment in a micro perspective that will at least help to save the mother earth. As it was discussed in chapter 2 that, now is the time to prepare and make solutions. Waiting will not help us at all.

This paper properly evaluated the effects of businesses in the environment while operating it inside the IE or either operating outside of the IE. The distinguish pattern as to how we can at least get a choice to operate business with care to the environment is hereto described below:

 Picture - a		 Picture - b
Environmental breach outside IE		Environmental breach inside IE
No immediate response of check		With immediate response of check
No immediate conclusion		With immediate Summon
No scheduled check		With scheduled check
No Second Layer Defense		With Second Layer Defense
No enough KLH employee to enforce		Enough employee to enforce
Effluent at backside of business		Effluent at entrance of the business
Over parameter – go direct to tributary		Over parameter – go to Layer 2

Looking at the two Photo inside and outside of IE with the same breach, as hereto compared (Picture-a and Picture-b), we can make an instant conclusion that Double-Layered Scheme of Protection can meet Environmental and Business Challenge, together with enhance monitoring using IRR.is very helpful to prevent further environmental problems coming from businesses that violates the rule.

- This writings did conclude therefore that as based on the main objective, the double-layered scheme of protection can meet environment and business challenge in Indonesia.

It is by way answered through the total assessments of the data that was gathered, observed and evaluated especially in making the comparative analogy between those businesses that operates inside IE and those that operates outside of IE. This conclusion that the double-layered scheme of protection and an enhanced monitoring within the industrial estate will absolutely answer the environmental and business challenge of Indonesia which is the anguished disposal of the pollutions of the footloose companies, direct to the tributaries which was the river, streams, brooks, lakes down to seas. With these writing, people will be aware of the distinction between those companies operating outside of IE and those inside of IE. Perceptions of the people will change about the IE and the betterment it can create to the surroundings. Further, businesses will know the distinct advantage as they are housed inside IE even if they have breached the parameters of standards in water effluent due to accidental, unintentional or even intentional as well.

- This writing made an inference also that an alternative way of the government to prevent environmental business enigma was to transfer these businesses outside of IE to inside of IE and be subjected to the use of the double-layered scheme of protection to meet environment and business challenge by the facility inside IE. When these businesses were operating already inside IE, then these are fully subjected to the IRR procedures.
- This writings concluded that in order to improve the businesses in Indonesia, government should find ways to relocate the manufacturing facility inside the IE thus environmental problems will be eliminated and at the same time those businesses that operates inside the IE will enjoy the benefits of the sustainable development with high business returns.
- This writings concluded also that the government's weakness was on the lack of capacity on human resources and infrastructure (Nakatsuma, 2008) to monitor erring businesses of Indonesia. Hence, the work on the ground was becoming re-active and not pro-active thus damage to environment was inevitable. Realizing this factor of deficiency to monitoring due to lack of human resource and infrastructure, the government of can now find ways to improve this situation by simply attracting businesses to conduct operation inside the IE and embrace the ways on the double-layered scheme of protection that meets the environment and business challenge with enhanced enforcement on the ground, so as not to pollute the water in environment.
- This writings lastly concluded that the capability of the existing manpower resources and physical assets of the government is not enough as evaluated in the interview processes and in the data observation. Since the ratio of the manpower to the number of footloose companies outside of IE is so huge, and the ratio of the businesses to the land area covered by each enforcer is not enough then this conclusion of capability was really way below to what was expected from the government. Improving the government assets at present situation is not observable hence the capability of the government is really not effective as the date of this writings, so therefore the IE with double-layered scheme of protection could meet the environmental and business challenge and can pave the way to control more on the environment with the most logical business returns as well.

B. Recommendation

This writing was recommending to immediately resolved issues over the businesses that operates outside of IE so as to immediately protect the people which was now suffering much on the negative impact of the environment especially on water quality. Furthermore in order to protect this environment and to resolve the issues created by the footloose companies, it was highly recommended to do the following:

- ☐ Give incentives to the companies that operates inside the IE so that the double-layered scheme of protection will be always included and in-placed in the day-to-day processes of each and every businesses with complete compliance also to the enhanced enforcement of the rules within IE.
- ☐ Popularize the use of IE in Indonesia, so that attractiveness of businesses will be concentrated inside the IE itself. If this will happen, then the water pollution will be mitigated at the very first on hand at least, even if not to the fullest, and businesses are still in a winning scenario.
- ☐ Regulators and enforcers shall strictly imposed the rules and regulations to the utmost to those businesses outside of IE even if there was lack of capacity on human resources and infrastructure so that these businesses outside of IE will have no other way but to enter to the IE so that potential errors will be at least eradicated.
- ☐ Government should give more tax holidays and more incentives to IE infra-developers so that more businesses will be housed inside the IE thus, the environmental challenge and the business challenge will be properly alleviated through the use of double-layered scheme of protection and with enhanced enforcement of IRR.
- ☐ Each and every IE developers should adapt, follow, consider, copy, and duplicate the IRR processes of summons as it was effectively done in MM2100 IE.
- ☐ For the legislators, they should file a moratorium to give at least 10-15 years that those businesses within the 100 kilometer radius of Jakarta that operates outside of IE be transferred inside of IE in order to prevent water pollutions in Jakarta where the degree of the people concentration was large. This was to lessen the business negative effect to rivers, and to other bodies of water. Do the way how Ho Chi Minh City of Vietnam implement such kind of regulations which was revealed in the earlier discussions hereto.
- ☐ For the local business operators – If they were outside of IE, they should have to operate their business with due diligence to follow the rules and regulations. If anti-pollution pre-treatment devices were not properly working, immediately stop the operation of the business and find first the solutions. To house their facility inside IE will lessen their anxieties of unintended errors, since there was a second-layer of protection scheme which will be provided by the IE thus business continuity is still in effect.
- ☐ IE employees as private enforcer regulators shall not stop the unending paradigms inside IE even if these are already a redundant work for them. Continue to motivate enforcers to actively participate in the Factory Inspection Orders over the Deed of Restrictions to positively gain the improved environment in IE.
- ☐ The government shall continuously and actively promote care to environment and include in the requirement in making the ANDAL to have an emergency fund that will alleviate the conditions of the surrounding environment where the proponent is located. This is to at least increase the funding needed for a good monitoring and enforcement.

