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A path way to Industrial Revolution 6.0

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Abstract

In the coming years and decades, a rapid technological transformation is affecting the living standards of human beings; the way we work, interact and live is drastically changed. It has been estimated that technology will achieve the pure autonomy by 2050. To predict the revolution and how it will transform is uncertain, but one thing is certain: it will be an interdisciplinary world that will coordinate by, involving all players in the global political system, from government and business to academia and civil society. We shall review the industrial revolutions from 0.1 to 5.0. In this paper, while the concept of industrial revolution 6.0 is discussed and futuristic vision is mentioned as well. The comparative analysis of the industrial revolution reveals a clear picture of technological, process, and system advancement. Virtual reality systems and artificial intelligence are some of the emerging areas used to characterise the sixth industrial revolution. Internet of Things (IoT) and cyber security are among the emerging areas used to describe the sixth industrial revolution.The sixth industrial revolution is more focused about the virtual reality systems and artificial intelligence, Internet of Things (IoT), cyber security is some of the emerging areas used to describe the sixth industrial revolution. An Overview of 6th industrial revolution is given and adopted by Finland where the conceptual model is providing the phase of modern technological world.

Introduction

The Industrial Revolution was the most significant upturn in mankind's set of experiences, as it effects on individuals' regular routines and help them to make their work easy. In 18th century a brief expression was given to depict the modern transformation in Great Britain, where the speed of growth was accelerated. The specialized advancements increased the speed by launching new devices and machines. According to these findings, robotic technology will have a big impact on human lives (Ray et al. 2008). More research on the integration of robots into many facets of human life will be conducted. The integration of robots into organizations will be a significant focus of research (Demir et al. (2017)

History

Over the long run, we encountered a progression of little developmental changes, which prompted the comprehensive digitalization of the economy and society. The digitalised upheaval occurred with a huge boom, yet it was the innovative state of art of the techno-monetary worldview that prompted the improvement of PCs, advanced control instruments, programming, and utilization of incorporated circuits in a wide assortment of creative items and administrations. However, the advanced unrest was rising under the brilliant age of the auto and large scale manufacturing. During the 1960s, people respected the vehicle, and all the buyer features that accompanied it. What's more, we came to know about the Henry Ford–an awesome gallery that embodies the fourth mechanical insurgency and Edison's lab. The revelation of the vacuum-tube as an on-off switch in 1935 expected the digital unrest. Later exploration by Alan Turing, Claude Shannon, Howard Aiken, and John von Neumann prompted the creation of the semiconductor in December 1947, when researchers showed the main point-contact semiconductor enhancer. Throughout the following twenty years, Bell Labs fostered a few different kinds of semiconductors, including the silicon semiconductor and the MOS semiconductor. A research facility creation stage that included numerous models, licenses, and early applications denoted the start of an arising unrest, which started at Bell Labs yet presently found inside a dynamic hardware group in the Santa Clara (Silicon) Valley. Intel reported the first financially pragmatic (4004) microchip in November 1971, that very year the US branch of protection introduced the principal PCs on ARPANET (which later transformed into the Internet). This microchip made it conceivable to fuse every one of the elements of a focal handling unit (CPU) onto a solitary incorporated circuit. The Apollo Guidance Computer was the main silicon incorporated circuit-based PC and expected the chip. Then, at that point, news about Apollo 11 mission totally overwhelmed the declaration by Intel.

Industrial revolution and its implementation

Tracing all the way back to around 1760, the advancement to new assembling procedures utilising water and steam was the first Industrial Revolution. It was quite beneficial in terms of putting together a larger number of different things and creating a better way of life for a select few. Industrialization had a significant impact on the material industry, as well as transportation.

The Industrial Revolution began in the 18th century when farm settlements grew more industrialised and urbanised. When the Industrial Revolution began around 1750, everything changed. People discovered a new source of energy that allowed them to operate more efficiently. Fossil fuels — coal, oil, and natural gas, with coal leading the way – were created underground from the remains of plants and animals from much older geologic epochs. When these fuels were consumed, they liberated energy from the Sun that had been stored for hundreds of millions of years. Fuel sources such as steam and coal made machine use more viable, and machine assembly quickly expanded. Machines made creativity faster and easier, as well as allowing for a wide range of new breakthroughs and advancements. The use of water and steam power during the First Industrial Revolution allowed for the mechanisation of industry and helped the industry to grow by boosting to production. During World War II, electricity was used to mass-produce goods. To automate the manufacturing process, the Third used electrical and digital technology. The fourth industrial revolution, which builds on the third industrial revolution, is currently underway, as is the digital revolution, which has been ongoing since the mid-twentieth century. The boundaries between the physical, digital, and biological domains are getting increasingly blurred in this age of technological convergence.

