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Analyzing Interaction among Industry 5.0, Society 5.0 and Education 5.0 towards Attaining Sustainable Development Goals in India

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ABSTRACT: It has been underlined that major societal changes are necessary to accomplish sustainable development goals. Education should focus on technology's role in the process of sustainable development in a future society. The study puts out a scenario in which a super smart society is created by fusing together industry 5.0 and education 5.0 to deliver high-quality education goals for sustainable development that are also mapped to reflect the related influences. Society is composed of people and resources, and industries operate within and for society. Education is crucial for bringing about change, as it instills awareness in new generations. The shift from labor to artificial skills in 4th generation Industrial revolution led to the transition to 5th generation Industrial revolution. Humans, being the most intelligent species, are essential to avoid the drawbacks of Industry 4.0. However, understanding the technicality of Industry 5.0 is becoming a challenge for society and education 4.0. Governments are making structural changes to enable co-creation or blend technology with humans, aiming to address unemployment as well as encourage the implementation of sustainable method.

KEYWORDS: Industry 5.0, Society 5.0, Education 5.0, Sustainable development.

I. INTRODUCTION

The phrase "sustainable development" is gaining popularity. The sustainable development goals are a comprehensive agenda that includes aims for the advancement of society, the environment, and people. The European Commission's proposed 5th generation industrial revolution seeks to advance sustainability, human-Centeredness, adoptability across Industries. To achieve equilibrium between economic progress as well as eradication of social cocerns in Japanese society, the Japan cabinet has submitted Society 5.0 to the cabinet. The Zimbabwean Higher Education Ministry has proposed Education 5.0 to increase education's transparency.

A human centric design approach that prioritizes the needs of people, whereby robots and people work together in a common space. In the last few years, industry 5.0 has begun to get greater attention. Using the integration of internet and physical world through Information and communications technology, society 5.0 and education 5.0 seek to establish a futuristic civilization characterized by comfortable lifestyles and high-quality education. In general, the revolutions in industry, society, and education significantly interacted with one another, and this will result in sustainable development objectives in India. This essay discusses the vision of the smart society, which will feature a new version of 5th generation of industrial revolution, human-centered culture, and the internet of things.

II. ANALYSIS OF THE LITERATURE

K.Padmanathan (2022): In order to accomplish the SDGs, the study investigates the possibilities of fusing disruptive technologies with 5th generation Industrial revolution, Human- Centered Culture, Smart Cities, and town. This research delves into the effects of disruptive technologies on various domains such as product development, healthcare system modifications, epidemic situation studies, ecologically conscious business models, and urban smart towns. The findings indicate that the most advantageous developments for accomplishing the Sustainable Development Goals are Industry 5.0 and Society 5.0.

H.Sihan,W.Baicum. (2022): This study looks at how Industry 5.0 and Society 5.0 have interacted since the first industrial revolution, concentrating on how they can coexist and avoid miscommunications. It compares, contrasts, and highlights the co-evolution of these two in an effort to stimulate more study and advancement.

Elias. G Carayannis & Johna Morawska-Jancelewinz (2022): The Future of Europe: people- centered culture and 5th generation Industrial revolution as Key Motivators and upcoming Universities focuses on the potential of digitization in universities and society, necessitating the integration of these principles, cooperation models, and human-centered innovation.

Abdullah M. Alharbi (2023): This study contrasts how Education 5.0 is being implemented in developed and developing nations, examining important components and pointing out the need for an evaluation of the system's present status in these areas.

III. RESEARCH GAP

The current investigation's goal is to find out the stronghold of evolutionary 5th generation industrial revolution, Human-centered society, and education 5.0 in the proactive surge of sustainable development goals in India and fill the gap among industry, society, and education.

IV. RESEARCH METHODOLOGY

To accomplish the aforementioned objectives, secondary sources, recently published literature, reports, and data all has been used. The data was acquired from a variety of books, reports, periodicals, and websites.

Understanding Industry 5.0

A growing body of academic research has focused on the Fifth Industrial Revolution since 2017. A People-centered, resilient, and sustainable European industry, Industry 5.0 was called for by the European Commission in 2021. This is consistent with the 2011 plan, a top-down undertaking, of the German government. Based on the Commission's stance, Industry 5.0 is analyzed.

