UNITEDNATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)

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I. Letter from the Secretary-General

Distinguished Participants and Esteemed Advisors,

It is with great honour and excitement that I welcome you all to the very first edition of IDATRAIN 2026. Every meaningful journey begins with a first step, and this year, we are proud to take that step together. IDATRAIN has been created with the vision of bringing young minds together in an environment where knowledge, experience, communication, and personal development can grow side by side.

In a world that is constantly changing, the ability to think critically, communicate effectively, collaborate with others, and approach challenges with confidence has never been more valuable. IDATRAIN aims to provide more than a training experience; it is an opportunity for participants to discover their strengths, challenge their perspectives, learn from one another, and develop skills that extend far beyond the classroom.

As the first edition of IDATRAIN, this event represents the beginning of a new chapter. We hope to create an atmosphere where every participant feels encouraged to ask questions, share ideas, make connections, and most importantly, embrace the learning process. Whether you are taking your first steps into this community or already have experience in academic and social activities, IDATRAIN welcomes you with the same purpose: to learn, grow, and inspire.

Throughout the programme, our academic and organisational teams have worked carefully to create an engaging and meaningful experience. Every session, activity, and discussion has been designed to encourage active participation and personal development while allowing you to connect with people who share your curiosity and ambition.

On behalf of the entire IDATRAIN 2026 academic and organisational teams, I would like to express my sincere gratitude to everyone who has contributed to bringing this first edition to life. What you are experiencing today is the result of countless hours of preparation, dedication, and teamwork, and we are truly honoured to begin this journey with you.

I hope that when IDATRAIN 2026 comes to an end, you leave not only with new knowledge and skills, but also with new perspectives, meaningful connections, and the confidence to take your next step forward. As we open the first chapter of IDATRAIN together, I hope this will be the beginning of a journey that continues to inspire, challenge, and empower many more young minds in the years to come.

Welcome to IDATRAIN 2026. Let us make the first edition one to remember.

Sincerely,

Gökçe Boğa
Secretary General of IDATRAIN 2026

II. Letter from the Under-Secretary-General

Distinguished Delegates,

On behalf of my chairboard, I would like to welcome all of you to the United Nations Industrial Development Organization committee. I am Yiğit Canbazoğlu, and I am greatly honored to be an Under-Secretary-General in this edition of IDATRAIN.

In our upcoming conference, the member states of the United Nations Industrial Development Organization committee will revolve their debates around the agenda of "Regulating the Integration of Artificial Intelligence in Manufacturing". This agenda is currently of utmost importance for UNIDO, given the rapid rise of autonomous manufacturing systems. These AI models have caused rivalries between member states, and the urge for higher quality and quantity in manufacturing has gone wild. Despite that, this urge has been the root of many improvements over the years and of many soon to come. And this raises several questions about the future of these systems and their legal breakpoints. Thus, the world urgently seeks a balance within the integration of said models. The delegates are encouraged to examine how AI-powered industrial models can be legally and globally accepted while maintaining fairness and not being a roadblock for industrial AI systems. The committee requires delegates to thoroughly analyze the economic, ethical, and legal implications of artificial intelligence in manufacturing while proposing practical, internationally applicable solutions. Through constructive diplomacy and cooperation, delegates should strive to establish a regulatory framework that promotes innovation, protects workers and industries, and ensures that the benefits of AI are shared equitably among all member states.

I encourage you all to approach the discussions with open minds and bold ideas. I look forward to your active participation, insightful contributions, and fruitful debates.

I would like to welcome you all to IDATRAIN once again. I hope to meet you all soon.

Sincerely,

Yiğit Canbazoğlu

Under-Secretary-General of the United Nations Industrial Development Organization

III. Introduction to the Committee: United Nations Industrial Development Organization (UNIDO)

The United Nations Industrial Development Organization (UNIDO) is a specialized UN agency. It is responsible for promoting inclusive and sustainable industrial development [1]. As a large agency with 173 Member States [2], UNIDO's core belief is that inclusive and sustainable development is a key driver of both economic and social progress. Therefore, UNIDO's vision is to create a fair global economy which is free from poverty and hunger. UNIDO's aim is to achieve a world in which industry, innovation and local value addition drive progress and inclusive growth, decoupled from emissions and overexploitation of resources [1].

