

Supply chain reengineering: a critical analysis with the implication of industry 4.0 Process restructuring after Automation using technological advancement in an economical growing country with E-Logistics

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Abstract - The Industry 4.0 revolution in the early twentieth century have already created an everlasting impact into the world of business. The core transition happened in the bottom line from reengineering in the process flow with the rapid implementation of automation to drive the nature of work function from man to machine to machine to machine.

The term 'Industry 4.0' was instituted to stamp the fourth fashionable unrest, another worldview authorised by the presentation of the net of Things (IoT) into the creation and collecting climate. The prime saying of business 4.0 underscores the worldwide organizations of machines during a shrewd process plant setting ready to do successful orauto-controlled commercialism information and dominant each other. This digital actual framework permits the savvy works to figure self-emphasized. as an example, a machine can understand the collecting cycle that ought to be applied to associate degree item, what selection to be created to it item, and then forth, therefore the item may be apparently recognizable as a functioning part whose arrangement and course within the creation line is outstanding. because the coordinated effort between suppliers, makers, and purchasers is significant to expand the straightforwardness of the multitude of steps from once the request is sent till the end of the prevailing pattern of the item, it is during this manner vital to look at the result of business four.0 on the inventory network beat all.

Under the idea of "Industry 4.0", creation cycles will be pushed to be progressively interconnected, data dependent consistently and, fundamentally, significantly more proficient. In this unique circumstance, limit streamlining goes past the customary point of limit boost, contributing likewise for association's benefit and worth. Surely, lean administration and nonstop improvement approaches propose limit enhancement rather than expansion. The investigation of limit improvement and costing models is a significant examination point those merits commitments from both the down to earth and hypothetical viewpoints. This paper presents and examines a numerical model for limit the executives dependent on various costing models. A conventional model has been created and it was utilized to examine inactive limit and to plan procedures towards the boost of association's worth. The compromise limit augmentation versus operational proficiency is featured and it is indicated that limit improvement may shroud operational failure.

Keywords: *Industry 4.0/4IR; Artificial Intelligence; Machine learning; Framework re-engineering; Integrated management systems; Advanced supply chain; E-Logistics; Lean management; Digital supply chain; Deindustrialisation; Neural network; Business process analytics*

PURPOSE

This investigation is concentrated on the combination of Management Systems and also the planned approach is supported on accessible literature relating to Management Systems and Integrated Management Systems, as well as one form conducted by the authors and sent to 843 Portuguese Organizations with 2 or a lot of certified Management Systems. The fifty-five valid answers were thought-about towards this work.

Attained results show that the long run of the Integrated Management Systems encompasses total integration of Management Systems, and also the main reasons provided square measure that Organizations Integrate their Management Systems principally for internal reasons like standardization/ simplification/ organization, resources reduction, documented info integration, and reduction. Major difficulties for the combination of Management Systems concern the dearth of specialised human resources.

The worldwide economy is entering the Fourth Industrial Revolution (4IR), or Industry 4.0, in view of the utilization of new advanced and robotized advances underway cycles and administration conveyance. These progressions are giving developing business sectors openings, for example, improved profitability, just as dangers, specifically reshoring and the dislodging of human work via computerization. More well-off developing business sectors, for example, the Gulf expresses, that have the assets to put

resources into new advances, and those with better settled assembling areas, for example, the nations in Southeast Asia, show up best positioned to receive the rewards of the 4IR. A considerable lot of these economies are setting up systems to oversee and empower the progress towards Industry 4.0. Then, different districts have given indications of alleged untimely deindustrialisation. Specifically, Latin America and Africa appear to be more defenceless against dangers emerging from innovative changes and at more serious danger of being given up. To keep away from such a destiny, they need to embrace new creative techniques that will permit them to jump existing phases of mechanical and framework improvement.