Concept

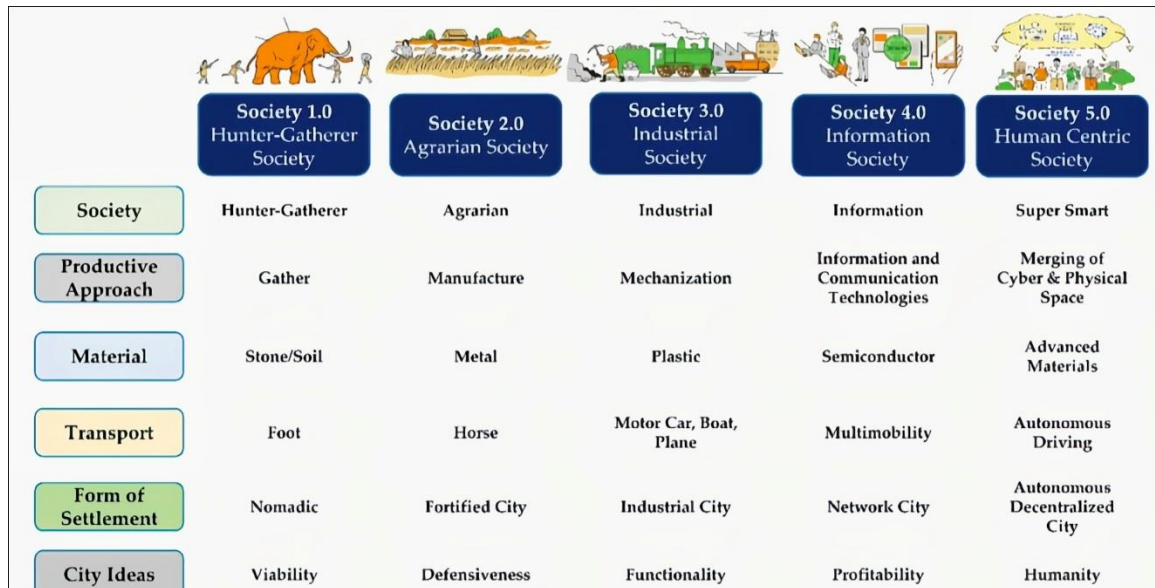
Beyond Job Creation and economic expansion. 5th Generation Industrial revolution recognizes the private sector's capacity to support social goals. Through ensuring that production respects the limits of the Earth and its regions a high priority on the health and safety of industry workers, it seeks to transform the private sector into a resilient supplier of wealth. The necessity for new technologies to be built with support for future social values is urgent given the recognition that technological advancements affect how value is created, exchanged, and dispersed. The industry needs to reconsider its place and function in society in light of these changes and questions that are intimately related to technological progress.

Core value

Three central principles— centricity on humans, sustainability, and fortitude —are the focus of Industry 5.0. It moves away from progress driven by technology and toward a human-centric strategy that emphasizes the basic needs and desires of people. This change necessitates adaptable technology to satisfy the various needs of workers. For employees' welfare and rights to be protected, a safe, welcoming workplace is crucial. Circular processes and other sustainable practices lessen waste and their negative effects on the environment. For industrial production to endure disruptions and keep infrastructure operational in an emergency, and tenacity is essential.

Understanding Society 5.0

The Japanese government has proposed a clear idea called "Society 5.0." the innovation and science council established it in the 5th grade Foundational Scheme, which was approved by the Cabinet in January 2016. As we reflect on human history, we can identify many social stages. Hunter-gatherer society is characterized by assemblages of individuals who chased as well as gathered in harmony among the natural world; agrarian community forms clusters centered on farming, enhancing structure, and constructing nations; The industrial revolution is used by third-generation society to advance industrialization, enabling large-scale manufacturing; and 4th generation society is a civilization based on information that generates higher higher value by tying together intangible assets as information networks. The 5th generation of society in this evolution is an informational society. a society based on Data-driven Society aiming to create a prosperous society that is focused on people.