UNIDO was founded on the seventeenth of November, 1966, by the UN General Assembly. At first, it was founded as an autonomous body within the UN [3]. Today, UNIDO operates globally and is headquartered in Vienna. UNIDO also has liaison offices in many important cities throughout the world, such as Brussels, Geneva and New York. On top of this, UNIDO has a large network of 49 field offices and 10 Investment and Technology Promotion Offices [4].

UNIDO is an active contributor and member of the United Nations Sustainable Development Group (UNSDG), and at the country level, UNIDO supports the analytical functions of the UN country teams and resident offices [4]. Furthermore, UNIDO maintains partnerships with numerous sister organizations across the UN, including the Food and Agriculture Organization (FAO) on agribusiness development and with the United Nations Environment Programme (UNEP) in the Partnership for Action on Green Economy (PAGE). On top of this, UNIDO is strongly engaged with different economic organizations, such as the BRICS of five major emerging economies and with the Group of 77 (G77), the largest intergovernmental organization of developing nations in the UN [4].

With support from the European Union (EU), UNIDO has actively assisted Member States by providing technical cooperation in various fields. UNIDO's common vision has managed to translate into tangible benefits in 100 countries over the world, in places like Africa, Asia and the Pacific, Latin America and the Caribbean, and the European Neighbourhood [4].

Moreover, the longstanding cooperation with the Multilateral Fund for the Implementation of the Montreal Protocol remains strong, with UNIDO's Montreal Protocol Division currently working on the phase-out of hydrochlorofluorocarbons (HFCFs) and phase-down of hydrofluorocarbons (HFCs) in about 70 countries [4].

IV. Terminology and Definitions

- **Labour pool:** The available workforce from which employers can recruit employees, including both currently employed individuals seeking new positions and people actively seeking employment.

- **Class struggle:** The conflict between different socioeconomic classes arising from differences in wealth, economic interests, working conditions, and access to power.

- **Semiconductor:** A material whose electrical conductivity lies between that of a conductor and an insulator, allowing its electrical properties to be precisely controlled. Semiconductors are fundamental components of modern electronic devices, including computers, sensors, and integrated circuits.

- **Automation:** The use of technology and control systems to perform tasks or processes with reduced direct human intervention.

- **PLC (Programmable Logic Controller):** A programmable industrial computer designed to monitor inputs and control machinery or industrial processes according to programmed instructions. PLCs are commonly used to automate repetitive and precisely controlled manufacturing operations.

- **CNC (Computer Numerical Control):** A manufacturing method in which computer-controlled machines execute precisely programmed instructions to manipulate tools and materials. CNC systems allow manufacturing operations to be performed with high precision, consistency, and repeatability.

- **Cybersecurity:** The practice of protecting computer systems, networks, software, and data from unauthorized access, disruption, damage, or other malicious activities.

- **Big Data:** Massive, complex datasets that standard computer programs and old database systems cannot handle.

- **IoT (Internet of Things):** A network of physical devices equipped with sensors, software, and communication technologies that allow them to collect, exchange, and process data over a network.

- **Cloud Computing:** The delivery of computing resources, such as storage, processing power, and software, over the internet rather than relying solely on local hardware and systems.

- **CPS (Cyber-Physical Systems):** Systems that integrate physical machinery and processes with digital computing, communication, and control technologies, allowing physical processes to be monitored, analyzed, and controlled through digital systems.

- **Smart Factories:** Manufacturing facilities that use interconnected digital technologies, such as sensors, artificial intelligence, robotics, and data analytics, to monitor, communicate, and adapt production processes with minimal human intervention.

- **Reskilling:** The process of teaching workers new skills that enable them to perform different tasks or transition to new occupations in response to changes in technology or labour-market demands.

- **Digital Divide:** The gap between individuals, groups, or regions in their access to and ability to effectively use digital technologies and information and communication technologies.

- **Mechanization:** The use of machinery to assist or replace human physical labour in performing tasks, while generally requiring human control or intervention.

- **AI:** Artificial Intelligence. The capability of computational systems to perform tasks typically associated with human intelligence.

- **Generative AI:** Subfield of Artificial Intelligence that uses generative models to generate text, images, videos, audio, code, etc…

- **Operational Efficiency:** The ability of a system or organization to achieve its intended output while minimizing the use of time, resources, energy, and costs.