The word "mechanisation" refers to the development of machines that can perform activities without the need for direct human intervention. Complex machines were built in Greece during the ancient time. But that was vanished as the Roman Empire crumbed during medieval period. This led to collapse of Western civilization. The water-powered mill stones, in my perspective, are prime cases of Stage 1, which describes the early development of processes used to develop nature and natural processes. These processes eased the life of human during that period.

Mechanical engineering and physics, chemistry and mathematics come together and bring new predictability in the Netherlands' steam-powered engine and windmills. Some say it began in 1784 when the very first automated loom was invented, but I believe it began far earlier. Changes in customer needs over time, which itself is classified into numerous dimensions, is one of the driving forces of industrial revolutions. Classification of manufacturing systems, like, Toyota production system (TPS), customized assembly line, cellular manufacturing, flexible manufacturing system, and seru are some of the major production systems that have been created and implemented by manufacturers to meet the demands of the customers throughout all the industrial revolutions (Yin et al. (2017).

Due to their speed, scope, systemic influence and current developments are not simply prolongation the 3rd Industrial Revolution, but relatively the beginning of a 4th Industrial Revolution unique from the previous three. Current innovations are emerging at an unprecedented rate in human history. As likened to earlier industrial revolutions, some analysts believe, Fourth Industrial Revolution is growing at very high rapid rate rather than other three industrial revolutions. Furthermore, it is wreaking havoc on nearly every industry in practically every country on the earth. The breadth and complexity of these shifts predict the transformation of entire production, management, and effective governance, among other things. Limitless possibilities abound as a result of billions of people being connected via mobile devices with extraordinary computing power, storage capacity, and information access. Artificial intelligence, robots, the Internet of Things, self-driving cars, 3-D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing are just a few examples of future technological advancements that will further broaden these possibilities. It is predicted that by the year 2050, technology will have advanced to the point of total autonomy Duggal et al. (2021). Artificial intelligence is already present in everything from self-driving cars and drones to virtual assistants and currency translation and investment tools. Artificial intelligence has advanced significantly in recent years, owing to exponential gains in processing power and the availability of vast amounts of data. Software that discovers new pharmaceuticals to algorithms that forecast our cultural preferences are among the breakthroughs. Digital manufacturing technologies are continually engaging with an ever-changing biological environment.

Industrial Evolution

Industrialization is the transformation of an economy from one that is primarily agricultural to one that is based on the production of goods. Based on this description, we can see that industry can take on a variety of basic and complex shapes. Even before the Stone Age, humans created magnificent and sophisticated stone tools, tanned skins, and elegant jewellery. All of these commodities were utilised as money, and the items were bartered for other things, as has been widely recorded. It's also common knowledge that flint and obsidian were mined by hand in some regions. Beads and animal parts were also acceptable. Tribal civilizations would quickly recognise those adepts in various skills, and they would specialise in making tools, homes, and clothing for the clan. Gender roles may also be thought of as a division of labour. As a result, I believe that industrialization began long before Homo sapiens appeared on the scene and well before we began colonising the continents.

As religion, engineering, medicine, fishing, hunting, agriculture, and leadership professions become increasingly specialised, education and training become more vital and permanent. As a result, the "family business" is able to thrive and exceed its competition. We can see the foundations of specialisation, division of labour, line-production, and economic development in products and services in Babylon, ancient Egypt, and India as far back as several thousand BCE, far before Industrialization Stage 1.0.

Each new stage addresses evolution of the modern industrialisation in the assembling system that has changed the manner in which we contemplate and work in the business.

1.0

The First Industrial Revolution, which began around 1760, saw the advancement of new manufacturing methods based on water and steam. It was really beneficial in terms of constructing a larger number of diverse products and creating a better way of life for a few. Industrialization had a significant impact on the material industry, as well as transportation. Machine use became more feasible because to fuel sources such as steam and coal, and machine assembly quickly spread. Machines made creativity faster and easier, as well as allowing for a wide spectrum of new breakthroughs and discoveries.

