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INDUSTRIAL GLOBALIZATION FOR MYANMAR

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1.0 Introduction

After 2012 election, Myanmar had more opportunities to reach global markets and modern technologies which resulted drastic changes in community, sociality and environment along with international countries. Traditional way of doing things become more systematic and structured especially in business and industries sectors. Open mind brought more strategic management in both government and private sectors.

Collaboration with neighbouring countries on social, culture, education, business and investments could lead nation and civilian to become prosperous, safe, healthy and wealthy with international standard. Myanmar is 14 States united nation and developing of each state would be important for government and civilian. After gaining independence in 1948, Myanmar started establishment of private industries and majority was nationalized by government in 1968 and 1974. In late 1980, Government promoted to launch a new economic strategy to increase diversify manufactured exports and to improve industrial competitiveness which include promulgation of some laws and regulations to enhance the systematic growth of industries.

Yangon, Mandalay, Sagaing, Taunggyi and Ayeyarwady divisions are concentrated for distribution of regional industries and developing of industrial zones. Myanmar had been developed 18 industrial zones, 34 sub-industrial zones and 10 industrial parks throughout the country to manage inadequate infrastructure, environmental pollution and many other problems due to number of industries increasing. Mostly those constructed industrial zones are general industrial zones and some zones particularly for export manufacturing. Due to rapid growing industries, most of industrial zones wouldn't have time to complete proper landscaping, road, electrical power and drainage before handed over to industries'

owners. According to the conducted census found that 91% of industries are owned by private and most are small scale industries in these industrial zones. Large scale industries are government industries and some other industries which associated or partnership with foreign investors which are only about 5% of overall industries in Myanmar. Those large scale industries had more systematic infrastructure, machineries, equipment, management, production and process control, quality control and enterprise resource management compare with small scale industries.

After getting plotted land, industry's owner need to build enclosure by fencing or hedging and need to raise land by filling sand, soil and gravel above road level before construction any building in order to avoid flooding later due to poor drainage system. Construction of building, factory, warehouse and office based on industry's owner budget amount which may not design and layout properly for industrial process and production requirements including electricity, piping system, machinery arrangement, environment and waste control. It may not have effective fire and explosion control, concept of supply chain management, vision of PLC, automation and robots to replace ergonomic hazards and increase productivity, information technology (IT) solution for networking security, information, feedback and monitoring system, competitive strategic management, quality system, quality assurance and control, performance management and occupational safety and health awareness. Information technology are growing rapidly with Internet and advance technologies, international business and global markets become united in one for all countries. Myanmar industries and industrial zones need to accelerate implementation and development of systems, procedures, rules and regulations for

Myanmar industrial globalizations and gaining sustainable global market for industrial products.

2.0 Current Industrial Status and Standard in Myanmar

Myanmar's industrial policy, performance and structural changes started since 1990 from socialist central-planned economy system to a market oriented one and emerged entrepreneurships which resulted in development of leadership, management, innovative and creative ideas. Development of the economies and growth of industries gave stable community, social and political atmosphere of the nation which could found major portion of Myanmar industries like; food, textile and garment, wood-based, motor vehicle and repair industries. Because of military government took over aft 1988, the major importing countries like United States of America, US and European, EU boycotted Myanmar's industrial products which affected on the growth of industries' development and some of foreign companies left from entrepreneurship with local industries. Myanmar industrialization wasn't reach to further improvement due to serious lack of publicized data, informations, surveys, inspections, recording, efficient decisions, rules and regulations. Myanmar's new government had been made a lot of changes and open opportunities for private industries after 2012 election, internet, information technology and communications network sectors gave modern industrial informations, machineries, technologies, management, strategy and innovative infrastructure which had been implemented and utilizing on developed countries around the world. Current industrial

status and standard in Myanmar is leading to growing horizon which need to address and develop in order to accomplish Myanmar industrial globalization.

2.1 Industrial Rules, Regulations and Structure in Myanmar

Myanmar's industrial and related laws included Myanmar Companies Act (1914), Workmen's Compensation Act (1923), Petroleum Act (1934), Payment of Wages Act (1936), Factories Act (1951), Oilfield (Labour and Welfare) Act (1951), State-owned Economic Enterprises Law (1989), Myanmar Insurance Law (1993), Revising Private Industrial Enterprise Law (2012) to replace Private Industrial Enterprise Law (1990) and Promotion of Cottage Industrial Law (1991), Employment and Skill Development Law (2012), Exports and Imports Law (2012) which repealed the Control of Imports and Exports Act (1947), Settlement of Labour Disputes Law (2012) which repealed the Trade Disputes Act (1929), Foreign Investment Law (2012) which added more key factors than Foreign Investment Law (1988), Draft Myanmar Citizen Investment Law 2012 which revised Myanmar Citizens Investment Law (1994), Social Security Law (2012) which enforced Social Security Act (1954), Draft Minimum Wages Law (2012) which repealed the Minimum Wages Act (1949) and the Agricultural Labourers' Minimum Wages Act (1948). Current Myanmar Laws are based on past 50 years' experience which need to review thoroughly depend upon global market and demand requirements for safety, standard, quality and business sustainability.

After the new government took place, resulting in currency appreciations, eliminations of export tax reduction from commercial tax raw material exports, trade facilitation,

deregulation in export and import processes and protection of local industries. Reforming and renaming of industrial banks, committees and associations to support industrial development and upgrading of industrial organization according to international standard. The current progress of industrialization couldn't able to materialize due to lack of concrete action plan deeply down from industrial organizations to general labour of each industry. The new government's first modification to economic objective is building of a modern industrialized nation through agricultural development and all around development of other sectors of the economy. New rules and regulations are under processing to implement the laws for industrial sector whereby many of the policy and structural changes need to make for supporting manufacturing and processing sector.

With enacted new rules and regulations, exports and imports policies and related functions would be in line with international trade norms and to facilitate export and import among other countries, considering needs for workers and their families, reviewing current wages, provide Social Security benefits, reduce cost of living and related changes, set appropriate living standard, offering job opportunities in line with the state's requirements of economic and production growth, reviewing state's GDP and per capital income and fixed minimum wages should be paid without sex discrimination. Also workers can able to fulfil the health and social needs through collective assurance of employers, workers and the state. Establish offices, hospitals, clinics and appointed staff for medical and social care insurance, family support insurance, disability benefits, retirement pension, survivor's pension, unemployment benefits insurance and other social security systems by safe guarding workers' rights and having good relations

between employers towards a safe and peaceful workplace. And there would be skill development training programs for appointed workers from employer in order to work safely and productively.

Restructuring of industrial ministries by merging the Ministry of Industry (1) to focus consumer goods and Ministry of Industry (2) to focus on heavy industry as the Ministry of Industry and formed the Ministry of Myanmar Industrial Development as a new ministry. The Ministry of Myanmar Industrial Development was to support the electronic industry, aeronautic and aerospace industry, industries aimed at the emergence of technology and knowledge based industries. However, to avert the over-ambitious schemes and favour the pragmatic approach to industrial development in Myanmar, the Ministry of Myanmar Industrial Development was abolished on September 5, 2012. Abolition of Ministry of Myanmar Industrial Development and Ministerial-level restructuring is an action which will focus more on light industry rather than the electronic and high-tech industry in the new government's term.

The small-scale and medium scale industries are under light industry category which produce not only the consumer products for people but also semi raw material goods for some industries. In Myanmar, there are over 42000 registered small and medium-scale industries operating nationwide but some are not registered with relevant institutions and operate as a hidden economy which are producing local products available in the local market. The state and union government and industrial-related departments such as the Directorate of Industrial Supervision, Inspection and the small medium enterprises (SMEs) development service centre deal directly with private industries to support, give guidance and monitor performance.

2.2 Industrial Zones, Organizations and Activities in Myanmar

Current Industrial Zones in Myanmar are East Yangon Industrial Zone, West Yangon Industrial Zone, South Yangon Industrial Zone, North Yangon Industrial Zone, Taunggyi (Shan State) Aye Thar Yar Industrial Zone, Mandalay (Mandalay Region), Kalay Industrial Zone (Chin State), Monywa Industrial Zone (Sagaing Region), Pakokku Industrial Zone (Magway Region), Meikhtila Industrial Zone (Mandalay Region), Myin Chan Industrial Zone (Mandalay Region), Ye Nan Chaung Industrial Zone (Magway Region), Pyay Industrial Zone (Bago Region), Mawlamyaing (Mon State), Myaung Mya Industrial Zone (Ayeyarwaddy Region), Hinthada (Ayeyarwaddy Region), Patheingyi (Ayeyarwaddy Region) and Myeik (Tanintharyi Region). New Industrial Zones under construction are Pha-an (Kayah State), Yadanarpon (Mandalay Region), Tut Kone (Nay Pyi Taw), Pon Nar Kyun (Rakhine State), Myawaddy (Kayah State), Nan-on (Shan State) and Pha Yar Thone Su (Mon State).

Myanmar industrial organizations formed with government and private agencies to support industrial development all over the country. Industrial Development Committee, ASEAN SME Working Committee, Directorate of Industrial Supervision and Inspection from Ministry of Industry, Directorate of Trade, MAPT from Ministry of Commerce, Foreign Economic Relation Department, AFTA Unit from Ministry of National Planning & Economic Development, Institute of Economics from Ministry of Education, Myanmar Science and Technological Research Department from Ministry of Science and technology, Small and Medium Size Industries Department from Ministry of Cooperatives and National Skill Standard Authority from Ministry of Labour are government agencies to

emphasize industrial development for competing with global countries in the global market due to political and economic changes in the world.

Objectives for Industrial Development Committee are aiming to develop and supervise industries to become a modern and developed industrialized nation, to transform country's economy from agro-based to industries-based, to enhance industrial production, to encourage production of new types of industrial machineries and equipment, to assist in channelling new investments into more value-added products and to attract Foreign Direct Investments (FDI) for integration of technology and management along with global industries. The union minister of industry chaired the Industrial Development Committee, deputy minister of industry as secretary and 14 ministers are included as a members. Formed 12 sub-committees to develop all-round in the industrial sectors and appointed the deputy ministers as a chairman for each sub-committees which consists of a representative of government sector, the private sector and a non-government organizations.

The respective regional ministers of the Ministry of Electrical Power and Industry have to perform developing strategies for industrial businesses in industrial zones in the respective states and regions. Industrial Development Committee is assisting private entrepreneurs to acquire capital, raw materials, machinery, equipment, modern technology and providing infrastructural facilities such as water, electricity, communication systems and buildings. Some state-owned mills have been sold, some leased and some joint ventures with local private entrepreneurs for private sector expansion in the industrial sector of the country. Also Industrial Development Committee is facilitating its organizational structure by implementing of new industrial zones in order

to establish new factories and cooperation with technically developed foreign countries, managing on the operation of industrial training centres as activities of the HRD management program, close supervising of industrial zones to produce qualified products with low cost and to reduce pollutants from manufacturing processes in order to create a clean and green tech factory, measuring with international cooperation and focusing point for small medium enterprises, SMEs development as the government sector.