- **Digital Twins:** Virtual representations of physical objects, systems, or processes that use real-time data to simulate, monitor, and analyze their physical counterparts.

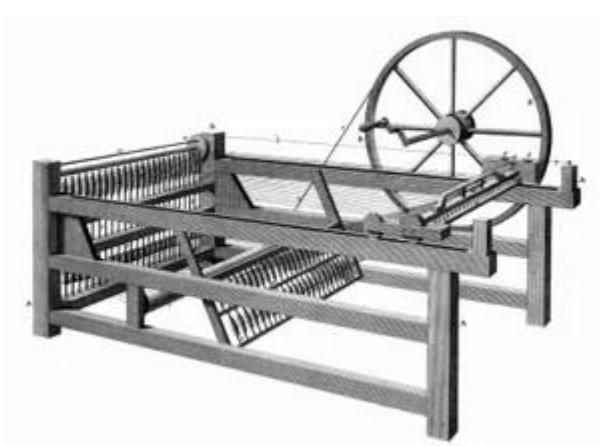
- **Edge AI:** The use of artificial intelligence directly on or near the devices where data is generated, allowing data to be processed locally with reduced reliance on centralized cloud computing.

V. Introduction to the Agenda Item: Regulating the Integration of Artificial Intelligence in Manufacturing

A. Historical Overview of Industry

1. Industry 1.0

Industry 1.0, also commonly referred to as the Industrial Revolution, first emerged in Britain and lasted roughly between 1760 and 1840 [5]. Industry 1.0 was defined by many technological advancements, such as the development of steam-powered machinery and the usage of new energy sources, among which coal and petroleum are important to note [6]. To name a few, some of the many new advancements that came were the spinning jenny and the power loom, both of which revolutionized the textile industries [7].



Industry 1.0 undoubtedly had many positives.. For example, the usage of the steam engine meant that factories no longer had to rely on human or animal labour, meaning they could run all season [8]. Furthermore, production in many industries like the textile industry (as aforementioned) and iron production scaled up

significantly [8]. Industry 1.0 was, as we know it, the beginning of industrialization.

Despite this, there were also many downsides to the initial Industrial Revolution. For instance, job security was lacking, and workers were frequently displaced by technological improvements, and the existence of a large labour pool did not help [9]. Moreover, the lack of worker protections and regulations also meant that work hours were long, and the wages were miserable. As such, exploitation and abuse in the workplace along with child labour also soared [9]. On top of these, urbanization on a never-before-seen scale caused mass migration from rural areas into urban areas, causing overcrowded and unsanitary cities, as well as many housing crises [10].

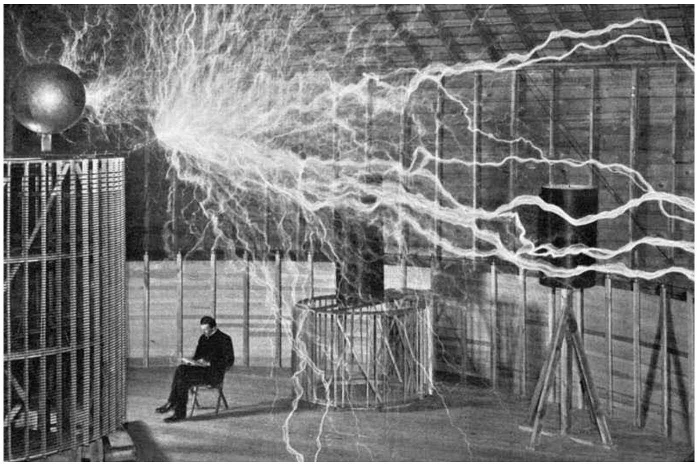
2. Industry 2.0

Industry 2.0, also referred to as the Second Industrial Revolution, is considered to have lasted roughly from the late 19th century to the onset of WWI. In Industry 2.0, the major economic, social and technological changes that occurred in Industry 1.0 arose again. This time, they were not only much stronger but also brought about the acceleration of industrial processes that considerably changed the way that people lived [11].

For example, the economic model known as 'capitalism' took root and became established as the primary model, which led to the creation of the middle classes and paved the way for a future class struggle. Furthermore, many new global powers, such as the United States, Germany and Japan, emerged from Industry 2.0 [11].