2.0

The expert can focus more on production and productivity now that technology can do the labour of humans and domesticated animals. We learned a lot about physics and chemistry during this period. These learning were applied to covert these chemical and potential energy into electricity, which allowed humanity to live and prosper in more areas across the world. Despite the fact that humans in our 75,000-year-old society had employment, this led to the development new concept of mass production, these production lines are driven by electricity. This resulted in concept of labour divisions in various domains. This elevated it to a new level, because instead of one person overseeing the entire process, each employee was only in charge of a little portion of the final output. Not Henry Ford's car facility, but a Cincinnati slaughterhouse hosted the first manufacturing line in the 1870s. Between the 1760s and roughly 1840, the second Industrial Revolution took place. The second industrialisation occurred during this period. Antiquarians refer to it as "The Technological Revolution," which took place mostly in the United Kingdom, Germany, and the United States. New mechanical frameworks were introduced at this time, with the most prominent being an electrical innovation that took into account mass production and more modern machines.

3.0

We see the emergence of machine automation as each step develops, as machines begin to replace people and assist in the creation of new machines. Machines have taken over mundane chores that were previously handled by muscle, allowing the mind to concentrate on learning and expanding human technology. Semiconductor devices were created as a result of research, and this resulted in digitalization process. The computer age started during this period. Initially, the cost of the hardware was very high and resulted in majority of the expenditures on CAD. As the rehabilitated of technology grew-up and was available more widely. The important software became more versatile and user friendly. The first programmable logic controller (PLC) with actual hardware connectivity was released in 1969. The primary PC period marked the commencement of the third industrial revolution. These early PCs were sometimes quite rudimentary, uncomfortable, and incredibly large in comparison to the processing power they could provide, but they set the groundwork for a modern reality that would be impossible to imagine without PC innovation. Around 1970, the Third Industrial Revolution began, which featured the use of gadgets and IT (Information Technology) to accelerate the process of robotization. Because of Internet connectivity, availability, and long-term power, assembly and computerization progressed significantly (Rüßmann et al. (2015). More computerised frameworks were introduced into the mechanical manufacturing system in Industry 3.0 to execute human tasks, such as using Programmable Logic Controllers (PLC). Despite the fact that computerised frameworks had been established, they nonetheless relied on human input and intervention (Zakoldaev, 2019)

4.0

Semiconductor and other technological breakthroughs enabled better sensors and feedback mechanical systems. This semiconductor also helped in improving the robotic production processes. Meanwhile, development of software was become more complex and better. This helped the industries to integrate computer aided manufacturing (CAM) systems resulted in better quality product that is beyond what people try to achieve. As a result, the term "Cyber Physical Systems" came to be used to designate a software-controlled mechanism. It allows digital, mechanical, and biological systems to communicate with one another (Brey 2005). Computation, networking, and physical processes are all combined in Cyber-Physical Systems (CPS). The processes which required feedback loops in which physical properties affect computations and other way round are observed and controlled by embedded computers and networks. The financial and sociological potential of these systems are much higher than previously realised, and significant investments are being made to advance the technology around the world (Maier and Student 2015). The approach is based on the older (still relatively new) science of embedded systems, which involves the integration of computers and software into items whose major role is sensory processing, such as automobiles, toys, medical equipment, and scientific instruments. CPS provides abstractions as well as modelling, design, and analytic methodologies for the entire system by combining physical process dynamics with software and networking dynamics. This revolution, which has been termed the "internet of things" by many, is currently underway.

The fourth stage has the potential to produce scientific miracles and liberate humans from many of life's difficult and physically demanding chores. It's up to us to decide whether this is a good or bad thing, but it doesn't matter to me. Individuals and organisations will select what will be accepted and what will be rejected by us as a species. It will, in my opinion, exacerbate the separation between the wealthy and the poor, as well as the fortunate and the unhappy. There are already significant variations around the world, and this is unlikely to alter anytime soon. In all aspects of life, we have already seen such rapid increases in communication and compression of timelines that keeping up with all of the information created is unfeasible. The ability of humans to digest and swallow the huge volumes of data that whirl around them has reached its limit. There are just three possibilities. Either "evolve"

systems to handle the data for us (as has already happened with products like Facebook), reject this rapidly developing way of life in favour of something less complex (as some people have already done), or we will become isolated from rapidly developing technology and ignore it as individuals and as a society, resulting in isolation from rapidly developing telecommunications infrastructure. Our educational institutions and cultures have definitely fallen behind when it comes to the human side of things.
This trade of data is made conceivable with the Industrial Internet of things (IIoT) as far as we might be concerned today. Key components of Industry 4.0 include:

- Digital actual framework — a mechanical gadget that is controlled by PC based calculations.