The private agencies to support Myanmar's industries are the Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI), Myanmar Industries Association (MIA), Small and Medium Enterprise Committee from Myanmar Engineering Society, Myanmar Fisheries federation (MFF), Myanmar Women Entrepreneurs' Association (MWEA), INGOs and NGOs include UNIDO, JICA, JETRO, KOTRA, etc. SMEs Development Service Centre engaged with private agencies for data collecting and recording SMEs history, intermediary service on technology, financial management, marketing advisory and distribution of external market information, arrangement of business matching with related entrepreneurs and serving as a credit guarantee corporation. Both government and private agencies adopted principle strategies which included HRD or capacity building, technology development, innovation and financial assistance at once and supportive strategies which contained infrastructure development, business support and favourable taxation regime.

2.3 Industrial Safety and Environmental Control in Myanmar

Myanmar's occupational safety health (OSH) legislative framework was embodied since 1951 in the Factories Act and the Oilfield (Labour and Welfare) Act. The Boiler and

Electric Inspection Division (Ministry of Industries), Planning and Inspection Department (Ministry of Mines), Occupational Health Division (Ministry of Health), Ministry of Construction, Ministry of Agriculture and Irrigation and Yangon City Development Committee were involved in regulating OSH standards with Factories and General Labour Laws Inspection Department (FGLLID) which was the primary OSH regulator in Myanmar. The frame work included establishment of mechanism for inter sectorial coordination of OSH activities between industries and OSH regulatory agencies, funding and resources mobilization for workers' health, integration of OSH objectives and actions for workers' health into national strategies. Occupational health, Safety, Workplace Health Promotion, Provision of Occupational Health Services, Chemical Safety, Environment Health, Prevention of Communicable Diseases at the Workplace and Prevention of Non-communicable Diseases at the workplace policies are current OSH framework for industrial employers and employees in Myanmar.

Industrial Development Committee is leading to raise Occupational Safety and Health framework and strategies for industries and organization to set up National OSH Committee, assist Small Medium Enterprise (SME) to improve work conditions, develop Capabilities of Inspectors, Upgrade Occupation Hygiene Laboratory, Upgrade Internal OSH Capabilities, Establish OSH training Centre and International Collaboration to learn experience in order to create safe workplace and upgrade Myanmar industrial safety up to international standard. Myanmar OSH framework also included the roles of stakeholders to carry out as a part of their business in the best position to influence OSH performance at the top of value chain whether operate as an individual, partnership, associate or companies. Each industrial development sub-committee and OSH

regulatory agencies collaborate to eliminate hazards, risks, provide informations, notify for duty and responsibility awareness for industrial employer and employee. Also Myanmar OSH regulatory agencies encourage to report accident, diseases, dangerous occurrences, spillage and inadequate facilities at work place which could affect safety, health and environment.

Environmental protection and renewable energy development sub-committee is one of the sub-committee under Industrial Development Committee which emerged along with new government in Myanmar. That sub-committee collaborated with Ministry of Environmental Conservation and Forestry (MOECAAF) to control and protect environmental stability along with industrial development and ensuring ecological balance for nation. Environmental Conservation Policy (1994) included to establish the utilization of water, land, forests, mineral, marine resources and other natural resources in order to conserve the environment and prevent it degradation. Environmental Conservation Department laid down the basic principles and give guidance for systematic integration of the matters of environmental conservation in the sustainable industrial development processes to emerge a healthy and clean environment. With cooperation of Environmental protection and renewable energy development sub-committee and Environmental Conservation Department, implemented environmental protection educational programmes for industries and organizations to promote awareness and manage loss of natural resources.

Environmental Conservation Department established the environmental conservation policies for industries to control pollution by prescribing procedures, terms and conditions for the treatment of solid wastes, effluents treatment and emissions from machines,

vehicles and mechanisms which contain toxic and hazardous substances. A system of environment impact assessment and social impact assessment, monitoring and carrying out follow up action on environment protection for each industrial estates to maintain national environmental quality standards. Cooperate with other ministries and departments to implement environmental management work plans to control hazardous wastes generation from production and manufacturing processes in industries especially those industries which are using chemicals. The industries which operate in industrial estate and business in the industrial or special economic zones need to comply environmental protection and conservation rules, regulations and prohibitions including disposal of wastes throwing into rivers, streams, canals, springs, marshes, swamps, lakes reservoirs and other inland water sources of the public. National Environmental Conservation Committee (NECC) enforced the environmental quality standards for inland water, underground water, atmospheric quality, noise and vibration standards, emissions, effluents, solid wastes standards and other environmental quality standards to protect negative impact from Myanmar's industrialization and maintain environment and natural resources.

2.4 Product and Quality Control in Myanmar

Myanmar's industrial products mainly included agricultural goods like rice, pulses and beans, rubber and textiles, wood products, forest products, food and fishery products, construction materials include cement, steel, bricks and tiles, gems, mineral, metals, oil, petroleum, petrochemical products and natural gas. Domestic products are blankets, paper, glass products, bicycles, aluminium ware, jute and cotton cloth, pharmaceutical,

beverages, matches and cigarettes. There is also segment engaging with foreign industries to produce export products and import parts to assemble of electronic appliances and motor vehicles for local markets. Garment industries are most popular industries for industrial owners to invest in most of industrial zones for local and export markets. Recently, footwear industries are emerging in Myanmar along with garment industries.

Myanmar's industrial development key problem is that domestic market was limited and consumers didn't care about product quality and standards. Although local manufacturers produced quality products, price couldn't compete with cheap low-quality products from china especially on electrical appliances, household products, snacks and drinks. Local consumers do not select products properly and their key consideration to purchase focus on price only due to lack of awareness on safety, health and education. Even though Industrial inspection standards established to assess the quality of manufacturing by the Directorate of Industrial Supervision and Inspection Department under Ministry of Industry, quality certifications need to be competitive enough for local and export to developed countries which could bring up quality and industrial standards of our country. Manufacturing within the limits of local demand and raw materials availability wouldn't be competitive china made products due to operation cost, transportation and distribution cost and utilities expenses. Most of Myanmar industries are using China made machines and technology which would give poor quality and low productivity. Product and quality control training only available in some of the industries due to assistance of foreign country like Japan, Germany and Korea. Lack of knowledge for having quality policies (QP), quality management systems (QMS), quality assurance (QA), quality controller

(QC) and quality system (QS) for each industry to control and promote product quality according to market demand and prices. Some of industries have laboratory, quality control section and quality inspection but competency of personnel and facilities to carry out for quality system were poor to achieve qualified products.

In 2009, Myanmar authorities started special quality control in exporting foodstuff to meet international standard for getting grant internationally recognized certificate for export.

The certificate was issued jointly by the Exporters Association and the Central Food and Drug Administration Department. Industrial Exhibitions and Fairs arranged at Yangon to promote industrial owners for developing international market links and get in touch with overseas competitors, modern technology and management. A few training centre started given ISO 9001:2008 Internal Quality Systems Auditor course, quality management system requirements course, quality systems lead auditor course, ISO/IEC 20000-1:2011 Internal Auditor course, ISO 14001:2004 Environmental Management Systems Internal Auditor and Lead Auditor courses. Nationally, Myanmar's industries and organizations need to educate and enforce to set quality policies for each industry to understand International Organization for Standardizations (ISO) standards, principles and practices to raise our products quality and industrial standard according to international requirements which would result industrial globalization for Myanmar.

2.5 Automation and Robots Application in Myanmar's Industries

Myanmar had changed in community, civil society accompanied with economic progress and growing industries after election, vision on utilization of automation and robotics to replace employees who are working repetitive and tedious tasks or close to harmful and

dangerous jobs. Myanmar key industries are Electrical Power and Renewable Energy, Oil and Gas, Mining, Manufacturing, Hotel and Tourism, Real Estate, Livestock and Fisheries, Transport and communication, Industrial Estate, Agriculture, Construction and Other Services industries which started ideas and implementation to use automation and robots in their operations and application processes. Mitsubishi electric in Myanmar provides industrial automation systems related different type of Programmable Logic Controllers (PLCs), servos, inverters, human-machine interfaces (HMI), different types of circuit breakers, contactors and motor starters. Also provide industrial automation machineries like laser processing machines, power devices, semiconductors, optical devices, high-frequency devices, colour TFT-LCD modules in order to improve industrial operations and processes.

Until today, using CNC & automation machines in industries found very few in Myanmar, some government industries and private industries started using semi-automated machines like Cigarette, food & beverages production factories. Apart from those industries, 95 % of industries were operating with human resources and manual handling operations including loading and unloading of materials within warehouse and factories for storage and distribution. Using robots for industrial application and full automation industries are not being introduce to Myanmar industrial organization yet. Government and industrial organization started organized automation, robotics, manufacturing technology trade shows and exhibitions for business and industrial sectors to open eyes for Myanmar's industrial owners and educate effectiveness on productivity and prevention control for their employees from ergonomic hazards.

Myanmar Industries Association organized Myanmar International Electronic Industry and Automation Exhibitions on November 2013 at Myanmar Convention Centre to promote industrial standards and encourage ideas of automation in industrial production systems which will be one of the important sector to grow for Myanmar's industries in order to compete quality and productivity with international industrial competitors. But 50 over years blocking of information and media with international countries affected badly on Myanmar's industrial organization, owners and society to improve their industries along with modern technology and international standards. Initial set up cost, competent person require for operation, unreliable electricity, poor knowledge on network and control systems, lack of mind set for maintenance and poor planning for production process resulted machineries not even reach in mechanization stage for current Myanmar's industries.

2.6 Industrial Wastes and Disposal Practices in Myanmar

Myanmar had been set up waste management policy and environment regulations likes the Yangon Water-Work Act (1885), the City of Yangon Municipal Act (1922), the Water Power Act (1927), the Underground Water Act (1930), the City of Yangon Development Law (1990), the Private Industrial Enterprise Law (1990), the Promotion of Cottage Industries Law (1991), the Development Committees Law (1993), the City of Mandalay Development Law (2002) and the Nay Pyi Taw Development Law (2009), many years ago. City Development Committees in every town is responsible agents to control for waste management within the country. Conducted many environmental awareness and

education on waste management practices to public and industrial sectors locally and nationally.

In Myanmar, most of the industrial estates are located near the rivers due to the reasons of accessibility for both motor vehicles and cargo ships which became to increase the potential of environmental degradation. Beyond this, some factories discharged untreated wastewater, waste materials into the nearby drainage, lands and rivers illegally which had been aroused significantly environmental pollution pertain to air, water and soil. Improper management of industrial waste could cause not only pollution but also health risks to industrial workers and those residents lived near the industrial estates. Myanmar Industrial Development Committee (MIDC) was formed in July 1995 and started conducting of industrial exhibitions, seminars and conferences on industrial establishment promotion along with growing technology including industrial waste management practices. City Development committee are responsible parties to enforce, educate and control all the industries in their respective regions for preventing water, air and soil pollutions, disposal of hazardous waste, toxic chemicals, handling and transportations of industrial wastes. After conduction survey, 85 percent of industries belong to private enterprises which registered under small scale industries, 11 percent was medium scale industries and 4 percent was large industries which more belong to government ministries.