These recommendations were based on the data, observations, results of business exploration, and business solution with proper interviews and opinions. Furthermore, the recommendation that was made herein tends to answer all the objectives of the study stated and declared in the early chapter of this writing.

For completing the effectiveness of this recommendation, the cost benefit of this writing implies that there was bounty business gain for IE developers when the double-layered

scheme of protection was implied and the enhanced IRR was enforced. This is through a penalty imposition which is called Sharing Cost.

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References

- [1] Apip, Sagala, S.A., & Pingping, L. (2015). Overview of Jakarta Water-Related Environmental Challenges. Water and Urban Initiative Working Paper Series. p.4.
- [2] Chou, L.M. (2009). The East Asian Seas State of the Marine Environment Report. UNEP EAS/RCU, Bangkok.
- [3] Cicerone, R. J., & Nurse, P. (2014). Climate Change Evidences and Causes. The Royal Society. National Academy of Sciences.
- [4] Dhahiyat, R. Water Pollution in Indonesia (Problems and Impacts). Retrieved on July 29, 2016 from <http://www.slideshare.net/fiddyprasetya/water-pollution-in-indonesia>
- [5] Firman, T., & Dharmapatni, I.R.I. (1995). The Emergence of Extended Metropolitan Regions in Indonesia: Jabotabek and Bandung Metropolitan Area, Review of Urban and Regional Development Studies, 7. p.174.
- [6] Gardiner, S. (2016). Why climate change is an ethical problem. Retrieved on July 29, 2016 from <https://www.washingtonpost.com/news/in-theory/wp/2016/01/09/why-climate-change-is-an-ethical-problem/>
- [7] Global Business Guide Indonesia (2016). Retrieved on August 05, 2016 from http://www.gbgindonesia.com/en/main/legal_updates/legal_updates.php
- [8] Greenpeace International Communications. (2013). Polluting Paradise: Big brands including Gap exposed in Indonesian toxic water scandal. Retrieved on July 29, 2016 from <http://www.greenpeace.org/international/en/press/releases/Polluting-Paradise-Big-brands-including-Gap-exposed-in-Indonesian-toxic-water-scandal/>

- [9] Hadi, S.P. (1993). Planning for industrialization in central Java, Indonesia: the process, the impacts and the alternatives. Unpublished Dissertation, School of Community and Regional Planning The University of British Columbia, Vancouver
- [10] Nakatsuma, A. (2008). Indonesian Environmental Issues. USINDO Brief. p.1.
- [11] Pacione, M. (2002). The City: The city in global context. Psychology Context. p. 552
- [12] Philippine Economic Zone Authority (PEZA). (1995). Rules and Regulations to Implement Republic Act No. 7916.
- [13] Rukmana, D. (2014). Indonesia's Urban Studies. Retrieved on July 29, 2016 from <http://indonesiaurbanstudies.blogspot.com/2014/03/the-megacity-of-jakarta-problems.html>
- [14] Sunaryo, T (1992). Environmental Problems in Indonesia: A review. Universitas Indonesia. Jakarta, Indonesia. p.48
- [15] Viet Nam News. (2015). HCM City eyes moving polluting companies out. Retrieved on July 29, 2016 from <http://vietnamnews.vn/environment/279806/hcm-city-eyes-moving-polluting-companies-out.html#MIP6yPTcj6ChpbBF.99>
- [16] Warren, C. & Elston, K. (1998). Environmental Regulation in Indonesia. University of Western Australia Press.
- [17] Yoshida, K. , Azechi, I., Hariya, R., Tanaka, K., Noda, K., Oki, K., Hongo, C., Honma, K., Maki, M., & Shirakawa, H. (2013). Future Water Use in Asia Monsoon Region: A Case Study in Indonesia. Journal of Developments in Sustainable Agriculture 8 :25-G. Eason, B. Noble, and I.N. Sneddon, "On certain integrals of Lipschitz-Hankel type involving products of Bessel functions," Phil. Trans. Roy. Soc. London, vol. A247, pp. 529-551, April 1955. (*references*)
- [18] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68-73.
- [19] I.S. Jacobs and C.P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G.T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271-350.
- [20] K. Elissa, "Title of paper if known," unpublished.
- [21] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.
- [22] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," IEEE Transl. J. Magn. Japan, vol. 2, pp. 740-741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].
- [23] M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.