INTRODUCTION

Industry 4.0 has been concentrated in the current writing from the point of view of production network the board or the triple primary concern of supportability, yet the two viewpoints have not yet been adequately consolidated. Accordingly, this paper sums up the present status of the writing on Industry 4.0-related possibilities with regards to the triple main concern as for store network the executives. To do as such, the examination directs an orderly writing audit, in view of 55 scholarly articles, which are specifically dissected and sorted by production network the board measures in modern worth creation. To start with, this investigation explains an all-encompassing viewpoint on the possibilities of Industry 4.0 for inventory network the executives regarding the triple primary concern. Second, the interrelations between the components of the triple primary concern are investigated concerning possible clashes and empowering advancements. Examination holes and suggestions for administrative practice are featured, for example, the part of little and medium-sized undertakings inside Industry 4.0, creating economies, multi-level production network the executives, data sharing across the production network, and the interaction of environmental and social measurements with financial advantages, reflected in new types of plans of action, which should even now be better perceived.

The genuine capability of the business 4.0, which is a side-effect of the fourth modern transformation, cannot be really figured it out. This is, obviously evident, until the shrewd processing plants in the inventory fastens get associated with one another, with their frameworks and the machines connected to a typical systems administration framework. The most recent couple of years have encountered an expansion in the appropriation and acknowledgment of the business 4.0's parts. Notwithstanding, the following phase of savvy industrial facilities, which will be the brilliant inventory chains, is as yet in its time of early stages. In addition, there is a synchronous need to keep an emphasis on the inventory network level execution of the idea that industry 4.0 advances. This is significant to acquire the start to finish benefits, while additionally evading the association-to-association similarity gives that may follow later on. While thinking about this idea, restricted exploration exists on the issues identified with the execution of industry 4.0, at the store network level. Consequently, remembering this absence of writing and examination accessible, on a wonder that will characterize the fate of business and industry, this investigation utilizes an exploratory way to deal with catch the usage of industry 4.0 ideas across different levels of the store network. In light of this examination, the investigation proposes a multistage execution structure that features the authoritative empowering agents, for example, culture, cross-utilitarian methodology, and the persistent improvement exercises. Besides, it likewise features the arranged usage of the high-level apparatuses, beginning from the central association with the ensuing joining with the accomplice associations.

METHODOLOGY

A basic evaluation is performed to investigate the key drivers and boundaries for Industry 4.0 execution under four business measurements: functional, authoritative, mechanical, lawful and moral. A framework elements model is later evolved to comprehend the effect of Industry 4.0 execution on inventory network boundaries, by including both the recognized main impetuses and obstructions for this mechanical change. The consequences of the recreation model are used to build up a reasonable model for an effective usage and quickening of Industry 4.0 in stock chains.

FINDINGS

Industry 4.0 is anticipated to bring new difficulties and openings for future stock chains. The investigation talked about a few execution challenges and proposed a system for a compelling adaption and change of the Industry 4.0 idea into supply chains.

Endeavours to robotize mechanical cycles have not generally gone easily. In April 2018 Elon Musk, CEO of electric vehicle maker Tesla, told nearby media that the organization had occupied with "over the top robotization" at its offices, and that this halfway added to its inability to meet creation targets. He added that compensations for architects to keep up robots could now and again exceed the investment funds engaged with their utilization.

The fourth modern upheaval, Industry 4.0 is ready to occur on a worldwide scale, taking the computerization of assembling cycles to another level by connecting the digital and physical, fusing AI and empowering altered and adaptable large scale manufacturing advancements. Industry 4.0 makes a "shrewd production line" inside which the digital actual frameworks screen actual cycles, make a virtual duplicate of the actual world and settle on decentralized choices. Over the Internet of Things, digital actual frameworks impart and help out one another and with people continuously.

Industry 4.0 empowers limiting inefficient cycles and activities and streamlining utilization of energy and different data sources. This is accomplished dependent on catching information, its investigation and utilizing the examination to improve working of machines, manufacturing plants and frameworks.

Germany, France, China, USA and so forth have made stages for pre serious collaboration in Industry 4.0. These countries are looking towards computerization and control as to supplant costly labour and accomplish lower cost of change accordingly recapture their offer in assembling economy from arising economies.

Be that as it may, the focal point of Indian program for Industry 4.0 is on utilizing innovation to make items for the worldwide business sectors at serious rates and to be grasp I4.0 innovation with most recent mechanical progressions.

Critical analysis

The basic impact on the economical growing country like India is development with the help of lots of new and emerging players in the market to endorse the revolution. As a developing country adapting this amidst change in a full-fledged form is hard but not impossible cutting down the existing business process and implementation of new emerging technology requires a huge investment so making a horizontal expansion rather than adopting vertical is the key in the success process. Its providing edge to a lot new start-up businesses alongside 3PL logistics.