Industrial estates being established central areas like Yangon, Mandalay, Sagaing, Bago and Ayeyarwady division due to demand of growing industrial economics. Due to inadequate infrastructure, improper planning of space allocations, industrial layouts and designing for disposing of waste, some of the earlier industrial estates arises some

environmental impacts which caused pollution and affected on public health. Government and city development committee enforced all industries owners to propose effective arrangements for the disposal and cleaning of wastes generated by their factories/ plants to remove or reduce potential pollutants with Private Industrial Enterprises Law before registration of their industries. Department of Human Settlement and Housing Development (DHSHD) committee and city development committee collaborate with industrial organizations to inspect and evaluate all industries' waste management and practices according to their proposal before issuing for certificates to operate any factory or plant.

Current industrial waste management practices in Myanmar are Reduce, Reuse and Recycle (3 Rs) by providing waste collection services, implementation of employer, employee awareness on hazardous waste handling and other waste management activities by city development committee and Myanmar Industrial Development Committee (MIDC). Industrial waste reduction focused on two areas; demand and supply side to minimize generations of waste from initial waste generators. Manufacturing economic products with appropriate amounts, quality and durability, repairing, refurbishing the defective products for next production rather than throw away, and creating awareness within industry staff for waste management concepts are methods for demand side waste minimization. Offering reusable alternatives, providing reusable transportation frames, boxes, covers and guards are areas to focus supply side waste minimization. Reuse method focused on conventional and transformation approaches. Set up deposit refund system for industrial products like glass bottles or polyethylene terephthalate (PET) bottles which return back to factory for reusing as same function is

designated as conventional approach. Old tires, food jars, paper bags, plastic bags, rubber tubes which are reusing for next function by transforming of those wastes according to next function requirements usage without recycling is designated as transformation approach. Recycling is the most famous method of industrial waste management practice in Myanmar which required collecting, sorting and reprocessing. Widespread of waste collectors, waste dealers and waste merchants are forming business with many recycling industries along with national industrial waste recycling scheme. So, Myanmar is applying 3 Rs management practices on municipal waste and industrial waste in order to control pollution, environmental hazard. But still need to improve for compositing, incineration and landfill method of disposing industrial waste and also implementing waste management system on hazardous industrial waste and toxic chemicals handling, transportation and storage according to national and international regulations.

2.7 Competency of Myanmar's Industrial Employer and Employee

In Myanmar, 80% of industries belong to private owners which derived from ancient rich families and running industries with traditional ways. Industrial buildings and related facilities, machineries and arrangement layouts, material storage, production processes, human resource management, packaging, distributions, waste disposing, fire and evacuation plans, first aid and emergency response plans had been out of date and lack of mind-set for innovation due to political crisis and centrally-planned economy system which closed door with international countries on trading and sharing technologies. Even though Ministry of Science and Technology has generated technicians, graduates

engineers and degree holders every years, employment in industries and working as an engineer in respective field is less than 20% according to survey in industrial society due to insufficient earning or lack of management process for merging engineers with industrial organizations. For human resources development, the Ministry of Science and Technology formulated short term and long term plans including regular education plan and special education plans.

New universities, colleges and technical institutes had opened and some were upgraded in states and regions. University of Technology, University of Computer Science, University of Aeronautic and Space Technology, Government Technical College, Government Technical Institute, Government Technical High School, Vocational Training School and English language Proficiency School, total 100 over units had been opened to enhance industrialization in Myanmar. For human resources development, Ministry of Science and Technology opened professional courses in technology ranging from the diploma level to the PhD level. For further development, the Department of Technical Promotion and Coordination under the Ministry of Science and Technology conducted industrial training courses on computerized numerical control (CNC), computer-aided design (CAD) drawing, theory and applications and other industrial training courses.

The Ministry of Industry collaborate with foreign countries and opened technical training centres to conduct machinery courses, computer and programming courses, electric and electronic courses. However, such centres could train only a few professional technicians and engineers which could not able to support effectively for industries and organization in Myanmar due to lack of knowledge, facilities, participation and contribution from employers to employees. Most of the private industries provided training to employees

after assigned the jobs as on-job-training (OJT) and some industries didn't even provided any training at all to understand the jobs nature, hazards, safe work procedure and basic operational procedures. Currently, most of private industries are appointed their reliable relatives or personnel to take charge their industries and operate who might not having basic industrial knowledge on safety, health control measures, fire and explosion hazards, handling of hazardous materials, first-aid and emergency response procedure, safe machineries operations and maintenances, disposing of industrial wastes, resource management, performance management, storage management, welfare of employees, quality and assurance on products.

2.8 Industrialization Pitfalls in Myanmar

Myanmar is one of the country which possess abundant natural resources since the time of the Myanmar Kings till date. Ruby, Jade, Gems, Teak, Oil & Gas, Textile, Natural Rubber, Water, Agricultural and Fishery products could easily extracted from country's natural resources which could foster a get-quick-rich mentality known as "Dutch disease" among the business and authority officials. Abundant of natural resources hindered the civilians' growth of mind-set, ideas and thinking on Myanmar's business and economy development with innovative and competitive strategy especially in industrial sector and lack of principle strategies such as HRD, technology, e-commerce and financing which resulted as the least developed country by international organizations. Another contributed factor for Myanmar's industrialization shortfall is land prices in industrial zones which had been ridiculously high due to real estate dealers for gaining profits easily by speculation and would become biggest barriers to foreign investors. Some of the small

medium enterprises (SMEs) are selling their lands in industrial zones and moving out to other places to run their business which lead to unsustainable industrial business for country.

Most of industrial zones are situated in the outskirts of the city where land is available would impact the industrial firms to loss of profit or even lost for business due to far from market place, out of reach from the port, trade routes and with a scarcity of raw materials and skilled labour. Manufacturing factories are too far and costly for the transportation of raw materials as well as finished goods to the market which become not competitive compared the price, quantity and quality to the smuggled products from border or illegal trading. Currently, new developed industrial zones are having these situations but regional authorities are having many reasons to carry out for developing new industrial zones in their regions along with employment opportunities. Another situation happening in most of industrial zones are the factories which not manufacturing products but used as storage facilities or warehouses would become shortfall for industrialization in Myanmar. Myanmar electrical power generations mainly based on hydropower plants and small amount of thermal energy power plants around the country. According to current power generations from power plants are more than enough for country's industrial zones' requirements and residential usages but looking for foreign incomes caused local industries and urban area become in dark and insufficient electricity for industrial zones which resulted serious impacts in Myanmar industrialization. Myanmar industrialists urged to diversify production and started to pay for new power substations due to unreliable power supply which created situations for local industries' products or goods become more costly and final lost market compared with smuggled products or goods

from borders or import from neighbouring countries. Even though government started taking serious action and fines on some local industries which operate and hook up illegally to power distributions tower stations caused voltage dropped when electricity reached to industrial zones and couldn't operate some machineries.

Myanmar industrial firms are getting inefficient financial assistance compared with other countries even though established Small Medium Enterprises (SMEs) Development Bank and implementation of the Credit Guarantee Scheme from Industrial Development Committee. High interest rate on SME loans, SMEs are not able to provide collateral of enough value, inability to submit all the documents required by the bank, inability to handle the extra charges for loan processing by the bank and received loans amount not sufficient to meet the business requirement caused industrial financial scheme for SMEs become not dependable in reality and some industrial businesses are struggling to cover the interest rather than getting profits. Upon that some of SMEs didn't invest approved loans at their requested industries and turn around to invest in their other businesses which become affecting for industrial development in the country.

Ethical behaviour and attitude, basic industrial knowledge and trainings, effective resource planning, optimize facilities layout, occupational safety and health awareness, efficient fire and explosion protection systems, supply chain management concepts, effective waste management practices, risk management, human resource development, process and performance management, quality policies and quality systems, setting of industrial mission, visions and goals, advance information technology, modernize electronic controls, network and monitoring systems, advance manufacturing technology

and strategic management for all industrial processes and industrial business are least develop areas in Myanmar where international countries implemented, practices and continuous improving by systematic ways of monitoring and reviewing timely. Educational gaps between international countries with Myanmar, National government and industrial owners, employers and employees lead our industrialization goals to become ineffective and inefficient which would result our products to lose market among international competitors.

3.0 International Industries Status and Standard

As growing information and technology among the international countries promoted global industrial standards. Country's industrial status and standard depended on setting of safe and healthful workplace, enforcement on employers for providing training, education, assistance and keeping their workplace free of serious recognized hazards and employees to comply with all applicable standards at all time. Innovation concepts lead developed countries' industries with modernize equipment, machineries, technology, strategy, management systems and procedures which will be integrated with e-commerce and international business at global market. Advance knowledge and information technology converge international industries into one global market and set standards and requirements across internationally. Modern design and layout planning for industrial zones and industries incorporated drainage and systems, modernize buildings and facilities, electrical power and renewable energy systems, environment controls, waste management systems, resource planning, supply chain management, fire

and explosion protection systems, security and network control systems, automation and control systems, quality systems, safety, health and human resource development systems.

3.1 International Industries Rules and Regulations

Compared with Myanmar, international industries enrich more complete rules and regulations for safety, productivity and quality to operate industries along with global economy and market requirements. Developed countries like England, United States of America, European countries and Japan established, implemented and applied more relevant rules and regulations for industries to safe public health, environment and competitive in global market. The most developing countries in industrial organizations at 21st century like Singapore, Korea, China and India still need to improve rules and regulations for their industries according to international standards. For general industry, United States of America had Acts, rules and regulations which different from Myanmar including Occupational Safety and Health Act (OSHA), Administrative Procedures Act (APA), Congressional Review Act (CRA), National Environmental Policy Act (NEPA), National Technology Transfer Advancement Act, Paperwork Reduction Act (PRA), Regulatory Flexibility Act (RFA), Small Business Regulatory Enforcement Fairness Act (SBREFA) and Unfunded Mandates Reform Act (UMRA), etc.