Perhaps one of the most important features of Industry 2.0 was the increased amount of machinery. There was also increased unemployment in many sectors, primarily the agriculture and textile sectors. On top of this, other problems which had emerged in Industry 1.0 had shown up again, like the mass immigration from rural areas [11].

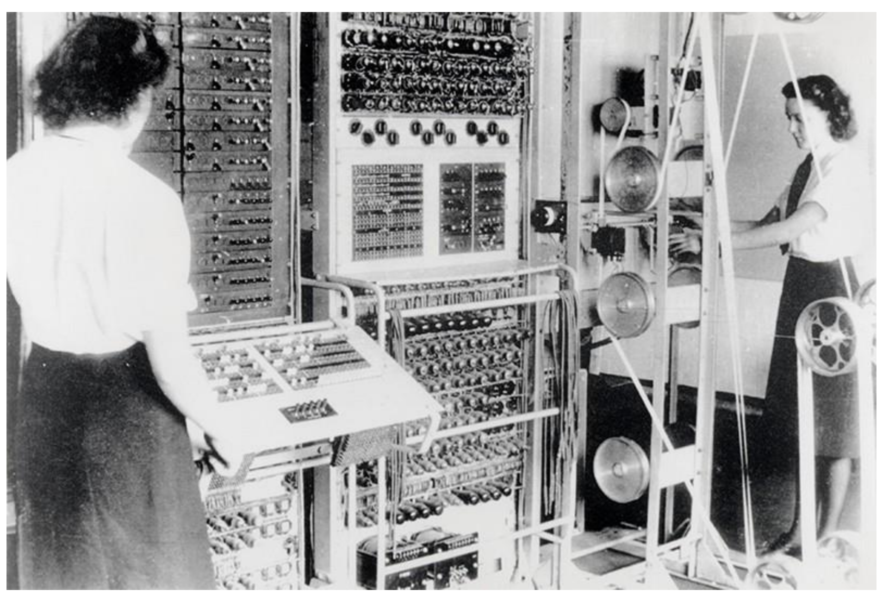
Maybe the most notable advancement in the industrial process was the establishment of assembly-line production, which significantly increased productivity and developed the way modern factories function [11]. Furthermore, many breakthroughs were made in terms of technology, like the internal combustion engine, aeroplane, telegraph and telephone, to name a few [11].



Another major change was in the energy sector. Not only did electricity become more common and advanced with many famous scientists and inventors, like Nikola Tesla, working to further it, but oil was established as a main source of energy. As a matter of fact, the first private oil factory and refinery was opened in Industry 2.0 [11].

3. Industry 3.0

The **Digital Revolution**, or shortly **Industry 3.0** started to emerge in the second half of the 20th century, more precisely in the 1960s. The main aspect/advancement that differs this era from the previous is the appearance of electronics, semiconductors and computers in industrial production. However, this advancement does not mean the direct replacement of labor with its better alternative, but rather the allowance of automation within the laborious machinery. This was made possible with the introduction of PLC's (Programmable Logic Controllers), CNC (Computer Numerical Control) machines and industrial robots paired with clever and precise factory designs. Outside of that, the advancements in information technology came as a total shock. Computers were now able to collect, process and store greatly large amounts of data, inter-connected computers' communications got a whole bunch faster, all of which laid the technological foundation for Industry 4.0. [12]



With this great advancement arose also the problems. The increase in automation lowered the need for humans in factories further, and just like in Industry 2.0, it displaced more workers. Alongside that, the increasing need for technical and digital skills made it hard to find sufficiently proficient people for the job. Furthermore, digital systems also introduced new problems such as dependence on technology and cybersecurity risks.

All in all, Industry 3.0 added to others the vital automation that would then lead to Industry 4.0. But in a statistical scope, it had lots of benefits, including higher productivity and precision, reduced room for error on humans' side, greater flexibility in comparison to traditional methods and generally safer working conditions. Despite all of that, one should not overlook the unemployment concerns and the risks that technology brought with it.