Core components

The industrial movement is paced with the grace of some important and innovative approach of gen next development in the technological domain. The continuous evolvement of innovation and bringing the dream scape in to reality through digital arena and automation making the thrust in the industrial arena. The core drivers of the process automations are debriefed below

Advanced mechanics

Ostensibly the most weighty region of 4IR-related innovation as far as its effect on work markets and blue collar positions is advanced mechanics and other computerized measures. The utilization of mechanical technology and robotized measures in assembling began to take off during the 1990s and has been extending quickly, posting yearly development paces of around 12%. "Take-up of advanced mechanics is extremely high and there is right now no sign that it will level off any time soon," Prettner said. "As of not long ago robots were utilized to a great extent for work that was excessively risky or hard for people, yet now the innovation is improving and getting more savvy, permitting it to be utilized for an always more extensive scope of uses." Use of the innovation is gathered in a few key businesses, quite automotive, gadgets and electrical gear, and hardware creation. While robots have commonly battled to work with more modest parts that made them less appropriate for different businesses, this is currently beginning to change, thus considered lights-out assembling industrial facilities that can work without human presence are now in presence, in particular in North-east Asia.

3D Printing

Otherwise called added substance fabricating, 3D printing is the PC controlled creation of three-dimensional articles from advanced models. The innovation is presently broadly used to make a scope of items, from models to profoundly altered systems, in a way that is more productive and savvier. A model is the assembling of portable amplifiers, which should be independently shaped to the ear of the wearer. "Listening devices used to be delivered physically, which was a muddled cycle, yet now makers can just sweep the ear and utilize a 3D printer to make the item," Prettner told OBG. Because of such helpful applications, 3D printing has seen a critical blast since 2008. Notwithstanding, Prettner disclosed to OBG that the innovation is currently beginning to develop, and that development rates will probably level off.

Computer generated Reality

Like the utilization of 3D printing for model creation, computer generated reality is especially helpful for the cycle before genuine creation, permitting originators to investigate and collaborate with virtual versions of their items, and to distinguish any plan imperfections and wellbeing issues. This is especially significant on account of ventures delivering huge, perplexing and costly merchandise. This innovation is now being utilized for such purposes in the flight producing industry, for instance, permitting planners to investigate the insides of airplane, yet in addition of complex individual parts, for example, stream motors.

Man-made intelligence, IOT and M2M

Man-made intelligence, IoT and M2M correspondence are at a prior phase of improvement than mechanical technology, having their effect on industry harder to check. Artificial intelligence isn't as generally sent in the administration area as envisioned, as indicated by Prettner; regardless, it could have various possible applications in assembling and related exercises, especially in the field of independent vehicles, which joins AI and IoT innovations. "Self-ruling vehicles, should they take off, can possibly radically change coordination's and supply chains," Prettner told Oxford business magazine. He estimates such vehicles to be accessible for a huge scope inside 10-15 years. Furthermore, IoT can empower machine parts in both mechanical segments and in customer items to naturally send cautions when they breakdown or need supplanting, further improving modern proficiency.

Revolution in the Supply Chain Industry

Behind the extraordinary capability of the advanced supply-demand management in trade 4.0, fourth fashionable transformationA amendment current and mechanisation were welcome on initial by steam and water power (Industry 1.0), at that time by zap (2.0), and every one the a lot of as lately by the advanced laptop (3.0). Industry 4.0, digitisation, is regarding organizations situating themselves to the shopper through web-based business, computerised showcasing, web-based media, and therefore the shopper expertise. Eventually, basically, each a part of the business is modified through the vertical coordination of examination and improvement, producing, promoting and deals, and alternative within tasks, and new plans of action enthusiastic about these advances. if truth be told, we tend to area unit developing towards a very advanced atmosphere. There has been a lot of price and advancement within the inventory network, nonetheless additionally at the same time, the assembly network has all over up being unpredictable than previous.