- The Internet of things (IoT) — interconnected organizations of machine gadgets and vehicles implanted with automated detecting, filtering and checking abilities.

- Distributed computing — offsite network facilitating and information reinforcement.

- Intellectual processing — innovative stages that utilize man-made consciousness.

"Industry 4.0 begins to move towards Industry 5.0 when you start to permit clients to tweak what they need

Industry Model	Aims	Present Status in India
Industry 4.0: IoT based cyber-physical systems	To develop products and services for cyber physical system through analytics • Better adaptability • Better efficiency • Higher quality • Less cycle times • Less lead time to market	• The majority of India enterprises, especially the larger ones, have started implement I4.0 compliant and some of the industries have already implemented. The scenario is very different for SMEs. • A major barrier is data collecting from legacy systems. • The RDI technology is in developing stage and insufficient. ICT and Industry domain research and development is lacking and woefully insufficient. • Software and connection are two major areas where Indian industries are failing to take advantage of cutting-edge technology. • The system's robustness has been demonstrated to be lacking (by COVID-19); • Software is reliant on the United States; Components are reliant on China; Russia Sustainability research is insufficient; India is not accurately connected to worldwide research programmes.

The increasing popularity of the digitalization and an incredible number of real-world applications have already built a strong groundwork for the growth of Smart manufacturing and, in the long-term, can provide as the launch pad for the development of Society 5.0 (Skobelev and Borovik, 2017).

What Is Industry 5.0?

Although it hasn't been quite ten years since the first mention of Industry 4.0 in manufacturing circles, visionaries are now predicting the next big thing: Industry 5.0. If the current upheaval emphasises the transformation of plants into IoT-enabled bright offices that utilise cognitive registration and link through cloud employees, Industry 5.0 is set to focus on the integration of human hands and minds into the mechanical structure (Paschek et al. 2019). The Internet of Things (IoT) is a crucial important enabler for ambient intelligence technology since it offers the essential infrastructure. Furthermore, the ambient intelligence paradigm improves the functionality and usability of IoT devices. As a result, companies who wish to take advantage of this new paradigm and the associated technologies must invest in the requisite IoT infrastructure (Demir et al. (2019). Boundary calculations in the context of data management from the Internet of Things will have an impact on practically all businesses in the economy and the public sector. They will cover a wide range of tasks, from throughput control automation and data acquisition on quality of product to vehicle traffic monitoring and factory robotization (Martynov et al. (2015)
Industry 4.0 has sparked a lot of attention since its debut in 2011. Industry 4.0 has spawned a slew of research projects and conferences. Furthermore, some academics and futurists have already begun to explore Industry 5.0 (Damir et. al (2017, 2018), They presented a variety of views for Industry 5.0. Human-robot collaboration is an emerging issue for Industry 5.0 (Damir et. al (2017).

Industry 5.0 is the upset where man and machine accommodate and discover approaches to cooperate to work on the means and proficiency of creation. Sufficiently amusing, the fifth unrest could as of now be in progress among the organizations that are quite recently taking on the standards of Industry 4.0. In any event, when makers begin utilizing cutting edge innovations, they are not right away terminating immense areas of their labour force and turning out to be totally mechanized. A thorough examination of existing innovation management frameworks demonstrates that Industry should be future-ready and provide suitable environment for the corporate that is aided by the IoT and Industry 5.0 phenomena. Industry 4.0 (from 2000 to present, defined by IoT, Big Data, electric cars, 3D printing, cloud computing, and artificial intelligence) is the result of exponential growth in the field of IoT (Urbanic (2018); Aslam et. al 2020).