4. Industry 4.0

The term '**Industry 4.0**' became relevant with Germany's **Industrie 4.0** initiative and began appearing in the early 21st century. Industry 4.0 represents the integration of various digital technologies throughout the entire manufacturing process, including artificial intelligence, IoT (Internet of Things), Cloud Computing, Big Data (massive, complex datasets that standard computer programs and old database systems cannot handle), Cloud Computing, Industrial Robotics, Machine Learning, CPS (Cyber-Physical Systems). All of these are technologies that differ from industry 3.0 and set in stone the approach of smart factories. Furthermore, smart factories are the core idea of Industry 4.0 and they, instead of simply being pre-programmed to do a certain task, allow for the real-time gathering of data, communication with other machinery, analysis of information and adaptation of production processes based on educated predictions. This has all

benefits of Industry 3.0, maybe even threefold, but some problems inevitably emerge. Job displacement and cybersecurity concerns do still exist, but additionally, topics like reskilling and education, ethical concerns about AI's decision making, data privacy and ownership, Lack of international regulations and standards and lastly, digital divide should be kept in mind. [13]

Essentially, though Industry 4.0 offers enormous potential, it comes with immense challenges that UNIDO seeks to overcome while maintaining a balance between consistent development and global ethics.

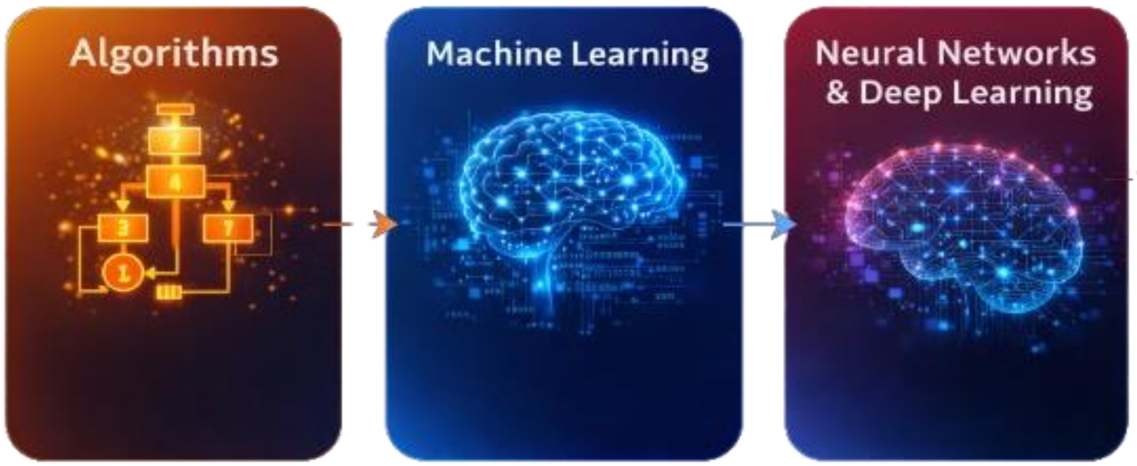
B. What is Artificial Intelligence (AI)

AI is currently woven into our daily lives in the form of language models, autonomous weapons, basic algorithms, etc. For us to deeply grasp this so-called "revolutionary" piece of technology, we need to first understand the single organ in our bodies that provides intellect to humanity: the brain.

The human brain is a complex and diverse organ that has been and will be used actively by every single healthy human being. A key organ that significantly differs humans from other living creatures all around the globe. It makes use of minuscule electrical currents to analyze information in the form of signals. The idea behind Artificial Intelligence (AI) initially was to replicate the neurons in the brain in order to perform certain tasks that require intelligence, such as reasoning, learning, planning, language processing, perception, decision-making, etc.

The current peak of AI uses databases and a dedicated function to process the given data (input) to output a result in the form of words or images. This process is similar to how we relate 2 things to each other based on the given input, with the only difference being that it is mathematically predetermined and unimaginably complex. Though oversimplified, you can think of it as analyzing the input to determine the context of a possible output and building an answer around that context. As one might think, this is not exactly how the human brain works. In fact what we know about the human brain's functionality is rather limited. Based on the information scientists have provided, we know that the human brain handles data by interpreting the infinitely many different sets of signals that roam through the different parts of the brain at different intervals. AI has not gotten this far yet but types of AI have been theorized aiming to express its potential of surpassing the incredibly complex human brain.

Three methods form the technical backbone of AI [14]*:*



Algorithms

Algorithms are simple step-by-step procedures for solving problems. And are usually integrated in simpler forms of AI systems.