| |  Society 1.0 Hunter-Gatherer Society |  Society 2.0 Agrarian Society |  Society 3.0 Industrial Society |  Society 4.0 Information Society |  Society 5.0 Human Centric Society |
|----------------------------|--|---|---|---|--|
| Society | Hunter-Gatherer | Agrarian | Industrial | Information | Super Smart |
| Productive Approach | Gather | Manufacture | Mechanization | Information and Communication Technologies | Merging of Cyber & Physical Space |
| Material | Stone/Soil | Metal | Plastic | Semiconductor | Advanced Materials |
| Transport | Foot | Horse | Motor Car, Boat, Plane | Multimobility | Autonomous Driving |
| Form of Settlement | Nomadic | Fortified City | Industrial City | Network City | Autonomous Decentralized City |
| City Ideas | Viability | Defensiveness | Functionality | Profitability | Humanity |

Figure 1: Understanding transitions of society

Concept

5th generation Society is concentrated in establishing a people-focused culture where individuals may live fully active and placid life with economic growth, which can eliminate the main societal concern. It is society that provides resources that enables economic activity according to demographic need of the society and even the land, labour, capital and entrepreneur are example of production factors. The merger of cyberspace and the real world revolutionize the society and its concept. Being humans as social animal, humans can neither avoid biasness nor eliminate fatigue. This merger is employed to create new values and answers to the issues. Japan presented a national vision that aimed to towards An all-new people-focused digital society with addressing several societal issues.

Enhancement of Society 5.0

Through the integration of technologies from the Fourth Industrial Revolution into every industry and facet of everyday life, Society 5.0 seeks to achieve both mid- and long-term growth. Innovations and creative ideas from industry drive progress, and society absorbs these innovations by incorporating them into education. To use Japan's advantages and appeal to a global audience, five key areas have been identified: "extension of healthy lifespan," "realization and creation of next-generation supply chains," "building and development of pleasant infrastructure and towns," and "FinTech." A universal healthcare and nursing care insurance system are made possible by Industry 4.0's blockchain technology, which is a response to the world's aging population. Through the provision of medical treatment, nursing care, health management, illness prevention, and self-sufficiency, this new health system will increase the average lifespan. Digitalization-enabled value creation and human resource development are examples of cross-cutting concepts.

Understanding Education 5.0

Since both academic institutions and technology have been working together to transform education. For higher educational standards, modern tool and technique development is also being updated concurrently. The fifth generation of education software follows the first four generations. The core of Fifth Generation Education is defined as learning by all parties engaged who may have a role in instruction, including teaching personnel, students, and administration. Learning is, in particular, linked to the learner or student, concentrated on the fresher, exhibited by the fresher, and motivated by the learner. As a result, the fresher is considered as a whole individual whose principles, convictions, ideas, and expertise, and abilities are not regarded as distinct fundamentals that need to be cultivated and trained. The student is surrounded by dynamic technology, which offers possibilities for the fundamental choices he or she must make regarding what, where, when, how, why, and with whom to study.

The following list comprises Education 5.0's main pillars and their results:

Integrated and Current Curriculum: A coherent and pertinent curriculum is essential for improving the learning environment. This necessitates the use of intuitive design and development methodologies to create dynamic, organic curricula. Students will be given the opportunity to practice their newfound abilities in a real sector or business. These

abilities must be able to be performed by students with adaptive competency. The curriculum must address issues and demands specific to the sector and community for this reason. The curriculum must also incorporate dispersed and shared content as well as diverse electives and initiatives.

Innovative Delivery and Assessment: Technology could come in handy and revolutionize the orbit setting where students will take on an active learner's role. Students are not simply looking at the world from a business viewpoint. As a result, the conventional learning situations will change from an instructional mode to one that turns the information gained into a practical and applied knowledge. Instead of using standard exams, the delivery method will be changed to include practical presentations and instruction.

Meaningful learning experiences: Learning will have the ability to effectively transform knowledge into information that is based on experience. It will have a broad range of dimensions integrating a focus on activities, support for technology, compliance, and wide industrial applicability.

Transformative Learning: By implementing cutting-edge technology, the learning environment will be active and distinctive for successful and fulfilling learning. This will incorporate practical educating experiences like transforming the structural paragon and putting the learners' ideas and spirits into classroom activities. Smart schools also have data analytics facilities for applying the doctrine as well as formulae in a hands-on, dynamic education setting. The apprentice will act as an agent for further knowledge extension.

