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INDUSTRY1.0 TO 4.0: THE EVOLUTION OF INDUSTRIES

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ABSTRACT

Therefore, an industrial production system is adaptable and facilitates the creation of specialized items. This paper's objective is to explain industry principles, including its drivers, enablers, aims, and restrictions, and to make it easier for readers to understand them. The "Internet of Things" is an industrial vision where people, things, and machines are always connected. Many new goods and services are intended to be produced as a result of this relationship. Products, cars, and tools are expected to "bargain" in an online marketplace over which production elements will best finish the upcoming production stage. As a result, the physical items present in both the real world and the virtual world would be seamlessly connected.The fourth industrial revolution is referred to as "Industry 4.0". It is best described as a new level of management and coordination across the whole value chain of a product's life cycle that is focused on the consumer's more ecognizee wants. The production of the product, including placing the order, is the first step in this cycle. Development and manufacture follow, followed by distribution to the consumer, and recycling, which includes all follow-up services, is the last step. The construction of dynamic, self-organizing, real-time optimal value-added linkages within and between organisations is made possible by the connectivity of people, things, and systems. These may be optimised based on a variety of factors, including cost, accessibility, and resource ecognizee.

INTRODUCTION

Three parts make up our description of the Industrial Internet, or Industry 4.0.

The adoption of cutting-edge digital business strategies, the digitalization of offerings for goods and services, and the better integration of vertical and horizontal value chains.The fourth industrial revolution, which is ecognizeed by an increase in the digitization and interconnectedness of goods, value chains, and business models, has penetrated the industrial sector. Industry 4.0: Opportunities and Challenges of the Industrial Internet is the title of our study. These components must be made by the formatter while taking into account the following applicable criteria.Itoutlines the key characteristics, possibilities, and difficulties this development provides. They predict that more than half of investments in Industry 4.0 solutions will be made.50% of anticipated capital expenditures over the following five years The promise of more effective management and integration of horizontal and vertical value chains is the primary driving force behind the development of Industrial Internet solutions. According to the companies questioned, productivity will increase by more than 18% during the following five years.

Businesses have currently digitalized their essential valuechain processes. By the end of the next five years, however, 85% of businesses will have used Industry 4.0 solutions across all important industry sectors.

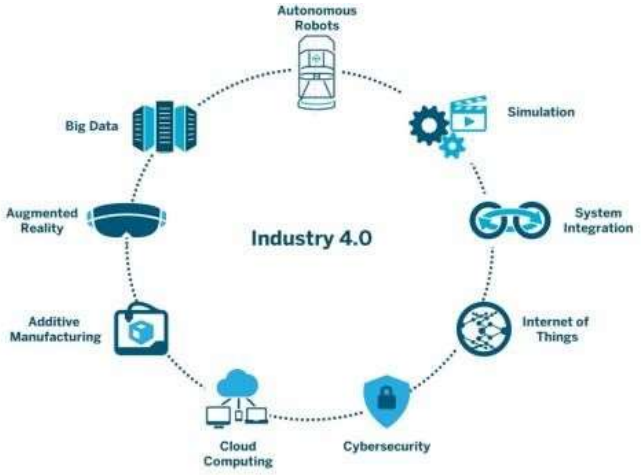

Fig: 1.1 Industrial Revolution

The networking and digitization of goods and services (Internet of Things/Services) is a second important aspect. It promises annual revenue growth of 2% to 3% on average and will significantly help businesses stay competitive. A third crucial aspect is the recently developed, frequently disruptive digital business models that significantly increase value for customers by offering them ecognizeed solutions. An considerable increase in horizontal cooperation across value chains, as well as the integrated usage and analysis of data, are characteristics of these new business models. They can so better meet client needs as a result. Due to the numerous prospects, the profound level of change, and the

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increased need for expenditures, the Industrial Internet is one of the most important topics for business management.However, it's crucial to ecognize all of the transition's challenges. In addition to the largely unresolved corporate commercial drivers for the Industrial Internet, there are issues with data protection and the need to develop and agree upon industry standards.

INDUSTRY1.0 TO5.0

INDUSTRY 1.0

People have been making their own food, clothing, shelter, and weapons by hand or with the assistance of working animals for thousands of years. However, the development of Industry 1.0 at the start of the 19th century marked a dramatic shift in production, and things moved along swiftly after that. Here is a summary of that development.