INDUSTRY PARADIGM	**Objectives**	**Current Status (India)**
Industry 5.0: Co-exist – Human-Machine co-creative Resilient and Sustainable cyber-physical systems for mass customization	Cyber-physical systems for mass customization that are co-creative, resilient, and sustainable (Flexible Industry 4.0 to agile Industry 5.0) The main focus is on Human being and sustainability • Main focused on Environmental sustainability • Focus on Remanufacturing and use of product after end of useful life. • Waste reduction and emission control • Circular economy • Intelligent, software-enabled goods and services • Intelligence-enabled products incorporating software applications • Innovative or improved product and services to the customers • Better product and service experience and resulted in enhanced customer experience	Indian research is already creating bits and pieces for that direction, but not covering all necessary ingredients • Strengths especially in 5G and AI

Step 0.5 of Industrialization

We took the next step forward as intellectuals by taking a modest stride forward. We realised that in comparison to the creatures surrounding us, a human's power and speed were small. Domesticating numerous species that could improve human abilities was vital for our survival. Wolves were used as hunting companions and early warning systems because their senses of smell and hearing were far superior to ours. Cattle were employed for agricultural purposes, while horses assisted us in settling new territories and protecting ourselves over long distances that we humans were unable to traverse. Their power, speed, and alertness were among the first "tools" that assisted humans in surviving and achieving greater results at work. From there, it was just a question of logic to recognize that natural power (Step 1.0), such as wind and water, could be utilized to enhance our potential to develop and provide goods and services to our communities. Now everything is the technology that make it happen. To begin, a simple Industry 4.0 diagram is provided. While it is an excellent beginning and provides a firm basis for understanding industrialization processes. It fails to explain the past, which is still required to appreciate the manufacturing processes, and it lacked the ability to predict where it will go next. It's crucial to remember that the various stages of industrialization don't happen all at once and that they're interpreted and used differently by different cultures at different times, often in unexpected ways, just like any new technology.

Steps 5.0 and 6.0 of the Industrialization Process.

It is feasible to extrapolate where we will be in the future based on current tendencies. In human-machine relationships, artificial intelligence, and genetics, there are already clues of what's to come. We should be able to piece together the following stages of industrialisation using information from these and other sources. I'm stopping at stage 6.0 because I don't think we'll need to move much further until we create new capacities and requirements as a species that we won't need. Whether or not Industry 5.0 is about human-robot collaboration, it will still be a significant development for businesses. Indeed, the presence of robots in our life will very certainly represent a major shift for humanity (Damir et al. 2019).

As a result, after we crack the code of directly connecting to the brain, the next revolution will emerge. It will take on tasks like - if you can visualize it, you can make it happen. The next stage of intelligence will be driven by artificial intelligence and 3D printing, with cybernetic implants virtual reality can be employed to aid brain-machine interface. Cybernetic implants would almost certainly be implanted or genetically altered at birth. In the early phases of this era, minimal gear, such as Google Glass, could be a solution to develop creatively which is technically doable. At this stage, I believe that innovation, creativity, and insight will take precedence over procedure and more rational thinking. Research into "new" and undiscovered technical ideas should make you more productive for the long - term. Robots and computers will take over the reasoning in this was human interventions can be reduced to a "point A to point B" routine. Robots for a variety of functions are now available on the market at reasonable rates. It won't be long until robots play an increasingly important role in our daily lives and industries. For robots or AI applications, several businesses save personnel records. Many professional disciplines will be impacted, and we do hardly believe that rational techniques will be able to compensate (Iscan, 2021). A good illustration of this approaching trend is the testing of driverless automobiles in traffic, (Demir, 2017). Briggs and Scheutz (2014) found a strong behavioural influence on task completion as well as subjective metrics like how comfortable respondents felt instructing the robot to finish the assignment We investigate if there is a link between the robot's apparent agency and the sensitivity of individuals to robotic conflict. Also discussed are the potential ethical ramifications of using robotic displays of affect to influence human conduct. Software/robotic combinations are expected to replace health, transportation, farming, insurance, legal, and economic experts during the next 70 years.

Industrial revolution 6.0

Our visionary chiefs, specialists, researcher determining the business unrest (6.0) period will be start from 2050 in which human insight (HI) man-made reasoning (Artificial intelligence) and inexhaustible cloud energy and Drone 3-D printing will link to work the assembling and procedure on most planet (like, moon, sun … and so forth) by unify cloud joining of human insight, man-made consciousness and Drone 3-D printing with right hand of satellite and industry robot. In this upset, we will be able to manage the movement of Automatic Mechanical Industry (ARI) in the sky with quantum radar control, similar to how planes now acquire a combination of sustainable power sources such as quantum power, sun-based energy, cloud power, planet nuclear power, and so on.