The customary production network was less difficult, yet had less perceivability between the levels in question, in this way frustrating important cooperation of the production network. Correspondence was deferred as it was gone through each level in a pecking order and consequently brought about lower level of responsiveness. Be that as it may, with digitalization, the conventional production network has become an incorporated production network environment, with complete perceivability and concurrent correspondence across the entire production network. This incorporated production network biological system is likewise described by high adaptability and responsiveness directly from arranging till execution level.

Supply Chain and logistic: the bulls eye of revolution

Organizations are moving towards an advanced work environment, where there are uses of e-money and e-HR, and complete dependence on computerized information sharing. Vertical incorporation, large information measure streamlining, increased reality, and a lot more has set in forward in the designing and assembling rehearses. Industry 4.0 has additionally denoted its position in the plans of action of the organizations through carefully improved items and benefits and computerized arrangements. Organizations are situating themselves to the client through internet business, computerized promoting, online media, in a rationale to expand client experience. Thus, for all intents and purposes each part of business is being changed through the vertical incorporation of exploration and improvement, assembling, advertising and deals, other inward activities, and new plans of action dependent on these advances. As production network the board fills in as the associating nerves of all the business angles, consequently with digitalization of entire business measures, the digitalization of inventory network is a must. Supply chain can be grouped into not many key components plan, source, make, convey, return, and empower. Through mechanical advancement with Industry 4.0, these components are quickly being revived.

Geographical paradigm

Different kind of development is happening throughout the world to learn adjust and grow in the future. Here a detailed division and difference is made based on geographical location.

DEEP DRIVING IN THE ASIAN REGION

In 2016 the public authority dispatched the Thailand 4.0 technique, with the objective of creating inventive and high worth added businesses to accomplish big time salary status. The technique incorporates the improvement of innovation bunches and new companies based around 4IR advancements, for example, mechanical technology, IoT and biotechnology, and covers with the Eastern Economic Corridor methodology to make development centre points in three eastern regions.

4IR-type movement is now growing quickly in Thailand. In 2014 it delivered 2646 multipurpose modern robots, up 13% on the earlier year, as per the "Chief Summary World Robotics 2017 Industrial Robots" report by the International Federation of Robotics. The figure is required to increment to 5000 of every 2020. A recent report by Citi GPS found that the compensation period for interest in mechanical technology in the nation tumbled from around five years in 2013 to three years in 2017, further promising the pattern. Thailand has at any rate four mechanical technology research focuses, and is home to the Institute of Field robotics, which offers advanced mechanics and mechanization science certificates.

Despite the fact that Thailand is effectively chipping away at its progress into an inexorably digitalised world, all the more actually should be done to guarantee that the nation augments its latent capacity. "There will consistently a danger from innovative disturbance, yet as we move into Thailand 4.0, the assembling area that has supported Thailand's development will profit by a more grounded serious edge," Porametee Vimolsiri, previous secretary-general at the National Economic and Social Development Board, told OBG. "Nonetheless, with the end goal for Thailand to update its economy, further unfamiliar direct speculation is required, which will require extra endeavours to interface multinationals with homegrown pioneers and nearby firms."

A critical necessity for any nation changing to the 4IR will change instruction and preparing frameworks to furnish laborers with abilities that are as yet important under the new worldview, for example, the capacity to program, keep up and collaborate with robotized frameworks. "We are pushing for change to schooling to create computerized labour, for example, AI and network protection subject matter experts, among others," Nuttapon Nimmanphatcharin, CEO of Thailand's Digital Economic Promotion Agency, told OBG. "Colleges are additionally creating educational programs zeroed in on subjects, for example, AI, however there will likewise be a requirement for more casual and hands-on types of preparing, and a significant advance will be to urge instructive establishments to work with multinationals."

Different nations in the area are likewise going with the same pattern. In April 2018 Indonesia dispatched its 4IR-situated technique, Making Indonesia 4.0, which the public authority expects will help support yearly GDP development by one to two rate focuses. The system centres around five need areas, in particular food and beverages, auto, material, hardware and synthetic substances.