INDUSTRY 2.0

Electricity replaced other forms of energy as the main source of power during the start of the 20th century. Compared to water and steam, it was simpler to utilise and gave businesses the ability to direct power to specific machines. Later, to make machines more portable, they were built with their own power sources. During this time, a variety of management programmes were also developed, allowing manufacturing plants to operate more effectively and efficiently. The division of labor increased productivity since each employee now completes a piece of the total labourThe use of assembly lines to produce things increased. Frederick Taylor, an American mechanical engineer, developed ways for evaluating tasks to improve employee and workplace behaviour. Last but not least, just-in-time and lean manufacturing concepts enhanced approaches for manufacturing firms to raise output in terms of both quality and quantity.

INDUSTRY3.0

The development of electronic devices like the transistor and, later, integrated circuit chips allowed for a higher level of automation of individual machines to assist or replace humans in the latter few decades of the 20th century. In order to take advantage of the electronic hardware, software systems were also developed around this time. Enterprise resource planning tools have replaced integrated systems like material requirements planning, which allowed people to schedule, plan, and monitor how product moves through the production. Many firms relocated component and assembly activities to low-cost nations under pressure to cut prices. The notion of supply chain management became formalised as a result of the extensive geographic dispersion.

INDUSTRY4.0

The internet of things (IOT) is linked to manufacturing processes through Industry 4.0 in the twenty-first century so that systems may exchange information, analyse it, and utilise it to direct intelligent activitiesAccording to the article "Industry 4.0 and Manufacturing Ecosystems" by Deloitte University Press, Industry 4.0 also combines cutting-edge technologies including additive manufacturing, robotics, artificial intelligence and other cognitive technologies, complex materials, and augmented reality. The transition to Industry 4.0 has been primarily fueled by new technological breakthroughs.Among other late 20th century programmes, manufacturing execution systems, shop floor control, and product life cycle management were novel ideas but lacked the requisite technology foundation to be properly implemented. These efforts can now benefit from Industry 4.0 to the fullest extent. equations with increasing numbers. Equation numbers should be encased in brackets and flush-right aligned using a right tab stop. You can use the solidus function, the exp function, or the relevant exponents to make your equations more compact. For numbers and variables, italicize Roman symbols but not Greek ones. For a minus sign, a long dash should be used instead of a hyphen.

INDUSTRY5.0

Industry 5.0 refers to a method of operating firms that makes use of cutting-edge technology to empower people and relieve stress on machine employees. Every industry will be impacted by this upheaval, and business opportunities are virtually limitless.

Recently, the term "industry 5.0" has grown in acceptance, in part because it is consistent with a novel, unsettling, and illuminating viewpoint on business and economics. It emphasises the importance of societal value rather than placing a focus on profit. In the production industry, tedious, repetitive, and dangerous tasks have historically been handled by robots. But as communication and technology advance, robots become more intelligent and networked.

The fifth industrial revolution seeks to combine cognitive computer skills with human resourcefulness, in contrast to industry 4.0's goals of automating operations and eliminating human involvement in the production line. Instead of only focusing on profits, the new sector prioritizes the welfare of people and the environment. The company strategy makes use of cutting-edge technology to boost productivity and lower stress. The fifth industrial revolution aimed to create an environment where workers could prosper alongside one another, much like industry 4.0. It promotes circular production models and supports technological advancements that help with more effective resource utilisation. Additionally, the procedure strives to increase an industry's resistance to outside shocks. Here are a few of its main characteristics that will increase industry's competitiveness and sustainability in the future. Before industrialization, handcrafted goods were produced by people who knew the process firsthand and gave them a personal touch. Industry 5 aims to bring those times back.

By successfully executing repetitive activities, collaborative robots (cobots) will assist human craftspeople in efficiently meeting demand and quality standards. Worker time will be freed up by cobots for innovative and creative tasks. Additionally, as cobots concentrate on routine activities, workers in the industrial sector can concentrate more on the company's future. Universal Robots, a Danish startup, is the first to provide industrial robots that can efficiently and safely work alongside production workers.