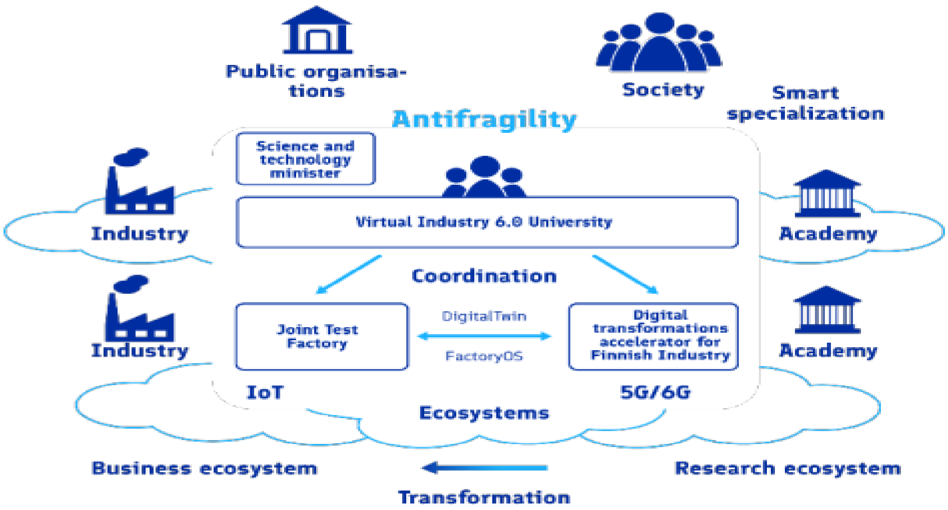

Figure 1- An approach to industrial revolution 6.0

As science, human knowledge (HI), computerized reasoning (AI), inexhaustible cloud energy sources, Satellite plan and quality improves and production line robots expect to be more human-like abilities, the cooperation between sustainable cloud energy, satellite, PCs, robots and human insight will eventually turn out to be more significant Furthermore, commonly edifying the manageable universe (Bartlett, et al. 2004). We will lessen the asset load just a single planet, we will fit to use the asset of all planet, which was, found by us and our human insight (HI) persistently find more planet furthermore, assets to take advantage of the inactive assets of universe for the greatness life of human and nature. As robots become more integrated into society, it will be critical to understand how people interact with and react to machines that make choices and behave as authorities, such as in the military or medical contexts. There is a serious issue that the HRI community must confront, since research (such as the Milgram and Stanford jail experiments) illustrates how regular individuals might comply to conduct activities that contravene their principles (Kolla (2008); Cormier et al. 2013).

Industry Paradigm	Goals	Global leader India
Industry 6.0: Virtualized antifragile manufacturing driven by customer	Virtualized ant vulnerable manufacturing based on customer need • Data flows across several administration domains in hyperconnected industries multifaceted, Complex and dynamic industrial supply chains. • Autonomous reconfiguration and adaptation • Role of manpower in production has changed tremendously. • Quantum computing enhance the effectiveness and productivity of current AI models while also enabling the creation of whole new ones.	India is a very fast developing economy and with systematic development and collaborative exertions can become the Global leader in signifying I6.0.

	• The production of the factory is monitored and stored in cloud server based which can be sale direct on Amazon • Minimum lot-size can be achieved as economically viable lot-size • The emphasis on sustainability can be extended from environmental protection to complete sustainable development. • Hundred percent transparency can be achieved at all level of production as well as process. • clients and innovation have now become increasingly prevalent. • End-to-end solutions push the boundaries among industries.	

Our visionary pioneers seek to move the centroid of planets to vote-based use in the second stage of the Industrial Revolution (6.0) (starting in 2070). Our research and invention will be able to verify and manage the movement of the planets, as well as bearings, at this time. This will be an amazing period when people can effectively access the majority of the universe's planets. We recognize that this will be a difficult and competitive moment for engineers, as well as researchers, but it will not be surprising to us.
According to the regressive path that leads to it, coexisting robots will be the industrial norm by the end of the next industrial revolution. Monolithic production houses are the most likely outcome of prior revolutions focusing on technical automation and customized manufacturing, in the sense that the machines are connected into numerous task-specific AI algorithms running in tandem to produce on a consumer requirement basis. The sixth revolution will make use of the following technologies in order to improve many aspects of manufacturing and general quality of life:
Robo-medics with multidimensional printing
Assistive robotics for the home
Alternative-to-cumulative energy
- Deep dive EEG

