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Impact of Industry 4.0 to the Industrial Location Selection

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ABSTRACT: The global industries change rapidly where the technologies drive the business to meet productivity and client objective. Industries 4.0 take place as a transformation in business and production in establish of cost benefit and revenue. In this paper we will discuss how the industries 4.0 affected to the manufacture industries in implement technologies at the location of the industries.

Keywords: Industry 4.0, Operations, Location;

INTRODUCTION

According to the Fageda [1] the globalization will become prominent economic trends in the past decade where big manufacturer player's emerging as major roles in the latest technologies. Main factor many organizations of such firms and manufacturer industries is to make sure their products and services fulfilled the needs of customers around the world.

The demand factor from customer itself influence to the organization or firms to open the facilities nearest with the demand. The Consideration area with customers aggregated in points of demand. The demand generated at each demand point changes in time. Facilities are planned to be located in that area in prespecified given times [2] .The organization finding that location determine up 50% of operating expensive where the factor of Location is critical element in determining revenue for the services, production or professional industrial[3] .

In start-up the new business or develop the new facilities in strategic location, the organization need understand what current technology can be implement or what their competitors offer to the customer and how the operations based on the latest technology implement by them. Technologies largely determine economies of scale, scope and experience and these are generally common across leading edge firms in most industries [4] **.**

Industry 4.0 now is trending worldwide where many countries now advise all the business firms such manufacture, ports, logistics, warehousing and so on change the business process from the old method job process to the digital transformation. It's important to meet a global requisition in ensure they can compete challenge in provide services or product to the customer.

Locations of the manufacturer and business firms also know can be findings easier for the customer in order to them to do a planning to get the services or product from the provider. As example, in port industry, the location itself such land rental and facilities their have can implement totally industry 4.0. In this report we will discuss the impact or benefit the organization gain when their implement industry 4.0 in the location organization business activity.

1 UNDERSTANDING OF LOCATION AND FACTOR INFLUENCE CHOOSE THE RIGHT LOCATION.

1.1 Understanding of the Location

When the industrial Choose a strategic location for business operations, it always been of critical interest to industrial and commercial where it can give major impact of the revenue and

overhead of the company. In decision made to choose location, the organization need to consider what the advantage of the company will gain and growth. As per describe by Porter[5] the location will be affects competitive advantage through its influence in the productivity and especially in the growing of production.

Prosperity depends on the productivity and production with which factors are used and establish in a particular location. In the development and acquisition of a new facility is typically a costly and efficient project. However**,** before the industrial construct the facility, a good location need to identified where appropriate facility capacity specifications must be determined based on the business requirement, and large amounts of capital must be allocated.

In establish facility location decision based on the government authority or firm, the high costs associated with this process make almost any location project a long-term investment [6]

1.2 Factor Influence choose right location

The decision to choose the location based on the long-term planning where, when the organization decide and committed with the final location of business activity it involved resource and costs issue are unchanged.

The objective of location strategy is to maximize benefit cost and revenue. In develop the business or manufacture industry for long term period, the firms will be looking to expand the current facilities, maintain existing and add sites and the last one is closing existing and relocating based the business trend.

Another factor business firm or manufacture need consider during choose the location as per below: -

i. Government rules, attitudes, political risks, incentives, climate and taxes. – The existence of support services of public activities may affect the placement of an industry.

   Government policies that affect industrial, including tax regulations and tariffs, export import restrictions, restrictions on the number and type of industry, the determination of industrial areas and the development of conditions favorable business (favorable)

   The government classifies some areas as underdeveloped areas where employers will be given incentives such as subsidies, or financial provision at the concession level, or the provision of educational and training facilities.

ii. Market Location – Access to markets is an important factor to consider. Industries that produce a product perishable and large commodities cannot be transported over long distances where it suitable only at nearest location market. Industries located nearest the market and demand can be able to ensure the industries reduce cost of transportation in distributing finished products

iii. Location of Resources raw material – In determining and decide of the location industry, proximity of resources raw material is very important.

   The company also needs to take into account its location very close to the source of raw materials and suppliers because of the cost of transportation, the amount of cargo and durability from rotten / damaged.

   Companies / factories tend to place their factories in areas close to their raw materials resources, where the factor based consideration of the transport costs to the plant are large / expensive due to volume and weight and distance when the plant distance is some distance away.

Proximity to raw material sources will reduce industrial production costs. For most large industries, the cost resources of raw materials forms part of the total cost. Therefore**,** most agro- and forest-based industries will be place around the source of raw material supply.

iv. Weather – Natural and climate considerations include weather factors such as the topography of an area, water facilities, drainage facilities, waste disposal, etc. These factors sometimes affect the location of the industry.

v. Availability in labor skills, attitudes, Efficient productivity and cost saving – Sufficient in supply of cheap and skill full labor is required in industrial development. The industrial appeal to labor centers depends on the ratio of labor costs to the total cost of production.

vi. Availability in suppliers, communications and energy – It is important that every industry requires both power generated from the flow of electricity, diesel, water, wind and others. Therefore, it is necessary to note the availability of resources (natural) with cheap and sufficient.

vii. Rates exchange and currency of the risks - The volume in global trade and financial depending on the currency exchange rate between different countries.

The firms or manufactures also need look to the local competition as per below: -

- Direct competition – Business activity in same process production produce product or services and selling to the customers
- Competition Indirect – Offering business in different products or services where it competing in same dollars of consumer
- Competition Complementary - selling a products or services where it can be used with other purchases

2 INDUSTRIES 4.0.

Technology now a very important element in driving the industry. almost all of the industries in the world use technology as one of the efforts to ensure the company's objective achieved. Today's 4.0 industry starts to be introduced and is a very important trend for driving industry.