ARABIAN GULF

The UAE has systematically shown its yearning to remain at the forefront of mechanical advances and has started a heap of activities with regard to 4IR-related advances. In Sep 2017 the state sent the UAE Strategy for the Fourth historic period, that diagrams eighteen important territories, four of that focus on grouping. These incorporate open superimposed substance manufacturing, 3D-printed development, perceptive frameworks and savvy offer chains. In Jan 2018 the general public authority and also the WEF to boot consented to line up the middle for the Fourth historic period, with the purpose of advancing 4IR advances and increase an age of specialists, even as a convention to manage the sphere. The central government and individual emirates square measure likewise dispatching activities that specialize in express 4IR advances. In March 2018 the general public specialists formed the bogus Intelligence Council to acknowledge government areas during which the innovation is actual and spike the advancement of the specified framework. The past Gregorian calendar month, the general public authority of urban centre sent a three-year IoT technique that expects to construct the world's biggest IoT environment.

Adjoining Saudi Arabia, which is trying to build up its assembling area as a component of its Vision 2030 arrangement, is additionally beginning to take a gander at different 4IR advancements. For instance, authorities from state energy organization Saudi Aramco, talking at a neighbourhood conference on 4IR in May 2018, said that the Kingdom could before long see the acquaintance of around 11,000 robots with complete specific modern and specialized work.

AMERICAN REGION

Latin America has been one in all the rule provincial instances of untimely deindustrialization. specifically, North American nation has verifiably been a conspicuous recipient of mechanical offshoring patterns and is consequently apparently at specific danger from elements of 4IR that might diminish its favourable position. All things thought of, North American nation is one in all the nations driving the charge towards business four.0 within the district, with the general public authority as of currently throughout the time spent drawing up a legitimate structure to direct the amendment. The province of Nuevo León, the country's pre-famous center for fashionable business and collection, is that the concentration of 4IR-centered action within the country. In 2016 the government sent the Nuevo León four.0 program, that plans to fabricate a high-level trendy base supported creative and mechanized innovations, obtainable the advancement of varied innovative workplaces. within the non-public space, the vehicle, aviation, and electronic equipment sections square measure the first habitats of the 4IR movement, with IoT the foremost fashionable innovation getting used.

AFRICAN REGION

Of the multitude of arising locales around the world, Africa is maybe most in danger of being given up by Industry 4.0. The mainland is ineffectively industrialized and large numbers of its nations do not have the assets and financing to put intensely in new advances. This is underscored by the locale's insignificant portion of worldwide robot buys – 0.2% of world deals in 2015, as per the most recent ODI figures. Infrastructural inadequacies in numerous nations, for example, deficiencies of dependable power supplies, hazard further preventing the progress. By the by, there are a few indications of 4IR-related turn of events, especially in the eastern and southern areas.

As per "The Future of Jobs and Skills in Africa" report distributed by the WEF in 2017, Kenya has a moderately high ability to adjust to future positions, however the nation is additionally more promptly presented to the work disturbances of the 4IR. South Africa, one of the mainland's principle producing centres, is likewise exceptionally presented to such future business patterns. There is developing interest in utilizing 4IR innovations, for example, advanced mechanics to improve the wellbeing and effectiveness of the nation's mining industry. One of the fundamental topics of the 2017 release of the AfricaCom meeting, held in Cape Town, was investigating the way towards Industry 4.0.

The likely installed in 4IR for nations to jump past advancement stages is quite possibly the most encouraging angles for Africa. Framework insufficiencies could even assist with accelerating such improvement in certain regards, just like the situation when the mainland jumped to portable interchanges without first putting resources into expensive fixed-line foundation. Prettner disclosed to OBG that the nonattendance of a fixed-line phone network in Africa really encouraged and quickened the take-up of portable correspondences and related advances, for example, versatile banking, and recommended that this could likewise be the situation with some 4IR advances.

Business process changes

E-Business is maybe the foremost simple approaches to contact the people related to the inventory network. you ought to merely to possess a web site} or register with a illustrious net crawler to carry its site all at once for the web site to be illustrious. A business will place all information with relevance their things, administrations, contact variety on the location. When done, the location is accessible for the shoppers and completely different members of the inventory network to be seen. The shoppers or suppliers would then be able to see all the types of things and administrations accessible and as desires be build a suggestion.

Web based business versus E-business

Numerous multiple times we utilize the term web-based business and e-business conversely, yet unmistakably they are particular ideas. In web-based business, data and correspondences innovation (ICT) is utilized in between business or between hierarchical (exchanges between and among firms associations) and in business-to-customer (exchanges between firms/associations and people).