Upon the Acts, rules and regulations, Standards are required to meet for all industrial employers and employee. Subpart A to Z included comprehensive standards as regulations for industrial organization in United States of America. Walking-Working surfaces, Means of Egress, Powered Platforms, Man lifts and Vehicle-Mounted Work

Platforms, Ventilation, Occupational noise exposure and Nonionizing radiation, Hazardous Materials like compressed gases, acetylene, hydrogen, oxygen, nitrous oxide, flammable and combustible liquids, spray finishing using flammable and combustible materials, explosives and blasting agents, storage and handling of liquefied petroleum gases, anhydrous ammonia, process safety management of highly hazardous chemicals, hazardous wastes operations and emergency response, Personal Protective Equipment, General Environmental Controls, Medical and First Aid for industry, Compressed Gas and Compressed Air Equipment, Material Handling and Storage, Machinery and Machine Guarding, Hand and Portable Powered Tools and Other Hand-Held Equipment, Welding, Cutting and Brazing, Grain Handling facilities, Toxic and Hazardous Substances are subpart of standards under OSH Act which mention in detail procedures and mandatory requirements to comply for all employers and employees in United States of America. In United Kingdom (UK) and European Countries also applied Employment law, Discrimination protection, Industrial relations, Health and Safety, Social security, European Community Law. And also their industrial standards and practices are covered enough to meet safety, quality and productivity according to global business market and their international industrial competitors. In Asian, Singapore is one of the most industrial rules and regulations developed country within ASEAN countries which could integrate industrial standards with United States of America, UK and European Countries. Singapore had been set up The Employment Act, Employment (Part-Time Employees) Regulations 1996, Retirement and Re-employment Act (RRA), Central Provident Fund (CPF) Act, Skills Development Levy Act, Employment of Foreign Manpower Act/ Immigration Act, Employment of Foreign Workers (Levy Order)/ Employment of Foreign

Workers (Fees) Regulation, Industrial Relations Act, Trade Unions Act, Trade Disputes Act/ Singapore Labour Foundation Act, Workplace Safety and Health Act and Work Injury Compensation Act (WICA).

Ministry of Manpower (MOM) in Singapore is playing vital roles for industrial employers, employees and collaborate with The Law Society of Singapore, Central Provident Fund (CPF Board), Workforce Development Authority (WDA), International Labour Organization, Industrial Arbitration Court, Workplace Safety and Health Council to ensure all employers and employees in Singapore follow industrial rules and regulations which was set by government of Singapore. And also Virtual Human Resources Development laid out practical guides and policies from each Act for employers and employees in order to understand responsibilities, legislations, rights and conditions including managers, executives, confidential employees, domestic workers, seaman and government employees. Japan, Korea, China and India also revised most of their industrial rules and regulations according to international industrial standards in order to attract foreign direct investment and achieve quality products in global markets.

3.2 International Industrial Zones, Organizations and Activities

Many of industrial zones started emerged around the world after Second Industrial Revolution. At 21st Century, industries zone become more structured, complete facilities, security networking systems, systematic managements for processing, production and human resources, advanced information technology, safety, health and environment control measures along with technological and global economic progress which gained momentum with the adoption, adaption and innovation for international industries. Among

the industrial zones around the World, Eastern North America, North Western Europe, Eastern Europe and East Asia could be found as the world's major manufacturing regions compared with other manufacturing zones. Textile, Metallurgy, Machine tools, Oil and Gas, Chemicals, paper, glass, agricultural, mining, food and nutrition industries and related industrial zones are the most technological developments sectors. Great Britain, German, Russian, Belgium are leading industrialization in early century followed by Japan and Korea, China and India are taking place for those industries nowadays.

International Labour Organization held annual conference to update set standards for international labour regardless of ratifications and created a legal obligation for ratifying nations to apply its provisions. International Labour Organization not only set labour standards, but also gave support for those developing countries to improve industrial practice, develop market access, employment job opportunities. In order to promote and accelerate for industrial development in developing countries, United Nations Industrial Development Organization was founded since 50 years ago in Austria. The organization worked towards international industries to play in accelerating economic growth, poverty reduction through productive activities, trade capacity building, energy saving and environment control along with competitive and sustainable strategy. International Industrial Development Organization assist the formulation of development, institutional, scientific, technological policies and programmes, analyses trends, disseminates information and coordinates activities, consultations, negotiations and provide technical cooperation to develop sustainable industrialization for international countries.

Many International Industrial Organizations and Industrial Societies collaborate annual conferences to share and discuss about safety and quality regulation, price regulation

and regulatory institutions, regulatory performance, industrial organization issues in financial services and entrepreneurship, technology and information, innovation, patents and antitrust, online platforms and e-commerce, energy economics, electricity, innovation in environmental technologies, theories and experiments for industrial organization, trade and foreign direct investment, contract, unconventional vertical contracts, auction, product differentiation, price discrimination, productivity and strategic interactions and many of industrial related issues to update and upgrade internationally.

3.3 International Industries Safety Standard and Environment Control

Morally, legally, and economically, occupational safety and health become important issues for international industrial societies and organizations around the world.

Developing policies, procedures, practices on all scopes of industrial societies and organizational activities intend to prevent needless deaths and injuries in every workplace. Educating of knowledge, sharing of experiences, cooperation of each employer, disciplining of policies, rules and regulations, interactions of safe work practices between neighbouring countries and developing personal awareness on ethical behaviours are become criteria to grow industrial societies and organizations for every country. International Labour Organization (ILO) and World Health Organization (WHO) joined and started committee for sharing common definitions of occupational safety and health since 1950. Every country around the world had been implemented laws for industrial organizations to aim for protecting human and facility resources in the workplaces. Most of developed countries set up safety, health and control measures for

their industrial societies and organizations especially U.S and European countries which had been started more comprehensive control measures than 40 years ago.

Industrial society becomes more technically advanced, the system of all tools which used at industrial become more and more sophisticated. Management and employers need to be aware of the limits of human performance as well as the fallibility of the individual in a mechanized system. Industrial Safety and Health program are setting as a written program for every industry which could demonstrate emphasizes of management commitment and employee involvements. Product liability is also major concern for many companies. System safety program become requirements for industrial society around the world. Conducting industrial compliance audits in international countries is one of the most important thing for growing industrial societies and organizations which required much cooperation and participation from employers and employees. Most of countries are giving training courses about classifications of dangerous goods, hazardous material transportation, marking and labelling-Hazmat, packaging and general awareness of hazard materials, etc. Addition to it, Developed countries implemented Hazardous Communication Program (HAZCOM) which is the most common required program for every company to handle hazardous materials on their premises to avoid daily exposure and to transport one location to another.

Most of country industrial safety and health standard set up based on their performance on safety and health program, safety legislation, safety related business laws, workers' compensation act, recognition of hazards and hygiene, fire prevention and protection, safety management system, accident investigation and conducting of safety audits. Most of developed countries' occupational safety, health programs already in corporate for

their industrial societies and organizations which we could find from published documents, books and magazines. Addition to it, they are studying on ergonomic hazards and safety management, managing the safety function, human elements in loss prevention, behavioural-based safety and industrial hygiene, etc. Workplace violence, terrorism preparedness, transportation safety and extreme weather conditions and associated hazards become part of consideration for occupational safety, health and which need to implement control measures, evacuation and emergency response plans. Principles and strategies are required to solve common problems and improve safety behaviour process for workplaces. Cultural, Attitude, intervention, motivation, process and psychology are also important contribution factors to focus for improving methods and proactive measures of industrial safety and health.

Environmental prevention and control from industrial related hazards which generated from industrial operations and processes by means of emissions, disposing and discharging would play important role in the economic well-being for every country. International industries promulgate specific minimum requirements, most effective techniques to achieve a higher level of environmental protection, several sectorial directives and main principles for permitting large combustion, waste incineration, activities using solvents and chemicals production which could easily accessible to the public for detail informations and precautions. And also international industries implemented many programs with lone term planning to protect the environment, protective control of environmental threats, monitoring of environmental quality, effective legislation and enforcement, provision of environmental infrastructure and use of

environmental technology which promote economic and industrial growth for international countries.

3.4 Product and Quality Control in International Industries

Global industries emphasized product quality to improve continuously, stabilize production, minimize defect and qualified products to compete for global markets. International industries followed quality systems and frameworks to meet International Organization for Standardization (ISO) quality standard for industrial business sustainability and produce world class quality products. In 1947, International Organization for Standardization (ISO) was officially began in operations to form global standards body for international countries which was involved and agreed from 25 countries around the world. International Organization for Standardization (ISO) jointed with Technical Committees to develop standards and terminology in the areas of electrical, electronic and related technologies, develop, maintain, promote and facilitate Information Technology (IT) standards, standardization in the field of energy efficiency and renewable energy sources. International Organization for Standardization (ISO) has one hundred sixty over national members who would be representative standards body in each country. International Organization for Standardization (ISO) set international standards, technical reports, technical specifications, publicly available specifications, technical corrigenda and guides for each country' industries and industrial organization to develop safety, quality and productivity.

International countries implemented quality policies for their industries which would achieve by applying quality systems, quality assurance, quality control, quality

management framework and standard operating procedure. They analysed their products quality strategically by performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality. International Industries and organizations taken corrective action and preventive action to eliminate caused of non-conformities, other undesirable situations and improve industrial processes. They had set systematic investigation procedures and activities to find root cause of failure which would be identify potential sources of non-conformity. In order to meet global market demands and requirements for a product, international countries applied quality assurance's administrative and procedural activities to prevent mistakes, defects during manufacturing with the principle of fit for purpose and right at first time.

Quality control would be more focused on process output from each industry by employing personnel to do physical inspections or applying software to verify features and functionality of particular product to meet business objectives. Quality management included not only materials or products inspections, administrative and procedures but also to meet operating, environmental, safety, reliability and maintainability requirements. Nowadays, international industries are using quality assurance software to monitor engineering processes, methods used to ensure quality and accomplished many and varies standards for their products. Growing technologies brought many automated monitoring and control systems for industrial processes by replacing human resources with software and hardware engineering control devices which could able to achieve more safety, quality, precisions and productivity.

Another important part to enforce and sustain quality policies for particular industry is quality audit which had been carried out internal auditors and external auditors quarterly,

half yearly or yearly based on particular industry policies, International Organization for Standardization (ISO) and external classification societies like Lloyd's Register, American Bureau of Shipping and Det Norske Veritas (DNV). By conducting regular audits on processes, traceability, materials flows, administrative procedures, document controls, monitoring procedures, quality management, quality control procedures, standard operation procedures, sequence of works, maintenance and preservations records, lifting gears, machineries inspection records, testing procedures and product conformance would be objectives of quality policies for international industries and organizations to produce or manufacture highly quality world class standard products for global market. In addition to it, software programs of quality management systems support international countries to achieve more efficient and effective product and quality control for their industries and organizations.

3.5 Robots and Automation in Modern Industries

After the Second Industrial Revolution, technologies grew rapidly within the industries and operating equipment, machineries especially in electrical, communication including computers, telephone and radio, new materials and substances including alloys and chemicals. The invention of industrial robots to perform various tasks for automatic transfers, loading/ unloading, carry out greater number of different movements and different speed, efficiency of material handling and increase productivity. Production and manufacturing industries integrated their processes with automated machines, devices and robots to increase economic productivity around the world since 50 years ago. Evolutions of robots in industry, American, Germany, Europe and japan companies

entered the robotics business. Based on the industrial applications, robots can classify, select, design, programme, manufactured with suitable mechanical, electrical systems, vision systems, sensors, interface and control systems. Modern manufacturing requires robotic systems maintenance, evaluating robotic implementations, re programming whereby performing new tasks, using multifunction manipulator arms or end effectors and safety standard requirement from national or international industrial robotics associations.

Many robots line up for sequence of work processes become automation in industry which include mechanical, hydraulic, pneumatic, electrical, electronic and computers control systems. With automation, industry in developed countries could benefit to save labour cost, energy and materials cost, improve quality, accuracy and precision.