Most countries in the world have begun taking steps to ensure that industry players are making the move by implementing industry 4.0 in ensure that they are able to increase revenue and improve their productivity.

4.0 Industries (4^{th} revolution of industries) is future of the industry development trends in achieve more intelligent manufacturing firm process, including reliance on Cyber Physical Systems (CPS)**,** construction of Cyber-Physical Production Systems (CPPS), and implementation in the operation of smart factories [7]

As reviewer by the Wee [8] , 4.0 Industry is driven by four disruptions as follow:

i. The collection and analyses the big volume of data, high-tech of computational, connection

ii. The emergence of analytics and intelligence business capabilities

iii. Collaboration interaction of new human–machine

iv. digital instructions transferring to the physical world

The terms of 4.0 industrial refer to process development the management of manufacturing and activity of supply chain production.

In understanding of revolution industry 4.0 today, its look like predecessors might give us a perspective in how the particular of revolution is different. The changes rapidly in the information

and communication technologies (ICT) have broken to the boundaries between the real world and virtual reality.

Objective and vision 4.0 Industry is to create social network where the machines will be communicated each other where this technology knowing as the Internet of Things (IoT) meanwhile communicate in between human it known as the Internet of People (IoP). The business process itself will change totally where the organization will set a new vision and objective to meet the industry and meet the customer expectations. As 4.0 Industry is based concept of the cyber physical systems (CPS), which is mainly a technological approach, aspects such as the modification of organizational structures and processes, the adaption of existing business models, or the development of necessary employee-skills and qualifications are neglected.

3 HOW IMPACT INDUSTRY 4.0 TO THE LOCATION AND IMPLEMENTATION INDUSTRY 4.0.

The organization need consider when they selected location where support by industry 4.0 in the business activity, it must support with the high technology, competitor advantage and customer need. According to the Lin Wang [9] , the advantages of Industrial 4.0, will be increase efficiency of the allocation resources**,** faster feedback to the market needed, efficiency of labor and logistics cost.

However, in selecting the location, need to take into consideration where the area has the high technology that support this industrial 4.0. For example, as mentioned in the journal, poor of the basic foundation, facilities and technologies backwardness**,** China's furniture manufacturing industry have some challenges.

One should make full use of its biggest customer market to speed up with the steps of industry automation, intelligence and green trend. The organization itself must be change method of the production as describe by Micheal E Porter [10] where in advance nations, producing standard product based on standard method will affected of the competitive advantage.

The company compulsory to do innovation at the global frontier. The companies need to create and commercialize a stream of new product and processes that's shift the technologies frontier progressing as fast as their rival's.

3.1 Implementation Industry 4.0

The industries 4.0 will transforming the organization such manufacture industries into intelligent one by the combination of the information communication in the technology, cyberspace virtual system and cyber physical system.

In the way the organization such manufacturing industries apply industry 4.0 as follow: -

3.1.1 Interconnection

Cyber Physical System(CPS) can be realize the integration of network and physical by connecting the single intelligent device with the internet. In this way, these intelligent devices can achieve self-adapting, self-diagnosing, self-repairing and remote assistance.

Interconnection as human to human, machine to human, machine to machine or service to service, in objective to achieve the vertical, integration process and complete horizontal.

3.1.2 Integration

The 4.0 Industrial system is combination of the sensors systems control, production system, production equipment together in perform a network intelligent. Objective of vertical integration is to realize a seamless connection of the information product, such as designer product, manufacturing, logistics, transportation and maintenance.

3.1.3 Big Data

Manufacturing intelligent equipment will produce a large number of the production related information and the data volume. The manufacturer industries collect the information data and feedback to all the aspects of the production. Thee manufacture will achieve efficient high-tech quality of the operation process.

When organization plan to apply Industry 4.0, they need standardize of systems and building a reference architecture. The organization need establish of the standard uniform where it purposes to developed a network between different factories and manufacturer can be connected and integrated.

The location also will influence efficiency of the factory when where the factories will have large and complex systems where they need to be efficiently managed. Appropriate plans need to establish and an explanatory model also needs to be developed in optimize the management.

Industry 4.0 enforces comprehensive and reliable establishment industrial broadband facilities in ensure networks communication meet these criteria and be reliable, comprehensive and of high quality.

To ensure it happen, the location itself must support by high technology facilities. Safety and security is an important part to ensure that facilities production and not threat from the product to the society and environment, meanwhile it preventing product misuse or unauthorized access to facilities of the production.

4 CONCLUSION.

In the decade of Industry 4.0, the organization such manufacture industries have many opportunities and the challenges in implement industry 4.0 in their business activity.

To achieve the development of industry 4.0, four transitions require completion such: -

i. The factor- change driven to driven innovation

ii. Move from low-cost competitive advantage to competitive advantages in efficiency and quality

iii. Move from consumption resource, pollutant emissions and more extensive manufacturing to changes of the green manufacturing

iv. Production manufacturing development to oriented manufacturing services

A good strategies location will give good impact to the business activity. Industries 4.0 can be success to apply where the location itself have facilities needed by the organization.

The advantages 4.0 industrial will be increase efficiency allocation resource, fast feedback to customer demand, efficiency labor and logistics cost.

5. Contribution Note

This work was a MBA class project. The first 3 authors wrote this work; Dr Shahryar was lecturer of the course who taught and advice the topic.

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