FIGURE 1: E-BUSINESS CYCLE

Essential cycles in E-business

Creation measures – Production measures incorporate acquisition, requesting and recharging of stocks, getting ready of instalments, electronic connections with suppliers, and creation management measures among others.

Client-centred cycles: Customer-centred cycles incorporates restricted time and showcasing endeavours, merchandising over the online, getting ready of clients obtain requests and instalments, and consumer service among others.

Inside administration measures – Internal administration measures incorporate employee administrations, preparing, inward knowledge sharing, videoconferencing, and accomplishment. Electronic applications upgrade knowledge stream among creation and deal powers to enhance deals power profitableness. Workgroup correspondence and electronic distributing of inward business knowledge are in like manner created enhanced.

How e-business can give a virtual store network over the web. It plays out the accompanying capacities –

Gives data on the items to all the members of the inventory network.

Permits putting orders with providers.

Permits clients to put orders.

Taking care of and conveying the requests to clients.

Accepting instalments from clients

We notice that each one in every of these exchanges is standard, but with the employment of e-business, these exchanges are presently performed all the additional proficiently and speedily, during this manner giving elevated levels of consumer reaction. E-Business permits exchanges nonstop that no alternative methodology of instalment will provide. during this half, we'll decide concerning the 2 most important models of e-Business for instance B2C e-business and B2B e-business.

Business to Consumer e-business (B2C)

E-Business of this type happens between company and emptor. However, within the event that, the client comes foursquare connected with the organization and might see the organization handout or define on-line aboard their item and administrations and therefore, create letter of invitation. this type of business lessens the issue of the patrons about to the shops and buying their merchandise.



FIGURE 2: E-BUSINESS (B2C)

Business to Business (B2B)

E-Business of this kind happens between a company and a company. Numerous an amount, one organization is dependent on another organization for crude material, save components or completely different things that they have to provide their merchandise. The store network administrators ought to note of that the price given by e-business is large. even so, its right usage is exceptionally basic or, over possible it would even flip the alternate path spherical for the organization, e-business execution is on no account an easy cycle and the inability to observe applicable execution has even caused immense organizations closing down.

KEY FINDINGS

The means toward swing the interest and provide composition and execution knowledge into a collective mode through the net causes the employees to talk with shoppers, suppliers and alternative business works quickly and moreover assists with corporal punishment requesting, promising and handling and alternative collecting exercises all the faster at lesser expense. Presently for associate degree E-Supply Chain Management thanks to touch upon work proficiently with inline key cycle, the exhibition targets have to be compelled to direct typically speaking procedure and also the set up of the framework within the incidental means –

- By lessening request-to-conveyance process durations
- By boosting on-time execution to at any rate 99%
- By getting inventories down to the absolute minimum
- By guaranteeing elite item and administration quality
- By bringing down working expenses without decreasing quality and on-time execution