DISCUSSION

The Industrial Internet, also known as Industry 4.0, is a component that will significantly change how businesses supply their goods and services with the ultimate goal of better satisfying customer expectations. The digitalization of horizontal and vertical

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value chains is one such component.Beyond improving industrial technologies, the Industrial Internet has a wide range of potential applications. However, taking advantage of these prospects calls for a significant investment. As a result, the issue must be of the utmost importance to directors and managers of industrial businesses.

The industrial enterprises questioned expect to spend an average of 3.3% of their annual revenues on industrial internet solutions during the next five years. This is almost equal to 50% of the higher capital investments that are anticipated, or more than €140 billion each yearFor these investments to be as effective as possible, the full value chain must be utilised. According to the organisations, 80% of vertical value chains and 86% of horizontal value chains would be highly digitalized and integrated by 2020.

The manufacturing process in the industrial sector must produce things in ever-increasing quantities while using less energy and raw materials. The Industrial Internet, which promotes higher productivity and resource efficiency, thus creates the conditions for efficient and sustainable manufacturing The organizations consulted predict that the digitization of value chains will boost productivity by an average of 3.3% per year across all industrial sectors. Over the next five years, this will have a cumulative effect of 18%. They anticipate annual cost savings of 2.6%.

The Industrial Internet will have a substantial impact on current company models, and this will also cause the birth of brand-new, frequently disruptive digital business models. This movement's main objective is to maximise consumer benefits by offering a greater variety of value solutions (as opposed to products) and fostering stronger relationships with clients and partners. What sets digital change apart is the quickening of change's pace. Disruptive innovations will quickly bring about a sustainable transformation in industries like the communications and technology sectors of the economy.

In the Digital 4.0 era, businesses face many obstacles to success. High investment levels and frequently perplexing business structures for new Industrial Internet applications are the key themes of discussion. It's also important to make sure that people have the appropriate abilities in order to satisfy the demands of the digital age.

The completion of activities in the area of IT security and the development of mandatory standards are required. Advocates for strong data security and data protection regulations as well as uniformed international or European industrial standards can particularly help with these latter difficulties.

Table No: 1.1 Industrial Revolutions 1.0 to 4.0

Revolution	Time period	Technologies
1st	18thand19thcenturies	Mechanical manufacturing fueled by steam and water
2nd	Late19thcentury1970s	Mass production using electricity that is based on the division of labour
3rd	1970s-Today	New levels of automation for difficult jobs are being driven by electronic and computer technology.
4th	Today	on the basis of a cyber-physical system

Figure Labels:

This study aims to investigate the Fourth Industrial Revolution (4IR) trend, which strongly emphasises industry, and to assess the Malaysian government's initiatives in light of this trend. Numerous studies have shown that advanced nations have begun using cutting-edge technologies like robots and artificial intelligence.

CONCLUSION

The Industrial Revolution was undoubtedly a significant advancement for humanity, bringing forth numerous inventions that greatly enhanced manufacturing capabilities across various industries. It resulted in a substantial boost to the economy and significantly improved the standard of living for many segments of society. However, alongside these benefits, the rise of industrialization also diminished the need for unskilled manual labor, leading to a rise in unemployment and subsequently increased poverty levels.

On the other side of the coin, the identification of waste disposal requirements allows for better management and preparation of essential activities. It facilitates the successful implementation and adoption of modern technologies by users, ultimately leading to process improvements.

REFERENCES

1. *http://www.apics.org/apics-for-individuals/apics-magazine-home/magazine-detail-page/2017/09/20/industry-1.0-to-4.0-the-evolution-of-smart-factories*
2. *https://www.pwc.nl/en/assets/documents/pwc-industrie-4-0.pdf*
3. *https://www.sciencedirect.com/science/article/pii/S2351978918300672*
4. *S.Wang,J.Wan,D.Li,C.Zhang,―ImplementingSmartFactoryofIndustries4.0:AnOutlook‖,InternationalJournalofDistributedSensorNetworksVolume2016,ArticleID3159805,1-10.*
5. *MAK Bahrin, MF Othman, NH Nor, MFT Azli Industry 4.0:AReviewonIndustrialAutomationandRoboticjournalTechnologic(Sciences&Engineering),eISSN,2180–3722(2016),pp. 137-143*
6. *http://online-journals.org/index.php/i-jim/article/view/7072*