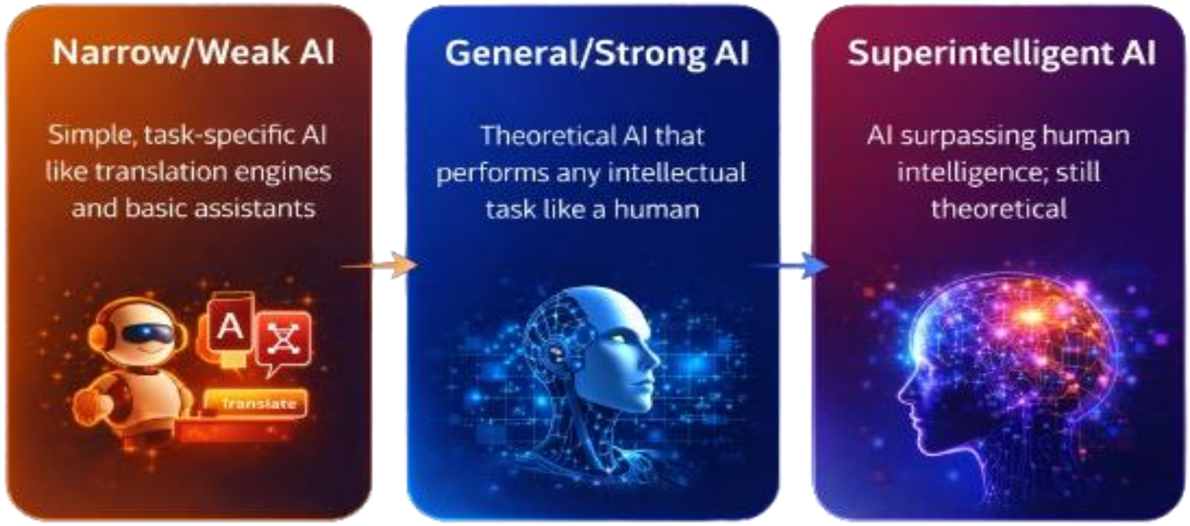
Machine Learning

These are the systems that learn from provided data instead of being explicitly programmed. This type of learning is often used for AI systems that are dedicated to one specific complex task.

Neural Networks & Deep Learning

These are models inspired by the human brain to recognize patterns and improve with experience. Large language models use these models to improve themselves with the data given.

AI can be divided into 3 categories by capability, which are as follows [15]:



Narrow/Weak AI

Narrow/Weak AI systems are considered to be the simplest of the 3 prototypes, as they are basically engines that work with some sort of algorithm to help them recognize and handle data. Translation engines and non-refined AI assistants can be given as examples of the Narrow/Weak AI prototype. These are the types that most people are familiar with and unknowingly use every day.

General/Strong AI

General/Strong AI is basically a perfect human being in the form of a machine. Though still theoretical, this AI prototype would perform any intellectual task a human can, and it works by using a much larger, much more complex database to find a relationship between given data and utilizing its deep learning module to provide better results. As mentioned before, this hasn't yet been achieved, even though some large language models such as ChatGPT, Gemini and Grok have come close to achieving this great feat, there still lies a big barrier ahead of these large language models, as they can perform most tasks at a reasonable level of success; however, their processing method is not yet capable of performing some complex and/or precise tasks.

Superintelligent AI

This type of AI is the one that would surpass human intelligence and step into uncharted territory. Though still theoretical, according to data provided by scientists and OpenAI researchers, AI will have surpassed human intelligence by late 2027. Though this is only a mere prediction, this comes to show just how fast AI is growing.

C. Automation in Manufacturing

Automation in manufacturing refers to the machinery or control systems that are backed up by several digital technologies. This aims to cut down human intervention immensely or – in some cases completely. Furthermore, manufacturing automation has the potential to increase yield and productivity with high precision and consistency while also maintaining top levels of operational efficiency. Automation is far superior to just mechanization because while mechanization only supports humans by physical means, these autonomous machines assist humans by not only replacing physical labor but also overhauling monitoring and control systems.

There are three main types of automation [16]:

Fixed Automation

This type of automation is based around high-volume and ultra-efficient production of a specific, standardized product and thus requires the lowest amount of software/intelligence.