Future 3-D printing expertise will bring existing Penta-dimensional printing systems greater degrees of freedom, enabling users to print with a broader range of chemicals and materials in additive manufacturing, as well as other materials like precisely controlled pharmaceuticals [36]. Precision medicine that dissolves at specific targeted regions of the digestive tract. The robotics and field robots' area also supporting in treatment of general medicine using statistical data, AI, ML, and mechatronic devices to eliminate human touch in an OPD scenario. This helps in minimizing human tough and reduces the risk of germ transmission, if not entirely eliminates. Consider the present scenario of Covid-19 pandemics. This is a bi-phase pandemic, the application of robots and sensors in medical treatment can ensure the contactless treatments of the patient. It ensures the professional anatomical manipulation can be performed by eliminating the risk of viral transmission to the practitioner.
Since inception of Mitsubishi's Wakamaru in 2005, the robotics industry has been imagining robot incorporation in the household. With the development of robotics, this industry is supporting in every domain of human life. It has started more diverse application-specific to the need of mankind; it can support from a child to an elderly human being in their everyday life. The home assistant robotic system is expected to be an important part in the sixth revolution. Consider a recently developed wireless sensor cluster with an online dashboard-assisted article fetching motor system. Worn sensors can also be used to control these systems by transferring information from the wearable device to the home assistant over a certain range.
With the much-anticipated arrival of electric vehicles (EVs) on the global market, the current trend toward energy centralization will accelerate drastically. The conventional electricity generation will be replaced by solar facilities. This leads to sustainable energy solution and it will become more integrated into the back end. This accountability for installing panels and batteries in individual homes is shifting to the organizations that supply electricity to customers. In the 21st century industries can improve productivity by combining innovative strategies. Natural gas, biomass and waste, nuclear energy, wind energy and solar energy are some of the alternative energy sources used in industry, in decreasing order of consumption (Martin and Milligan, 2019). Current technology only allows for limited control of prosthetic limbs when using deep-dive EEG. Artificial pain receptors could be included in future EEG-controlled prosthetic technology, allowing for realistic skin grafting with synthetic materials (Sachsenmeier (2016).

Conclusion:

According to future trends, the sixth industrial revolution's primary focus will be on medical technology, with multi-dimensional printed controlled release medicine and fully automated medical diagnostics, removing any additional burden from practitioners and allowing them to concentrate on critical cases.
Another crucial would-be automated capital generation via robotic manufacturing, which was envisioned in the fourth revolution but could not be realised on a large scale owing to the impossibility of mass production.
Cleaning and other task-specific robots would most likely be the next step in domestic robotics. Alternative energy sources will play a significant role, eventually replacing fossil fuels until all time-consuming resources are powered by renewable energy sources. The most basic growth accelerator for businesses is the fusion of ideas, which will redefine market borders by shifting the emphasis

on digital business values from one commodity to another. Convergence, on the other hand, might be a risk since other businesses may eat into the company's primary operation in order to fulfil their own convergence ambitions.