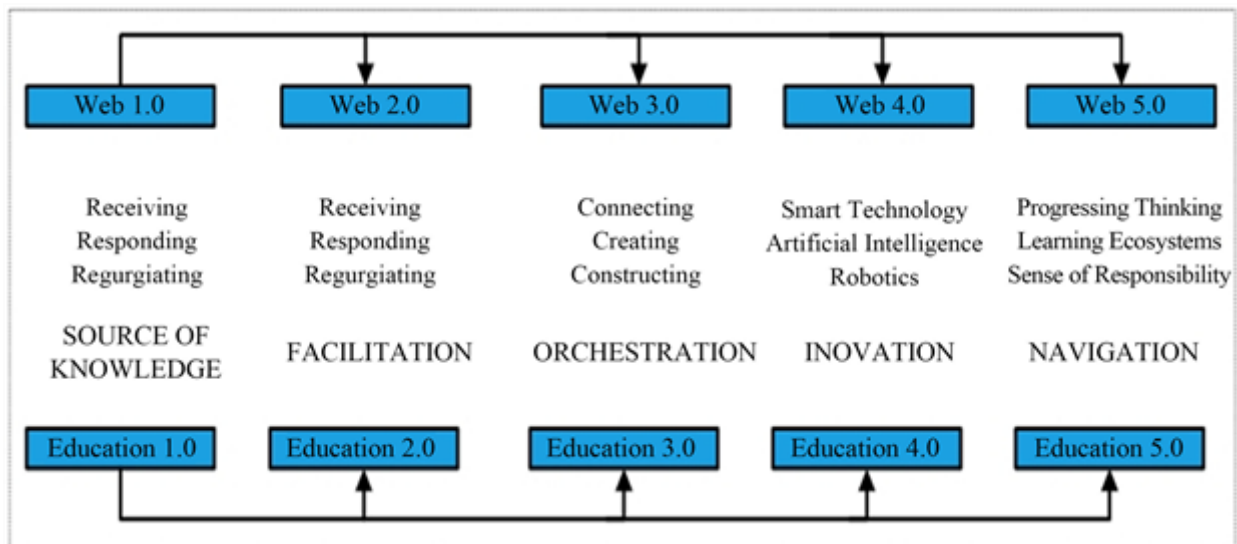


Figure 2: Understanding transition of education 5.0

Driving forces behind attaining SDGs

Radical developments in consumer behavior, globalization, and technologies for production and sales were all notable features of the 21st century for modern companies, in both commercial and non-commercial. The Sustainable Development Goals (SDGs) are a comprehensive agenda that includes goals for the advancement of the environment, society, and people. This framework has 169 targets and 17 goals. The study's goal was to examine how the Fifth Generation Industry, Society and Education interact with one another. It is clear that SDGs 4, 9, and 11 have a more noticeable synergy influence across SDGs and will help to achieve SDGs in a shorter amount of time. Other than SDG-4, 9, and 11 remaining SDGs remains untouched in the paper, the emphasis is mainly on the root form where the changes can implemented effectively and efficiently. Targets are intimately aligned with advances in technology, innovation, and industrial advancement SDG-4 i.e. Education and SDG-11 i.e. Society, still fewer research exist focusing on the tactics and provide guidance about achieving SDG-9. Still, a beginning toward the SDGs and can induce In case coordinated endeavors put into SDG-4, 9 and 11.

SDG 4 (Quality Education)

Education 5.0

The Industrial Revolution accelerated sustainable development by bringing in an interactive, technological friendly learning environment in education, improving quality and opening up skilled jobs for young people. The proposed SDGs strives to guarantee equity and inclusivity, top-notch instruction, encouraging lifelong learning, and providing chances for everybody with corresponding targets, Several SDGs result targets are being helped and facilitated by Education 5.0 including equal access to university as well as technical, vocational, and higher education, Education for all, irrespective of gender is the target by 2030. The entail boosting the proportion of people with the necessary skill for respectable employment, eradicating gender gaps in education, attaining universal youth literacy, advancing sustainable development via teaching about human right, gender equality, sustainable life style, peace, non-violence & cultural appreciation.