International industries utilized automation and robots in food industry, tobacco industry, mining industry, automotive industry, agricultural industry, motorcycle industry, aerospace industry, manufacturing industry, heavy machinery industry, off road and high way equipment industry, steel industry, offshore and marine industry. Semi automation industries utilized robots and automated machines for sealing, seam tracking systems for gas metal arc welding, laser cutting applications, paint shops, electroplating, hot dip galvanizing, die castings, moulding, polishing, bottling and packing which could increase safety, productivity, quality, efficiency of particular industry. Robotics and automated manufacturing offered careers that could be exciting, challenging, and a variety of educational opportunities.

International industries provided specific training for their employers and employees who would operate, maintain or supervise robots and automation systems based on their

broad range of applications. Many of Universities, colleges and technical schools offered many programs for robotics and automations from design till construction of robots, automation systems and control networks according to local and international safety standards and legislations in developed countries. Their well-organized training programs offered a career boost for most workers and narrow down educational gaps between workers and applications of advance technologies. Some international industries focused on operators training in order to have safe and smooth operation, proper maintenance and understanding for special systems applications. Effective education systems resulted students to understand robotic and automation fundamentals, programming, electricity, basic electronics, hydraulic, pneumatics, digital electronics, microprocessors, programmable logic controllers and machine vision systems which could lead applicable design, construction of robots and automation for international industries.

3.6 Industrial Wastes and Management Practices in Modern Industries

At international countries, Modern industries implemented effective waste management practices to provide solutions for real-world problems on managing garbage crisis of industrial wastes which required technical information including chemistry, microbiology and engineering with local and international regulations. It focused on the entire processes which become wastes and their respective managements. Mostly industrial wastes can be designated as hazardous waste because it exhibit either ignitability, corrosivity, reactivity, toxicity or combine one or more characteristics. Industrial waste stream are coal combustion solids, including bottom ash, fly ash and flue gas desulfurization sludge, packaging waste, medical product waste from pharmaceutical

industries, petroleum waste from oil and gas industries, used motor oil which residual from machineries maintenance, radioactive waste, mining waste, etc

Due to current worldwide technological revolutions, electronic waste (e-waste) become inevitable and unavoidable for electronic products industries. Semiconductor devices, passive components, electro optical components, sensors, electronic packaging, computers, printers and electronic equipment are electronic waste (e-waste) which are fastest growing fractions of the industrial waste stream nowadays. Source reduction, recycling, composting, incineration and land disposal are general methods of international waste management practices. All these practices are concerned with the generation of waste from industry, on-site storage, collection, transfer, transportation, processing, recovery and ultimate disposal of industrial wastes. Mainly industrial organizations and senior managements should aware the concept of reduce, reuse and recycling for waste management practices and applied with responsively for environmental concern along with profits margin on manufactured products.

Innovative and comprehensive program of integrated industrial waste management practices would be able to promote by utilization of technologies and management programs. Strategies that emphasize and encourage all parties to inform managing waste whenever possible to meet particular industry capabilities, needs based on demand product criteria, presence of industry and business, existing infrastructure and financial resources which results in substantial cost savings. Financial incentives, method of disposing, combustion, landfilling and process of recycling would lead particular industry, whole organization and nation to give hygiene and safer industrial environment. Waste prevention includes designing products, reduce quantity by packaging, reduce the

amount of material used, use potential recyclable materials, manufacturing durable products and managing non product organic wastes from each industry's processes are bottom line of managing industrial waste reduction stream.

For offshore and marine industries, waste reduction can be improved by managing resources with exact amount just in time (JIT) according to industry's requirements for each process. Some kind of industrial wastes which need not to throw away and can be benefit for process of next production line or able to manufactured value products by recycling. Recycling is one of the best integrated waste management for industry to achieve maximum economic and environment returns. Industrial products like paper, glass, aluminium, ferrous metals, plastic, yard waste, food waste, tires and rubber can be recycled. A controlled aerobic, biological conversion of industrial organic wastes into a complex, stable material can be defined as composting. Undesirable reaction, competition for plant nutrients and leaching are adverse effects during composting processes of industrial waste transformation. Processing of feedstock, environmental factors, nutrients, C:N ratio, aeration, moisture content, temperature and pH are factors affecting the industrial waste composting process.

Another method of industrial waste management will be incineration. By incineration, volume of industrial waste can be reduced. Incineration emphasize burning of industrial solid, liquid or gaseous wastes under controlled conditions. Second purpose of incineration is to recover heat energy from combustion for water or space heating or electricity generation within industry or next production processes supporting systems requirements. Many types of incinerator built around the world for industrial waste volume to reduce by compacting residuals. Mass-burn incinerator could generate undesirable

and hazardous air quality, resource recovery, fuel quality, particulates, acid gases, trace gases, toxic metals and aesthetics which will impact on environment and public health.

For this method of industrial waste management should set up air pollution control due to fly ash from incinerators and should use refuse-derived fuel (RDF) technology two stage production-incineration system.

Some of industrial waste can be managed by Landfilling which need to meet stringent requirements for siting, construction, operation, maintenance and final closure. It cannot be simply dump on open area which could result growing of insects, rodent infestations and other hazards or nuisance conditions. Drinking water sources must be away from landfill area because no protection liners for leaching with regard to subsurface geology or ground water features. There are many requirements for landfills operations such as receipt of hazardous waste, inspections, training, landfill design, clay liners, hydraulic conductivity, compatibility of liners with wastes, survivability tests, permeability, stress, geomembrane liners handling and placement, construction quality assurance, daily operations and issues, cover materials, disease vector control, biological control of pests, generation of landfill gases, prediction gas production, control of explosive gases, trace gases, landfill gas control and gas utilization, etc. So, international industries are managing the entire spectrum of wastes which generate continuously from their industries into re utilize as other form of resource and renewable energy for some industries till reached final disposable stage with effective waste management practices.

3.7 Human Resource Development and Performance Management

International industries emphasized their employers and employees to develop and improve competencies, capabilities and performance continuously while serving for both the organization and the individual in order to achieve safety, quality and productivity. International industrial organizations and societies organized and arranged industrial related training, seminars, conferences and career development programs to improve individual, group and organizational effectiveness for their human resource development and expansion of human capital. Developed countries included human resource development, human resource management and performance management in academic programs to cultivate concepts, theories and ideas for younger generations in order to carry out frame work into the increase in humans' knowledge, career and talent capital. With human resource development, international industries improved on their processes, practices, professions and relation to other fields which resulted their industries' manufacturing or productions to world class standard and qualified products in the global markets.

International industrial human resource development departments and practitioners find the solutions which could develop human capital and organization along with their industrial mission, vision and values to promote profession, process and level of managements. Executive and management level development, managerial and supervisory levels management, general staff and basic worker level development, new employee orientation, professional skills training, technical training, on job training, customer service training, sales and marketing training, health and safety training are human resource development practices that implementing and applying in international industries. Human resource manager, training manager, management development

specialist, blended learning designer, training need analyst, chief learning officer, talent development manager, individual career development advisor are positions in industrial business and organizations based on the size of industry where industrial owners established and set up their human resource department to optimize their industries standards and productivity.

Most of Management Universities in developed countries are offering undergraduate, graduate, Masters and doctorate level degree for human resource development programs to empowering the organizations, develop of human expertise, take advantage of human resource capital and improve performance according to international requirements. Opening of many training centres and learning workshops, publishing of journals, magazines, books boost awareness of human resource development knowledge and experience to international industries and organizations rapidly.

Nowadays, human resource development and human resource management programs converted into computer software programs to support human resource department's functions and solutions due to information and technology advancements around the world. So, human resource development departments and programs are playing vital roles in international industries and organizations.

Performance management is one of the essential component for human resource development which requires facilitating, guiding and coordinating processes.

International industries focused more on interaction between any personal and organization performance in order to get better results from organization, teams and individual by understanding and managing performance within an agreed framework of planned goals, objectives and standards. Academically, performance management

become part of human resource development programs and mostly conducted as a short course programs with different approaches for different level of employers and employees from executive and management till supervisory level. International industries are achieving their organizational goals, objectives and standards by continuous implementing and enhancing with wider context of performance management programs and agreed framework for their employers and employees to understand and overcome for encountered challenges.

4.0 Industry Development Expectation for Myanmar

Until today many of our industrial owners, executives, employers and managers do not realize the ongoing negative impacts on people and costs resulted from poor industry layout, planning, outdated machineries, outdated mind-set, isolationist attitude, lack of industrial knowledge and lack of ethical behaviour which would create high material handling costs, cycle and lead time delays, high work-in-process inventories, lower than optimum quality, product or parts damage, safety and morale problems, poor equipment utilization, congested aisles and wasted floor space. If Myanmar's industries would like to compete in a world-class, global economy can no longer ignore the ongoing costs of a poor industry layout, planning, modern technology, machineries, network and control systems, human resource development and strategic management systems which we need to review and improve our production methods and implement that support those methods. The first thing to understand and visualize for every industry is a streamlined organization and a streamlined industry layout concept to achieve competitive cost

advantages over others by saving in material handling costs, shop time, work-in-process (WIP) inventories and making profits from scrap including excessive material handling, generated industrial wastes which would make a huge difference for Myanmar's industrial globalization.

4.1 Effective Layout Design for Current and Upcoming Industries

Industry layout could have adverse effect on performance and costs for particular industry which may not be able to visualize and realize by many level of managers and owners unless either competition or education opens their eyes. We need to have more knowledge on indirect material handling costs which could offer tremendous opportunities costs saving and productivity improvement. Most of the industrial owners have a good grasp of the direct labour and material costs for their plants processes but products couldn't be competitive price and quality with global markets due to overlook costs of layout and inefficient materials handling, storing and transportation. So, efficient plant layout design and planning is the most fundamental knowledge for our Myanmar's industrial owners, managements and employers to realize and improve for safety, productivity, quality, employee morale and saving total industry cost.

For developing industrial zones and individual industry, we need to implement major planning phases like Needs Analysis phase which would determine what is actually required to correct problems or meet new challenges, Location Analysis phase which would determine how are we going to re-design the present location, rearranging several locations within industrial zones or within industry, Block layout phase which would determine design of the basic flow patterns and major individual area allocations, Detail

Layout phase which would determine the specific location of each piece of machinery, equipment or physical features including utilities and services and Installation phase which would determine installation instruction, developed time line schedule, actual installation performed as per design, appropriate inspections and implementing the rearrangement or move with the least amount of disruption for ongoing production operations. Apart from this major planning phases, we need to learn manufacturing process planning, equipment and systems planning, space planning, site selection, evaluating alternatives sites, overall site planning, implementation planning, schematic, utilities and energy planning.