References

1. Aslam, Farhan, et al. "Innovation in the era of IoT and industry 5.0: absolute innovation management (AIM) framework." *Information* 11.2 (2020): 124.
2. Bagdasarov, Zhanna, April A. Martin, and M. Ronald Buckley. "Working with robots: Organizational considerations." *Organizational dynamics* 49.2 (2020): 100679.
3. Bartlett, Brendan, Vladimir Estivill-Castro, and Stuart Seymon. "Dogs or robots: why do children see them as robotic pets rather than canine machines?." *Proceedings of the fifth conference on Australasian user interface-Volume 28*. 2004.
4. Bekey, George A. *Autonomous robots: from biological inspiration to implementation and control*. MIT press, 2005. (W. Grey Walter)
5. Briggs, Gordon, and Matthias Scheutz. "How robots can affect human behavior: Investigating the effects of robotic displays of protest and distress." *International Journal of Social Robotics* 6.3 (2014): 343-355.
6. Caymaz, Ebru, Kadir Alpaslan DEMİR, and E. L. Ç. İ. Meral. "ISSUES IN INTEGRATING ROBOTS INTO ORGANIZATIONS." *Defense Resources Management in the 21st Century* (2017).
7. Cormier, Derek, et al. "Would you do as a robot commands? An obedience study for human-robot interaction." *International Conference on Human-Agent Interaction*. 2013.
8. Demir, Kadir Alpaslan, and H. Cicibas. "Industry 5.0 and a Critique of Industry 4.0." *4th international management information systems conference, Istanbul, Turkey*. 2017.
9. Demir, Kadir Alpaslan, and Halil Cicibaş "The Next Industrial Revolution: Industry 5.0 and Discussions on Industry 4.0." Industry 4.0 From the Management Information Systems Perspectives. Peter Lang Publishing House, (2018)
10. Demir, Kadir Alpaslan, et al. "Ambient intelligence in business environments and internet of things transformation guidelines." *Guide to Ambient Intelligence in the IoT Environment*. Springer, Cham, 2019. 39-67.
11. Demir, Kadir Alpaslan, Gözde Döven, and Bülent Sezen. "Industry 5.0 and human-robot co-working." *Procedia computer science* 158 (2019): 688-695.
12. Demir, Kadir Alpaslan. "Research questions in roboethics." *Mugla Journal of Science and Technology* 3.2 (2017): 160-165.
13. Duggal, Angel Swastik, et al. "A sequential roadmap to Industry 6.0: Exploring future manufacturing trends." *IET Communications* (2021).
14. Duggal, Angel Swastik, et al. "A sequential roadmap to Industry 6.0: Exploring future manufacturing trends." *IET Communications* (2021).
15. Elvis, Martin, and Tony Milligan. "How much of the Solar System should we leave as Wilderness?." *Acta Astronautica* 162 (2019): 574-580.
16. Industrial revolution: Definition, history, dates, summary, and facts. Britannica. https://www.britannica.com/event/Industrial-Revolution (Year). Accessed 19 March 2021.
17. İŞCAN, Erhan. "An Old Problem in the New Era: Effects of Artificial Intelligence to Unemployment on the Way to Industry 5.0." *Journal of Yaşar University* 16.61: 77-94.
18. Kolla, Sai Vamsi. "Machine Learning and its Application in IoT." (2021).
19. Maier, A., and Student. D. (2015) "Industrie 4.0 – Der Große Selbstbetrug." Manager Magazin, 13.02.2015, http://www.managermagazin.de/magazin/artikel/digitale-revolutionindustrie-4-0-ueberfordert-deutschen-mittelstand-a-1015724.html.
20. Martynov, Vitaly V., Diana N. Shavaleeva, and Alena A. Zaytseva. "Information Technology as the Basis for Transformation into a Digital Society and Industry 5.0." *2019 International Conference" Quality Management, Transport and Information Security, Information Technologies"(IT&QM&IS)*. IEEE, 2019.
21. Paschek, Daniel, Anca Mocan, and Anca Draghici. "Industry 5.0-The expected impact of next Industrial Revolution." *Thriving on Future Education, Industry, Business, and Society, Proceedings of the MakeLearn and TIIM International Conference, Piran, Slovenia*. 2019.
22. Ray, Céline, Francesco Mondada, and Roland Siegwart. "What do people expect from robots?." *2008 IEEE/RSJ International Conference on Intelligent Robots and Systems*. IEEE, 2008.
23. Rüßmann, M., et al. "Future of Productivity and Growth in Manufacturing." *Boston Consulting, no. April* (2015).
24. Sachsenmeier, Peter (2016) "Industry 5.0—The Relevance and Implications of Bionics and Synthetic Biology." Engineering, 2, 2016: 225- 229.
25. Skobelev, P. O., and S. Yu Borovik. "On the way from Industry 4.0 to Industry 5.0: From digital manufacturing to digital society." *Industry 4.0* 2.6 (2017): 307-311.
26. Urbanic, John. "A Brief History of Big Data." (2018).
27. Yin, Yong, Kathryn E. Stecke, and Dongni Li. "The evolution of production systems from Industry 2.0 through Industry 4.0." *International Journal of Production Research* 56.1-2 (2018): 848-861.
28. Zakoldaev, D. A., et al. "Modernization stages of the Industry 3.0 company and projection route for the Industry 4.0 virtual factory." *IOP Conference Series: Materials Science and Engineering*. Vol. 537. No. 3. IOP Publishing, 2019.