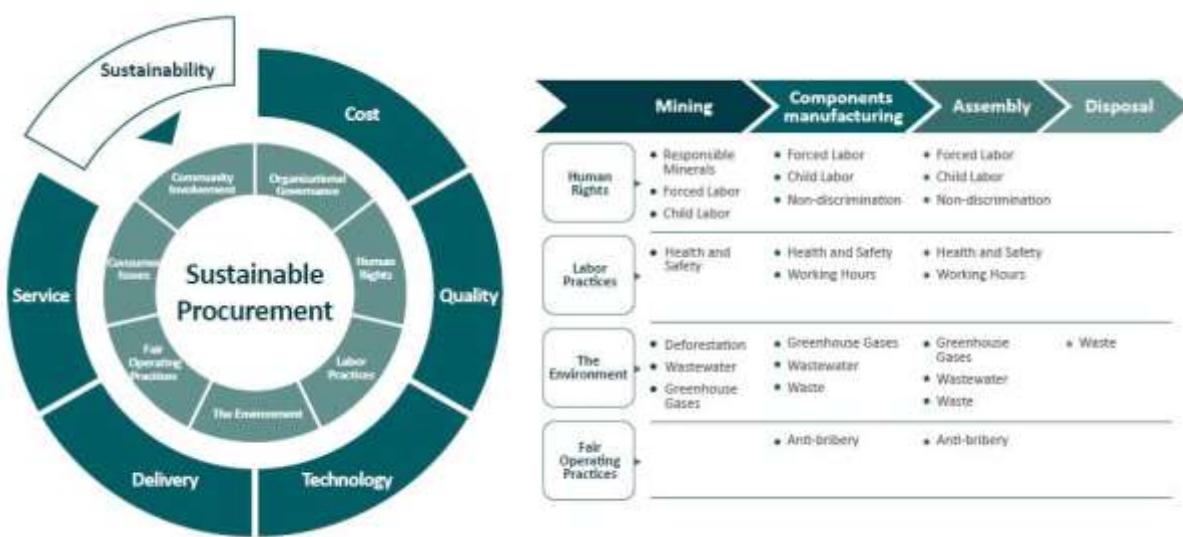


FIGURE 3: SUSTAINABLE PROCUREMENT TABLE

Electronic Business structuring

Electronic business system comprises of a virtual atmosphere where all the perspective work of management and progression bended with showcasing, deals, innovative work, coordination and so on. The qualities that e-business gives to a production network by giving away from of each stage in a production –

General qualities

Trade and offer information throughout the globe with a strong network.

Messaging and transferring data quicker side by side less expensive.

Favour with evidenced management flow rapidly

Present cooperative working

Update representatives right away new strategies or methods

Hold Web gatherings or information conferencing.

Exploit time distinction.

Convey email consequently.

Utilize the web to improve business organization.

Getting prepared on the Web

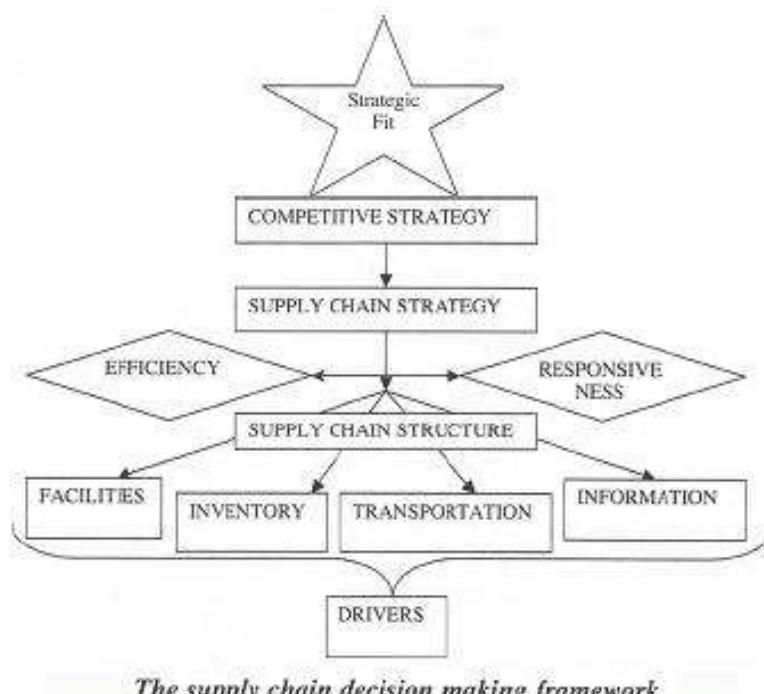


FIGURE 4: SUPPLY CHAIN DECISION MAKING FRAMEWORK.

CONCLUSION

Industry 4.0 is changing the assembling area around the planet. It empowers makers to keenly interface machines and gear across the creation line to fabricate a consistent associated environment where machines catch and trade information through machine-to-machine correspondences and to human administrators. New age business featured the significance of Industry 4.0 for arising economies like India and the need to comprehend and receive progressed producing strategies, which is the key achievement factor in this consistently changing and serious climate. Despite the fact that India slacks in the robotization of assembling offices comparative with the remainder of the world, producers in the nation are making each endeavour to execute progressed fabricating innovations to improve their business tasks and are progressively grasping the continuous worldwide pattern of Industry 4.0 and savvy producing. The country needs to ensure that it has the correct asset and framework to benefit as much as possible from this computerized change.

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