Fundamentally, our industries should centre on the one-time chance of doing things right by implementing improvements to the production and manufacturing operations with all supporting activities which would promote for skill level improvements. People skill and leadership, invaluable project management tools, setting the path of the success by defining the attributes, details of the procedures and relationship logic required for industry layout, a prelude to the data gathering process, planning conventions and standard symbols are basic requirements to realize for current industries in Myanmar. Our industrial owners should understand their desired end products and manufacturing process by stating in terms of raw materials, piece parts, subassemblies, final assemblies and finished goods, etc. Also should visualize process activities directly required to produce the end products, people involved from planning till distributions to markets, quantity of raw materials amount needed until quantity of products produced and quality for each process, assembly or product within the tolerance standards and limits.

For basic safety in industry, we need to have fundamental data of space, activities, flow and equipment informations for employee to understand potential hazards and optimize their performance. We need to study on material handling analysis, calculating space requirements, relationship and affinity analysis, establish relationship diagrams for existing industries, developing the spatial relationship diagram, developing alternatives layout configurations, manufacturing cells with cellular approach which could able to work with two or more workstations independently and integrated or coupled into a series of sequential operations, multi floor, multi-site space allocations, information technology based tools and evaluating alternatives to optimize facilities for our current and upcoming new industries.

Material handling analysis should include bulk versus unit material handling, the basic questions to be asked for work simplification, large versus small unit loads, the effects of unit and container configuration, for special case like dual manufacturing and shipping containers, typical manufacturing plant flow patterns, the operations process flow chart, the importance and opportunities of production line and cell balances, equivalent load analysis and basic factors affecting all movements. General considerations for calculating space requirements are space balance for long term projections, using of gross business ratios, site saturation and master planning method, equipment utilization considerations, adjusting daily needs, detail determinations and calculations for space needs, planning storage area within the industry, ratio trend and projections, pitfalls and realities of space projections which would lead us effective industry layout for business expansions and maximize profits.

Methods of establishing relationships between activities, the engineered planning approach, getting the logical approvals, pre-diagramming, existing constraints and monuments, important physical considerations, expansion flexibility considerations, ergonomic and human factors, budget limitations, cell planning procedure, detail cell planning, balancing labour within cells and assembly lines, computer allocation systems, dynamic computer simulation, dynamic model building, information and networking, tangible and intangible decision factors are essential informations, methods, procedures and required knowledge of efficient industrial layouts design planning for our industrial societies and organizations to meet world-class standard which need implementation and continuous improvements from all responsible parties of Myanmar's industries.

4.2 Ethics for Myanmar's Industries and Related Organizations

Myanmar is one of the religious country which clearly have psychological and humanistic conception of faith by one's values and reflected in the nature of one's relationships with others. Myanmar's social, cultural, historical traditions and ethical behaviours are getting faint due to wrong impression on different cultures which protruding our societies from information medias. No promulgations of traditional ethical codes, ignoring values of tradition behaviours, lack of knowledge and education caused our societies, industrial organizations to fall behind from global industrial markets and international industrial competitors. So, code of ethics and ethical behaviours are essential and fundamental of human needs for achieving psychological fulfilment and building industrial globalization through our ways of being in our nation.

Understanding the natural world, the family and extended social relations, work and play with meaningful expression, accomplishments and recognitions would build moral strength to our societies. Faith, ostensibly entails a direct and explicit engagement with existing questions could lead ethics and values in Myanmar's industries and organizations. Honesty, fair, respect, goodwill and dignity of ethical behaviours would improve productivity and effectiveness of our industries which could able to sustain industrial business and quality products. Changing in today's world, our industrial organizations, industries' owners, employers, employees need to improve their roles and responsibilities in single uniform system, or standard, of ethical conduct across the entire profession according to international requirements.

Moral of professional ethics would be main role for industrial professionals to govern their attained specialist knowledge and usage of that knowledge when providing a product or service to the public. Professional ethics, professional responsibility, codes of practice, engineering ethics, engineers' responsibility to society, personal ethical code, professional and engineers' obligations are moral theories which we need to cultivate diligently across our country in order to gain moral qualities and actions to public, society, organizations and nation. Ethics publication for our industrial societies and organization should consist of ethical codes to offer as helpful guides for professionals, trade associations, individual organizations and others, theoretical and philosophical treaties to familiarize varieties of ethical reasoning and to offer alternative conceptual approaches which may be helpful in participating, evaluating and resolving ethical dilemmas, illustrative casebooks to understand specific applications of ethical principles and guidelines that may otherwise be ambiguous or poorly comprehended and practical

ethics which tackles issues like euthanasia, animal killing, environmental degradation, the distribution of wealth and much more from a consistent theoretical position.

Codes of professionals and engineering ethics identify a specific precedence with respect to the professionals' and engineer's consideration for the public, clients, employers and the profession which is one of the practical ethics, examines and sets standards.

Violations of these codes should punish by the appropriate governmental organ. Not only for professionals and engineers but also for each citizen should set personal ethical codes which could define our standards of right and wrong. Personal ethical codes would help us resist temptation when time pressured, emotional and complicated situations come and becomes our basis for making ethically sensitive decisions. Professionals and engineers responsibilities should emphasize safety and welfare of the public and clients, professional ethics, legal liabilities of engineers, environmental responsibilities, quality and communications which could give interaction between engineers and clients, society, employers, employees and to the other engineering professions. It would be part of the essence of engineering as it pertains to the professional responsibilities that the engineer has with the society.

Our engineers and industrial organization need to develop broad fundamental understanding of their professional responsibilities and adopt best practices for our nation to upgrade industrial standards, to protect the health and well-being of present and future generations. Ethics and ethical behaviours should include in academic atmosphere of our education systems which would give bottom-line thinking is supreme, the chance that such forms affords for our students to hear something different is essential to their moral development. Our students need to know that people making decisions using guidelines

other than those suggested by expected value and maximization. With having mind of ethics, we could carry out good work which would have both excellent in quality and socially responsible.

We need to learn relationship science for global markets and communication with international competitors to understand cultural difference and ethically acceptable business practices in other cultures while integrating industrial businesses. Interpersonal relationships could give the foundation and theme of human life, most human behaviour takes place in the context of the individual's relations with others. We need to build the essence of morality with meanings of responsibility, duty, fairness, justice and also the human qualities of empathy, caring, altruism, honesty, reasoning ability, susceptibility to social influences. Use of ethical reasoning, reject egoism, universalizability, acknowledged between moral knowledge and moral action, ethical thinking for cross-cultural similarity and not slipping into the ought from is trap are useful frameworks for ethical decision making tools which our people require adopt and adapt all these theories and philosophical treaties to build Myanmar's industrial globalization.

4.3 Building Industrial Family and Society

Building of industrial family and society would be one of the most fundamental philosophy and our industrial owners, organizations need to adapt, adopt and collaborate among each other. Most of industries in Myanmar are private company and operate by family members rather than employed qualify person in each position for their industrial processes, resulted to fall industrial standard and finally impact on Myanmar's industrial globalization. Some industrial owners employed low educated employees, accommodate

to stay in their industries and just giving a few instructions to follow whatever jobs require to carry out in their industrial operations. Even in government industries and large associated corporations, human resource development, welfare and building family relationships didn't organize well which would have negative impact on employees' motivation and interest for their daily works.

Industrial owners and employers didn't view on their employees as part of their family and treated inhumanity, discrimination and didn't interest employees' welfare at all. We need to understand importance of employee welfare including listening of employees' concerns, family situations, internal communications, balance between work and future and comprehensive welfare system in order to improve safety, hygiene and health, quality, productivity, employers and employees' quality of life and our industrial standards. Each and every industry should set employees' welfare programs and collaborate with government and industrial organizations to encourage workforce development, respects employees' rights, become part of industrial family and societies which could avoid unsafe act, unproductive works and impedance between internal employees' communications. Government and industrial organizations should promulgate basic statutory requirements for employees to have benefits like dormitory, transportation, cafeteria, recreational spaces and activities, educational programs, participate in environmental protection and public welfare events upon salary.

Arranged proper facilities in dormitory, educate personnel to environmental hygiene awareness, providing proper personnel protective equipment for workplace, published hazards information for personnel, workplace and public, providing safe work procedures, training safe work practices, implementing international standard and requirements,

conducting regular meeting for employees welfare, work practices, sharing knowledge and experience among industries, understanding of employees' needs and expectations are parts of essential requirements for building industrial family and societies for our nation to reach international industrial standards. Building of industrial family and society would be product of industrial globalization for Myanmar which would be many functions included production, landholding, regulation of inheritance, reproduction, socialization and education of each and every members. Our industries should collaborate with government and industrial organization to change industrial network and living conditions, connect with public institutions for career development, psychological motivations for jobs and family events, eliminates risk of mortality due to undesired accidents, stability of secure job and higher life expectancy for future.

Upgrading employees' education continuously and timely giving relevant training programs would raise competency and performance of individual employee and able to create positive interest for current work process improvement, contributing valuable suggestion for particular industrial development and achieve teamwork spirit with the industry. Building relationship with employees, establish labour unions to listen employees complaints, establish employee welfare committee, funds and proper care activities, arranged regular check-ups and seminars to promote healthy living, new employee orientation programs and opening opportunities to learn advance courses for their related professional fields could particular industry to achieve productivity with high quality products and sustainable industrial business in local and international markets. We need industrial families' and societies' emotional bonding between employers,

employees, government, industrial organizations and individual industry to take challenges with long term targets and common goals for our industries.

4.4 Safety, Health and Environmental Control for Industries

Myanmar also started first draft of occupational safety, health and control workshop discussion at 2012 year end. By organizing industries in different categories base on their manufacturing, we can standardize mandatory safety measures and control, risk management plan, occupational health and hygiene, quality assurance, evacuation plans, emergency response plans, competency grading, salary and insurance of employers and employees. Due to growing technologies and industrial revolutions, occupational safety, health codes and practices need to review timely for improving control measures and identify risks in order to survive from industrial hazards.

Occupational safety and health professions, industrial hygienists, safety engineers, safety managers, risk management managers, safety missions and visions are fundamentals requirements for industrial societies and organizations which is seriously lacking in our country.

We need to encourage for giving occupational safety and health training, institute in every part of our country to implement new or improving existing safety and health programs, provide for research to develop innovative ways, dependent responsibilities and rights for employers and employees, maintain reporting and recordkeeping systems, increase competence occupational safety and health personnel, mandatory standards and enforcements and provide occupational safety and health programs to control, develop, analyse, evaluate and approved for industrial employers and employees. We need to

learn, educate, train and enforce occupational safety, health and control according to international standards along with our government policies, rules and regulation to upgrade safety legislation nationally with correct trends and approach. Our future safety legislation should cover workplace examination to comply with applicable standards, eliminate hazards, utilize more posters, colour codes, labels and warning signs, and provide standards training, inspections and auditing.

Inspection should carry out for imminent danger situations, catastrophes and fatal accidents, employee complaints, programmed high-hazard inspections and follow-up inspections. Inspection process should start with opening conference, follow by inspection tour and end with closing conference. Citation should differentiate wilful violations, serious violations, other than serious violations and repeat violation and penalties should enforce with fine and stop work order to tighten up employers follow occupational safety, health and control Acts. Our law required to come out standard payroll according to industrial classifications, Standardize factory organization chart based on competency and educations, rank and salary grading, recordkeeping for injuries, illness, fatalities and centralized posting of summary requirements from employers and employees. By Standardizing payroll and annual income, standard insurance premium could be able to calculate for proper coverage of workers' compensation.