Programmable Automation

Programmable automation allows for the reconfiguration of production processes for different product batches. This is the first stepping stone for intelligence in machinery.

Flexible Automation

This technology allows for rapid adaptation to changing production requirements fairly quickly, mostly via the extensive use of AI.

The first of the core components of most automation systems is **sensors**. Sensors are mandatory for 3D data gathering from the manufacturing environment. Sensors act much like the eyes of autonomous machinery. Next comes the **software**: through artificial intelligence, the information gathered is processed and the physical actions are coordinated. This acts like the brain of autonomous systems. Then, **actuators** take the spotlight. They interpret the output of the software and execute physical actions based on the given command. These act like the hands of AI-backed machinery. [17]

To sum it all up, with all these rising technologies, integrating automation within the manufacturing sector has transitioned from a mere luxury to a fundamental pillar of industrial progress, offering a myriad of economic and operational advantages. These autonomous systems are designed for continuous operation, which drastically amplifies production yield and compresses manufacturing timelines, allowing for an agile response to fluctuating market requirements. By effectively eliminating the inconsistencies within human labor, such technology bolsters product reliability and precision through sophisticated, high-tech monitoring protocols. While the initial financial barrier for these advanced tools remains high, they eventually lead to significant cost reductions by mitigating material waste, maximizing resource efficiency, and utilizing predictive maintenance to prevent costly system failures. Furthermore, these machines significantly improve employee safety by replacing humans in high-risk environments and taking over monotonous or physically exhausting duties. The advent of flexible systems also permits timely adaptation to custom orders and seamless shifts between different production lines. [18]

D. Rise of AI in Manufacturing & Industry 5.0

AI manufacturing refers to the usage of Artificial Intelligence technologies and machine learning to analyze data, optimize operations and streamline the manufacturing process. With the rise of AI technology, it is inevitable for the manufacturing sector to adopt the innovations it brings with it. AI manufacturing is not a far-away hypothetical future, but one that is emerging right now.

For instance, a study done by NIST found that 46% of manufacturers in the United States use AI in some form, and more than 80% expect to use it in the next two years [19]. Furthermore, the

World Economic Forum guesses that the manufacturing AI market is set to grow to $20.8 billion by 2028. Nearly a $17 billion increase from its value in 2023, which was set at just $3.2 billion [20]. Such data shows us that the rise of AI in manufacturing isn't just inevitable but also extraordinarily fast.

An important term here is Industry 5.0. It is a modern industrial framework that goes beyond efficiency and productivity as sole objectives. It redefines the role of industry as a driver of both economic and societal progress, while leading the green and digital transitions. Building on the core principles of Industry 4.0, it places research and innovation at the service of three core priorities: Human-centricity, sustainability and resilience [21].

1. Benefits of the Integration of AI

The integration of AI in manufacturing holds the potential to have many benefits in the manufacturing process. These benefits include, but are not limited to [20]:

- Increased Efficiency: With the usage of AI systems, production processes can easily be streamlined. This can save time, energy and valuable resources.

- Predictive Maintenance: AI-powered tools can help predict machinery failures before they happen. With this benefit, workplace incidents as well as downtime will be significantly reduced.

- Cost Reduction: Using advanced algorithms and machine learning technology, we can use AI to optimize resource use. This way, we can reduce waste and operational costs.

- Enhanced Safety: AI-driven automation can take over otherwise dangerous and hazardous tasks, which will improve workplace safety by eliminating the risk of human-involved incidents.

- Enhancing Productivity: Using AI-driven automation will allow employees to save time on repetitive work, allowing them to focus on tasks that require more intensive care.

- Ease of Data Reading: AI technologies will be able to easily read through and analyze hundreds of thousands of pieces of data and will be able to make data-driven decisions upon that.

2. Major Challenges and Roadblocks

a. Economic Roadblocks

AI, as an emerging technology, requires vast amounts of financial investment. This leads to our first major issue: the cost of development and adoption. Along with the already expensive investments required to develop Industrial AI technologies, the cost of retraining employees, physical infrastructure as well as the cost of updating digital infrastructure result in the cost of Industrial AI going up remarkably.