SDG 9 (Industry Innovation & infrastructure)

Industry 5.0

The prior research predicted a technological revolution that might fundamentally change people's lifestyles, work schedules, and work-life balance. Regarding size, extent, and intricacy, the extent of this transition would be completely novel for people. According to studies, disruptive technologies offer enormous promise that has yet to be realized. In the following ten years, if Industry 4.0 is realized, it may bring in One trillion US dollars in revenue regarding business and society. According to McKinsey, the automotive industry's revenue is predicted to double by 2030, reaching 6.6 trillion dollars as opposed to 3.5 trillion was spent in 2016. When disruptive technologies like electrification, shared transportation, and connectivity were adopted, the growth rate is predicted to be 84%. To attain this anticipated expansion, the businesses must develop new technology for themselves. Industries are now aware that cutting-edge technologies are crucial links during the course of innovation and development of products in the future value chain.

To obtain an advantage and increase their market share, leading companies are reevaluating their goods and services. They are using technology and services to build new goods and services as the cost of sensors, processing, and networking drops. Reducing contamination risks requires organizational restructuring in order to identify impacted individuals and their movements. Research is being done on disruptive technologies including automation, cloud computing, machine learning, Internet of Things, augmented, virtual, and mixed reality, and smart homes and cities. Digital-physical systems, genetic engineering, chatbots, artificial intelligence, biotechnologies, sophisticated robotics, 3D printing, cloud and remote computing, genetic engineering, autonomous cars, and more are a few examples. High-level cognitive activities including problem-solving, learning, perceiving, and reasoning can be carried out by modern intelligence robots.