Injuries could be categorized into Partial, Total, Temporary, Permanent based on conditions that happened and affect to workers. Injury and illness require to record and carry out recordkeeping to reveal most hazardous operations, determine safety and

health programs weakness, comparing past records or other similar plans records to judge the effectiveness, aid for accident analysis and investigation, identify particular exposures or processes which will cause to occupational diseases and legal, insurance requirements satisfactions. Giving responsibility to employer for keeping records, immediate reporting for hospitalizations and fatalities which occur on-the-job accidents and enforcing workers' compensation liability any time an employee is injured in the course of work. Employers should make sure effort to ensure the safety of their employees at all times and must be prepared to track injuries and illness when things go wrong. These record must be kept in timely manner and include all required information. Every product may have potential problems for manufacturers and consumers with complex and hold many exceptions. An awareness of the laws likely to affect the profits of the company will be critical, knowledge of potential pitfalls, methods to avoid those traps can only to increase company profitability and personal protection for employees. Liability is one of the major concern from a safety perspective.

Industrial hygiene can be describes recognition, evaluation, control and anticipation of workplace health hazards which require to share and understand among our citizens. We need to implement industrial hygiene programs for national wide and it will require to put in national health development plans. Industrial hygiene cannot be practiced by simply following a recipe. Experience, preparation and steeped in a variety of sciences, including engineering, epidemiology, physics, statics, biology, microbiology, chemistry, anatomy, physiology and toxicology. We would require huge numbers of industrial hygienist who have knowledge of chemical, biological, physical and radioactive health hazards,

environmental health, computer applications, geographic information systems and industrial psychology to practice comprehensive industrial hygiene. We might include an occupational physician, occupational nurse, safety professional, health physicist for radiation protection and others. We need to share serious information like toxic substances exposure that cause injury would take up into body through one or a combination of four routes; ingestion, inhalation, absorption and injection. Toxic substances could enter into human body with two type of exposures; acute and chronic. When two or more substances are taken into the body, there would be three possible interactions; antagonism, additive and synergism may take place which would damage parts of body and may lead to fatalities.

Our country need to follow industrial hygiene practices by providing a safe and healthful work environment for all workers. Recognition of environmental stressors: chemical, physical, biological and ergonomic, Evaluation which need to analytic base on hazards contaminants forms, Dusts, Fumes, Aerosols, Mists, Gases and Vapours associated with Threshold Limit Value (TLV) and Control by implementing Engineering methods, Administrative and Personal Protective Equipment (PPE). With increasing numbers of new chemical products being produced and new manufacturing methods being used, the industrial hygienist and occupational safety and health professional must remain vigilant for promoting industrial hygiene in Myanmar. Accident causation theories and investigation programs are vital importance for safety, health and control for Myanmar's industrial society and organization. Collection of critical data after accidents and theories could focus on people variables, management aspects and physical characteristic of

hazards for proactive responsibility to prevent accidents at future. The more information and experience available, the more safety and health hazards are anticipated and recognized. So, Control measures can implement more and able to aim accident free workplaces.

We need to establish concept of designs and phases for risk analysis and hazards control which will include preliminary hazard analysis (PHA) or risk analysis (RA) or system safety program plan (SSPP). A product or system is removed from service known as disposition or termination phase and sometimes the removal product may create a hazardous situation. Employers and management should monitor all these situations with the assistance of safety professionals to protect the employees and the public. Hazard analysis techniques, Failure mode and effect analysis, fault hazards analysis, fault tree analysis, job safety analysis are various methods to apply before performing any kind of jobs to determine the sequences or steps and hazards encountered in order to prevent loss in industrial organizations. Until today, our country is lacking to implement system safety for industrial and workplaces which would be important part of the product life cycle in every manufacturing. We need to set up industrial system safety program with the concept of developed countries and adopt the relevant programs in order to upgrade Myanmar industrial society and organization.

Our government, industrial organizations, industries owners and public should fully aware and understand atmospheric pollution, water pollution, soil pollution, noise, vibration, ground subsidence and noxious odours which could generate from industrial daily

operation processes as basic environmental pollution and hazardous conditions to damage our environment and potential climate changes. We need to implement control measures for smoke, dust, exhaust fumes, toxic substances such as sulphur dioxide and nitrogen dioxide to prevent atmospheric pollution and protect to happen health hazards like asthma, bronchitis. Water pollution caused noxious odours and poisoning from polluted waste water, waste fluids such as petroleum, sludge, sewage and discharge, general waste and agricultural chemicals which we must set guidelines for step by step disposal procedures. Landfill disposal should control by government strictly in order to protect soil pollution from disposing tyres, rubber, plastic, arsenic and heavy metals especially in agricultural chemicals to nearby land and urban areas. Long-time exposure of noise caused headaches, insomnia, depression, hearing loss and impaired development.

Government and industrial organizations should set acceptable noise level and allowable exposure timing across the country and conduct regular hearing test for all industrial employees. Industrial owners should provide earplugs or headphone and assign jobs rotation regularly to prevent over long time exposure limit from noise hazards to their employees. Ground subsidence is one of the environmental pollution which could cause structural damage to buildings due to up swelling of groundwater, gravel quarrying and coal mining. We need to understand this environment pollution clearly and educate our people to reach their attention before come to major damages. Government and organizations should control strictly amount of up swelling of groundwater for any industrial used. Exhaust fumes, river contamination, sanitation facilities, accumulated

sewage and livestock farm could cause not only environmental damage but also affect public health seriously due to noxious odours. Basically, environmental pollution can minimize if our industries strictly follow waste management practices and national level to enforce environmental control act seriously.

4.5 Innovation Concept Implementation for Myanmar's Industries

Innovation is something that not use to hear for our industries and industrial organizations. Actually, innovation is novel idea or method which refers to the application of better solutions that meet new requirements, unarticulated need or existing market needs. With implementing innovation concept among our industries, we could produce more effective products, processes, services, technologies and ideas that are readily available to markets, governments and society. So, innovation concepts, ideas and methodology are something that our industrial organization and society need to cultivate and applied effectively for our industrial globalization. Innovation measures should set national level, organizational level, industry level and personnel level to adopt, adapt and improve continuously for something original, new and important that would breaks into global market and society. Innovation concepts are not only important for our industries and industrial organizations but also important for economic, business, entrepreneurship, design, technology, sociology, pharmaceutical and engineering to improve with better ideas and solutions for our nation.

Innovation concepts resulted wood to steel cars, iron to steel rails, stove-heated to steam-heated, gas lighting to electric lighting, diesel-powered to electric-diesel locomotives, incandescent to compact fluorescent, then to LED technologies, modems to

cellular phones, then smartphones and cathode-ray tube to flat-screen LED smart televisions, etc. Innovation concepts would give comfort, convenience and efficiency in everyday life for society and pave the way to modern city for our people which we need to understand and apply seriously. Innovation concepts and ideas would link our industries and organization to positive changes in efficiency, productivity, quality, competitiveness, market shares and others. Innovation ideas and concepts require identifying needs, developing competences and finding financial support in order to proceed innovation processes to accomplish generated ideas or methods. Research and Development (R&D) would be formal ways for government and organizations to develop ideas and methodology but there may be many exceptions for each of these research to develop successfully.

We need to learn innovation framework integrate together with seven dimensions to produce a portfolio of outcomes that drive our industrial growth. We should adapt those seven dimensions; innovation process by combining non-traditional and traditional approaches to industrial business strategy, strategic alignment by building industrial support, industry foresight by understanding emerging trends, consumer and consumer insight by understanding articulated and unarticulated needs, core technologies and competencies by leveraging and extending corporate assets, organizational readiness by making ability to take action and disciplined implementation by managing the path from inspiration to business impact. Innovation process could be divided into divergent and convergent thinking modes. Creativity lies under divergent thinking mode which would include discovery and exploration process and innovation lies convergent thinking mode

which would function with evaluation and implementation process. Balance scorecard could be used during innovation process for short term success.

Industry foresight is a top down approach that explores the drivers, trends, enablers and dislocations within one or more industries. Intentionally. some cases industry foresight used “what if “perspective to go beyond market trend and research. Consumer and consumer insight is a qualitative bottom up approach that leverages insights into behaviours, perceptions and needs of current and potential consumers and customers by involving them as true partners in the innovation process. We must fully aware about innovation framework and flow which come in sequence of ideas and customers, tools and methods, industrial business design assessment, innovation capability assessment and finally would be required action plan to execute. It would not easy to produce creative and visionary strategic thinking for us, it would be equally challenging to successfully implementation for thinking process in a way that creates meaningful industrial business results which we need to grow for our industrial globalization.

4.6 Integration of Advance Technology and Automation for Myanmar’s Industries

Emerging global business and competitive markets around the world, economic productivity for each business unit become critical and finding ways to improve productivity with modern technologies. Productive labour-saving devices, machines, processes management, planning techniques, skill development trainings, automation and robots become part of accomplishments to develop economic productivity for all industries and manufacturing units. Industrial robots play one of key role for increasing productivity by saving man-hours per product for each industry. The term Automaton

which was known originally become a robot which we are seeing today's world. After

World War II, industrial robotics took place in production where repetitive operations that are not only monotonous but may also be unpleasant and dangerous along with thinking machines, computers and automated systems.

Selecting a suitable industrial robots according to process application, Myanmar industries and organizations should capture robotic technology and design a safe and highly productive systems. Developing on fluid power systems, power supply and movement systems, understanding on type of programming, motion and sensors would become fundamental requirements for Myanmar industrial organizations and industrial sectors of government. Upon understanding robots' constructions and involved components, maintenance programs of mechanical, fluid and electrical parts, devices are essential programs to implement and develop according to general or recommended service manual and techniques. Regular inspections programs, safe operating and handling procedures, personnel familiarization and competency trainings are mandatory requirements to rule out across all industries within the country. With industrial robotics, Myanmar industries would be able to aim fully automated factories for future development like other modern industrialized countries around the world.

Industrial robotics could be able to define the study of robots for particular industry with suitable design, fabrication, theory and application to perform special purpose automatically within industry's production or manufacturing processes. Industrial robotics system consists of a motor-driven, multifunction manipulator arm, an electronic memory system containing the program that controls manipulator movement and a microcomputer for reprogramming the robot for new tasks. Three generations of industrial robots could

be found today industries' processes to increase ability for accomplishing more difficult tasks. Industrial robots categorized under flexible automation which could save money compare with fixed automation because equipment does not have to be discarded or rebuilt and easily reprogramming or replace multiple use of end effectors. Industrial robots constructed many shapes and sizes based on industrial applications. Body parts and movements of robot is based on human's hands dexterity which supported by wrist, bone, joint and muscles. Degrees of freedom based on the shape of the work envelope and also require more complex controller design for more degrees of freedom. The type of control system used, the type of actuator drive used and the shape of the work envelope, robot can be classified.

Depending on the components, configuration and use, could be able to classify industrial robot as well. We need to understand basic electric control systems before we design robots for industrial application, then could able to plan for setting up fully automation industry. Programmable logic controllers (PLCs) are widely use in industries especially for process control technology. PLCs could provide increase reliability, more flexibility, lower cost, communication capability, faster response time and easier to troubleshoot. Modern control systems still include relays but these are rarely used for logic compare to PLCs. We must learn PLCs hardware components and operation principles to utilize at correct applications according to our industrial requirement. And also number systems and codes, fundamentals of logic, basic of PLC programming, developing PLC wiring diagrams and ladder logic diagrams, programming timers and counters, data manipulation, math, sequencer and shift register instructions are essential knowledge for our engineers to understand modern industrial control technologies.

We need to organize and encourage for opening practical installation practices for PLCs, editing and troubleshooting training centres in many of our cities collaboration with government and private associations. Based on the type of industry and type of processes, control and network systems would be different including robots selections, data terminals and computer systems. And also based on type of motion, our designer need to know electric liner actuators, electric rotary actuators, fluid-power liner actuators and fluid-power rotating actuators to optimize machines, robots and mechanisms motions. Sensors are parts of robots and automation industries which sense or detect entire system operations as a monitoring devices. We must study details of electric position sensors, pneumatic position sensors and point sensors to design safe and efficient robots and automation for our future modern industries.

4.7 Competitive Strategy for Global Industrial Market

Complexity of industry competitions through the world bring theory, practical and teaching of competitive and business strategies for industries and industrial organization for international countries. Myanmar industries and organizations need to learn powerful strategies and competitive tools to take part in global industrialization by understanding competitors and able to choose competitive positions in global markets. We need to have techniques for analysing our industries, understand our competitors, predicting competitors' behaviour, enduring competitive strategic foundation and grounding point to achieve lowest cost, differentiation and focus on superior profitability. The structural analysis on our industries, generate competitive strategies, competitor analysis framework, attention to market signals, competitive moves for our industries, competitive

strategies for fragmented and declining industries, emerging industries to industry maturity and competition in global industries would be the specific ways for our industries to go about competing internationally.

Our government, industrial organizations and management of the industries should accept industrial analysis, competitor analysis and strategic positioning are essential management practices to support industrial globalization for Myanmar. With new technologies, new management tools, new growth industries and new policies, we couldn't stop learning about international industries, our rivals or ways to improve or modify our competitive position. Developing a competitive strategy need to set goals for our industries to strive industrial business and key operating policies which would bring overall behaviour of the industries to achieve our goals. Our industrial competitive strategy should include target markets, marketing, sales, distribution, manufacturing, labour, purchasing, research and development, finance and control and product line. And also we need to set key operating policies for each of these functional areas to guide for connecting each other for rolling our industrial business and targeted goals. External factors and internal factors would limit each and every industry to determine for setting appropriateness of a competitive strategy which would result in successful accomplishment of particular industry's goals.

Industrial opportunities and threats, broader societal expectations, personal values of the key implementers and company strength and weaknesses would limit to our industrial competitive strategy. Basic concepts to think internal consistency, environmental fit, resource fit, communication and implementation for testing our proposed goals and policies, then establish process to formulate a competitive strategy for our industries.

There would be five forces driving industry competition, threat of new entrants, threat of substitute products or services, bargaining power of buyers, bargaining power of suppliers and rivalry among existing industries. The collective strength of these forces determines the ultimate profit potential in the industry where profit potential could be measured in term of long run return on invested capital. Industry structure has a strong influence in determining the competitive rules of the game as well as the strategies potentially available to that particular industry.

Our government, industrial organizations and industrial owners should have great deal of attention to direct for defining the relevant industry as a crucial step in competitive strategy formulation with systematic structural analysis. There would be three potential successful generic strategic approaches to outperforming other industry; overall cost leadership, differentiation and focus which need to cope together with five competitive forces. We need to analyse competitors' and their potential response profile with a basic framework which include components of current strategy, capabilities, assumptions and future goals. Market signal is one of the competitive strategy we need to learn for understanding competitor's direct or indirect indication of their intentions, motives, goals or internal situations which may have two fundamentally different functions; truthful or bluff signals. After analysing competitors and market signals, we have to start competitive move with both cooperative and nonthreatening moves and threatening moves depend on situation. Establishing commitment is essentially a form of communicating the industry's resources and intentions unequivocally. Commitment could be guarantee the likelihood, speed and vigour of retaliation of offensive moves and could be cornerstone of defensive strategy for our industries.

We need to attention policies and framework toward buyers and suppliers, buyers selection, purchasing strategy, a mapping of strategic groups in a hypothetical industry with vertical integration for industrial business's profitability and long run sustainability even in condition changes due to industrial growth. We need to generate strategic industrial environments with industrial concentration, building state to reach industry maturity and encouraging exposure to international industrial competition. Also we need to know potential strategic traps, problems constraining industrial development, strategic pitfalls in transition, techniques for forecasting and organizational implications for maturity to make effective framework of competitive strategy for our industries and organizations. In order to make strategic decisions for our industrial globalization and expansion of our industries' standards, quality of products to reach global market, we must implement competitive strategy concepts and framework across our country industries.

4.8 Renewable Energy and Electricity from Industrial Wastes

Every nation of industrial society and organization should set minimum mandatory requirements of local & international industrial waste management practices for their industries to prevent environmental damage, public safety and health. Different industry produce different wastes which need to reduce, reuse and recycle for serving public health and protecting the environment. Well trained scientists, technical experts, regulatory personnel and policy makers are essential for every industrial society and organizations to manage complexity of different kinds of wastes. Waste include hazardous waste, non-hazardous waste, sludge, rubbish, debris and trash which could be formed of solid, liquid and gases state in nature. Industrial waste management

practitioners need to understand sampling protocols for industrial wastes, variability affecting waste sampling, common components in industrial waste, chemical properties and physical properties of industrial waste to develop waste collection system, transportation, handling , treatment, storage and disposal facility according to international standard and requirements for their industries and organizations.

Significant legislations should be enacted for the purpose of protecting humans and the local environment from the effects of improper waste management and disposal for every state of Myanmar. Government and industrial organizations should provide wide range of economics incentives available to municipalities, corporations and universities to support waste reduction, recycling and other applications of an integrated waste management programs. Those decisions for allocation of resources and consequences effect for environment need to be well-informed to public and industrial management in order develop future waste management. Understanding on chemical, physical and biological properties of waste, handling and transportation of waste, storage and re processing of disposable waste are part of waste management processes and steps which need to implement and develop national and internationally for Myanmar's industrial organization. Improper handling of industrial wastes would have a devastating impact on ecosystems and cultures throughout our country. We should study new ways to recycle waste for transforming waste to energy by developing electricity generating industries from landfill waste and pollution across the country. Industrial waste could generate a number of items or units by transforming heat to energy with development of rapid industrialization around the world. From research and development, international industries diversify numerous ways to covert waste to energy such as thermo-photovoltaic (TPV) cells could generate

power from the wasted heat, water into hydrogen fuel with waste energy, waste energy to gain steam, waste heat could double battery life on laptops, cell phones, turning waste water into ethanol, getting biofuel from plenty of garbage, electricity and desalination from waste water, hydrogen from waste materials, waste vegetable oil into fuel, waste into a renewable energy sources, anaerobic digestion of biomass, turning airborne carbon into fuel, harvesting hydrogen from farm waste and energy could generate from pollution.

Our electrical power generation sectors already known and proven that waste to electricity is environmentally sound process which provides reliable electricity generation and sustainable disposal of post-recycling industrial wastes. Waste to energy would reduce dependence on fossil fuel, greenhouse gases, complements recycling and reduces landfilling, truck traffic and associated emissions, recovers and recycles metals thus reducing mining operations. And also waste to energy technology has advanced with the implementation of the clean air and dramatically reduce all emissions to surrounding areas of residence who stay near industrial zones. Our government, industrial organization and industries should collaborate and develop waste energy electricity generators around all our industrial zones across the country which could support electricity requirement for particular industrial zone and minimize environmental impact from industrial wastes.

5.0 General Conclusions

Myanmar, our country is one of the most resourceful country in the world and people that living not really reach to the stage of starvation for food and homeless even in poor family,

compare with those countries terribly facing for food and place to stay. But there would be a bit status different for rich and poor family within societies due to inflation, unstable financial situations, unreliable for jobs, sky price of real estate values because of get-quick-rich mentality, no opportunity difference between educated and non-educated people, least contribution to societies, organizations and nation. At 21st century, we need to develop and change some of our mind-set to develop our nation along with international countries. For developing our nation, everyone has own responsible to carry along the journey and play the role accordingly. Governmentally, we need support to open opportunity for education, economy and giving financial supports wherever necessary like public safety, health, etc. And also strategic management with strict control for real estate, trading, import and export including natural resources. Our resources should utilize for our nation and civil society sufficiently before export out to other countries even looking for foreign incomes.

We need to be proud for our country's abundant natural resources and also need responsible to keep our natural resources last long forever in our nation. Government could eliminate get-quick-rich mentality from dealer and companies who are currently in business of real estate, gravel quarrying, extraction of teak, natural gas and electricity productions by adopting real business concepts, strategic management and systematic ways for developing our nation. Government and business associates need to change of course for doing business by setting up industries, beneficial import for health, education, knowledge and technology, exporting qualify our industrial products to global market. And also developing shipbuilding, marine and offshore business, establish international ports for transit shipments would be better ways to earn foreign incomes rather than export out

our natural resources. Establishing of large industries could raise our employment rates and stable incomes for civil societies which would bring up education, safety, health, competency, productivity, technology and strategic management for performance, human resource development, enterprise resource planning, total supply chain, environmental and waste practices.

Government, business associates and industrial organizations should review our current industrial rules, regulations and structure, industrial zones status and activities, industrial safety and environment control, wastes and disposal practices, product and quality control measures, outdated machineries and controls, competency and human resource development situation and conditions to visualize shortfalls and pitfalls of industrial development in Myanmar. And also need to open eyes for analysing difference between us and international industries rules and regulations, industrial zones, organizations and activities, safety standards and environment control measures, quality policies and systems, robots and automation application, modern industries waste management practices, competitive strategy, human resources development programs and framework, security and network control systems. We need to understand those differences and implement systematic frameworks to catch back status according to international industries standards.

Finally, we need to relook into our industrial zones and industries operations and enforce actions to optimize industrial layout, build industrial families and societies, share and educate awareness for safety, health hazards and environmental control practices, innovation concepts implementation, integration of advance technology and automation, renewable energy from industrial wastes, load sharing from electricity and strategies for

managements and competition. Additionally, China and India would be main concern for our Myanmar industries to compete price and quantity but if we could able to achieve better quality products with same price, then we believe that our civil societies would consume more our industrial products with pride which would be leading road for Myanmar to aim industrial globalization in coming future soon.

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