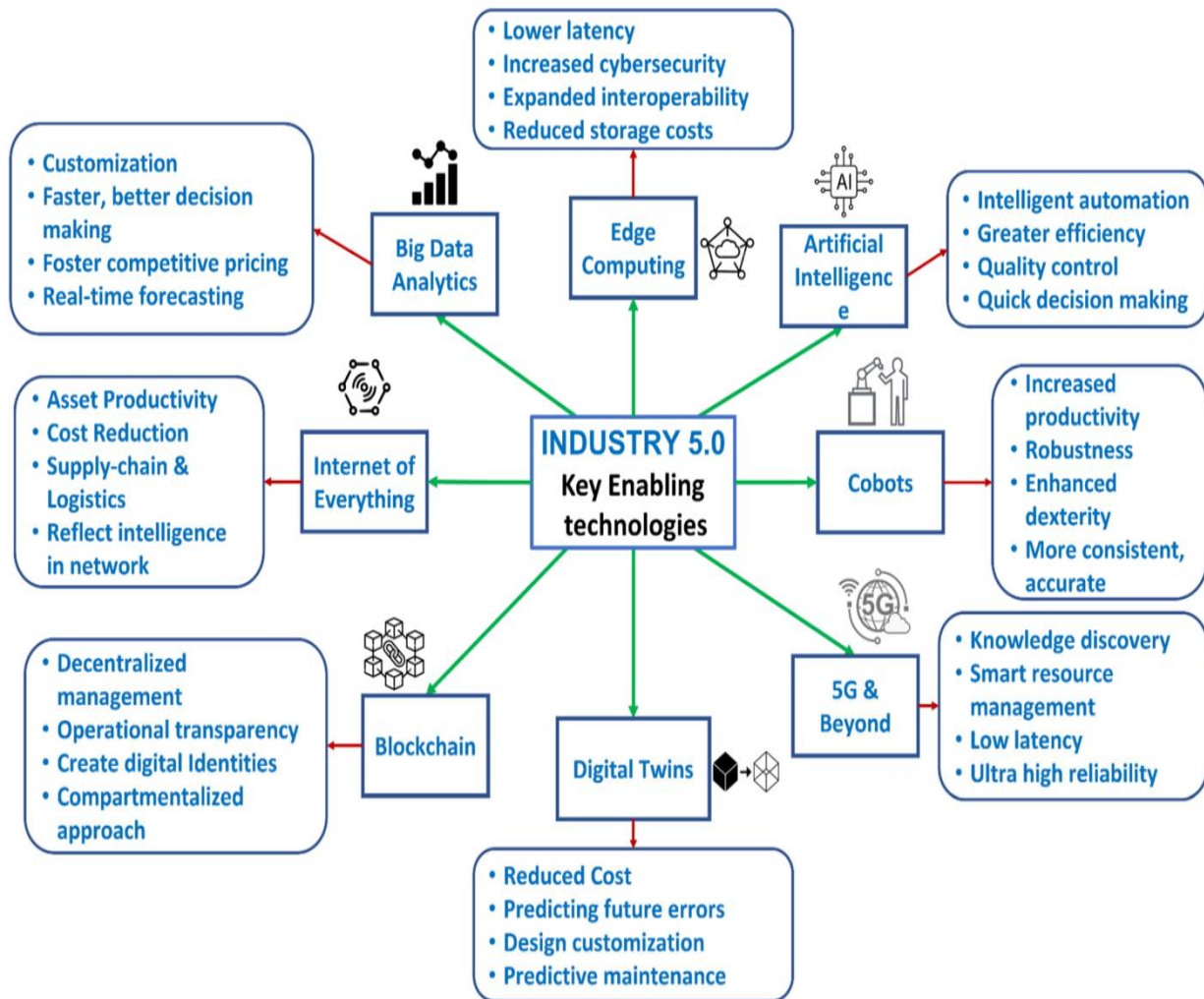


Figure 3: Industry 5.0 in accordance with SDGs

**SDG 11 (Sustainable cities and Communication)
Society 5.0**

The UN established the Sustainable Development Goals (SDGs) to address social issues pertaining to human interaction with the environment, and Society 5.0 will help to attain these goals. A section titled "Realization of a Sustainable Society" was added to the amended Charter of Corporate Behavior on November 8, 2017, with the primary goal of proactive SDG delivery through the creation of the Fifth Generation Society. Even the 5th generation Human-centered Society for SDGs" rationale as well as illustrations of the major technology and framework for the 17 SDGs are summarized (Fukuyama, 2018). According to (Grunwitz, 2019), the development of Society 5.0 has direct effects on people due to the greater use of smart technologies. In the workplace, where digitization and AI are prevalent, human activity is undergoing modifications and expansions. The majority of traditional occupations are disappearing, necessitating retraining and coaching.

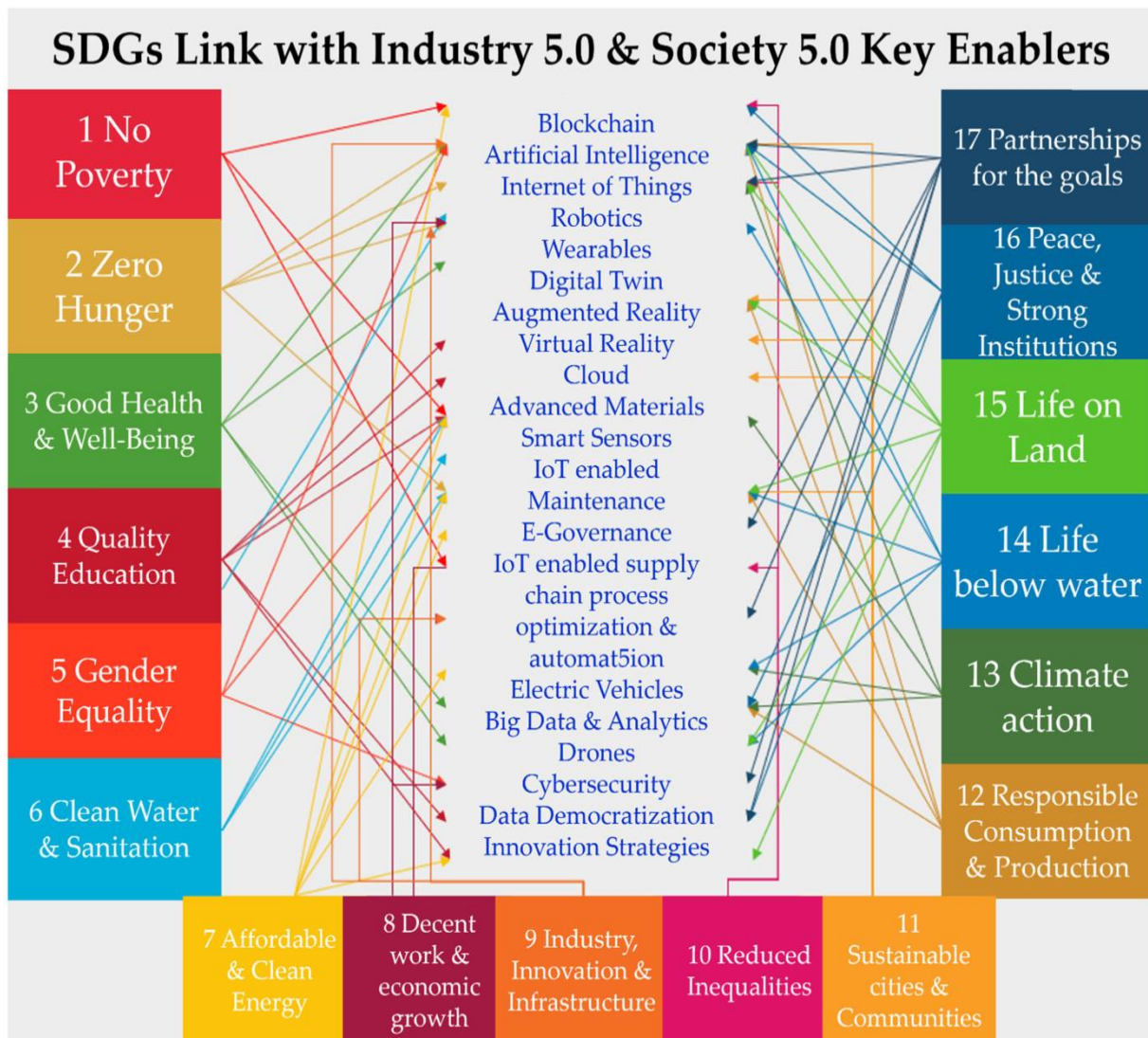


Figure 4: SDGs Link between Industry 5.0 and Society 5.0

The move from Society 4.0 to Society 5.0 is marked by the importance of trust as a social capital for success in the digital age. Innovations have increased life expectancy, worker productivity, and societal wealth. In smart industries, workers employ wearable technology and digital tools, while people operate robots to do physical tasks. The smooth amalgamation of these technologies enhances workforce, security, and efficiency. To ensure a seamless shift from one technology to another, policymakers might encourage firms to teach future manufacturing technicians more. By putting into practice efficient measures to accomplish sustainable development goals and objectives through transparent policy-making using artificial intelligence, Human-centered culture should be in line with the Sustainable Development Goals of the United Nations.

IV. CONCLUSION & DISCUSSION

As we all know society is the summation of all the people and resources. An industry operates in the society and for the society. Education is the key to bring changes. Education is the primary stage where development is being inculcated in the minds of the generation. Bringing awareness in the new minds will lead change. Humankind through the years has recognized the alarming changes in the atmosphere that was led by the changes in environment caused over period of industry 1.0 to industry 3.0. There was extensive exhaustion of the resources without environmental concern, specifically in the era of industry 3.0. It leads to transition from labour skill to artificial skill, which has higher

efficiency in production than humans. This transition is to avoid wastage and adding more specialization to work and this led humankind to enter industry 4.0. As we all know humans are the most intelligent species on the planet they have analytical skill and quick decision making on this criteria they outclass the AI. AI's has limited skill set they lacks self learning, so the humans are becoming essential to avoid this drawback of industry 4.0 and this quick realization of the flaws of industry 4.0 led transition to industry5.0.

Although industry 5.0 is to eliminate shortcomings of 4.0 but to understand the technicality is becoming new challenge to the society 4.0 and education 4.0 where the focus was on becoming information society. This neglects humans that's becoming very difficult for the governments to tackle the problem of unemployment. Thus governments try to bring the changes from the root. Governments are making structural changes enabling the co-creation or blend use of technology with humans. This white paper tries to analyze the interaction between 5th generation Industrial revolution, 5th generation Human Centric Society as well as 5th generation Education to the certain extent i.e. within the scope of SDGs, there are lots of research possibility that can be undergo as this study does not have quantitative aspects and can check the achievements till date.

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