This leads into our second issue, which is the high barrier for entry, and the possibility of emerging monopolies because of it. Since the investment, development and usage of early Industrial AI technologies are so costly, the high barrier of entry may cause smaller competitors to fail against the sector giants. This, if not addressed, will inevitably lead into a homogenous and monopolized market. This will result in innovation and development coming to a halt. Because of this, UNIDO should consider what regulatory laws they can enact to ensure a lower entry barrier, as well as what regulations they can enact to keep market competition fair and block monopolies from being established.

b. Ethical and Social Challenges

Although it is impossible to tell to what extent the social and ethical struggle from the integration of AI in manufacturing will affect the world, we can make an educated guess by examining past historical developments of similar significance. This way, we can at least have a broad idea of how much we'll approximately be affected.

First, the threat of unemployment and displacement remains perhaps as the single biggest issue in the public eye. According to a recent Reuters study [22], around 53% of Americans are afraid that AI will take over their jobs. Furthermore, prominent figures in AI like OpenAI's CEO Sam Altman publicly stating that AI will "probably replace most of the jobs people do today," [23] has not helped with the issue's public image.

However, a recent study done by Stanford signals that AI's impact on the job market is actually relatively low, at least as of now [24]. It is also important to note that Sam Altman has walked back on his statement, saying that he was wrong and that his "intuitions were just off." [23]

Regardless, it is incredibly likely that the worst of the crisis has not passed yet. Arguably, the crisis has not even begun yet. As it has happened historically in similar situations, unemployment will most likely spike at some point. UNIDO's goal is to prepare for this hypothetical problem and minimize the crisis. An important term to note here is "retraining," which refers to educating the current workforce to acquire new skills so that they can work alongside AI. Despite it sounding rather simple at first, it is a very expensive and time-consuming process. The retraining process would require extensive audits to test the AI literacy of the current workforce, identify the training program and then teach workers everything extensively, from basic AI terminology to repairing AI tools. Despite the retraining process being extremely unpredictable and expensive, it may be one of the best methods we have to ensure a safe and easy transition for workers and to fight with unemployment and displacement.

Another problem to be aware of is the inequality between developed and developing countries, which is one of UNIDO's core mandates. The advantages that developed countries have over developing ones in integrating AI into manufacturing risks increasing the already vast socioeconomic gaps. While developed countries can freely invest in and develop AI technologies, or create new infrastructure; developing nations have to rely on their pre-existing infrastructure and developed nations to advance and share AI technologies.

If this problem is not addressed, we risk increasing the already large socioeconomic gap between developing and developed countries. Namely, this will cause three immediate issues for both ends of the spectrum: erosion of comparative advantage, brain drain, and humanitarian crises based on mass immigration. Firstly, most developing nations use cheap labour as the driving force for their economic growth and as the central incentive for foreign investment. Automated labour with the integration of AI risks getting rid of the primary incentives of developing economies, leaving them stranded. Secondly, brain drain from developing nations to developed nations will increase substantially, creating a lack of professional and educated individuals in developing nations. And finally, as a consequence of all of these problems, mass immigration will most likely occur, which has the potential to create a major humanitarian crisis.

c. Legal Issues & Regulations

The integration of AI in manufacturing comes with a myriad of legal problems. A lot of these problems boil down to the fact that a lot of these developments are new, and that therefore, we don't have any existing legal frameworks for them. Your responsibility will be to establish these frameworks. There is a large spectrum of unanswered legal questions, some of which are:

- Liability and Negligence: If a decision made by an AI-driven system were to fail and injure a human employee, who would be held legally responsible? Would it be the owner of the company the AI worked for, or perhaps the company that trained the AI model?

- Intellectual Property and Data Collection: Industrial AI often relies on large operational datasets on the internet, which often contain copyrighted content. Do the owners of the copyrighted content have a right to sue, since they own the content?

- Owners of AI-Generated Content: Suppose an AI system created a five year top secret plan for a company, who would own this plan? Would it be the company who needs the plan, or would it be the company who owns the AI? Essentially, are companies who provide the AI system entitled to the content generated by that AI?

- Who is Responsible for Worker Protection?: Who is meant to protect workers who may be displaced because of AI? Should it be defined by international or national law? Should the state or private companies have a responsibility in ensuring the retraining of personnel?

Regardless, there are a lot more legal questions we may ask. Like, as another example, we may attempt to develop legal frameworks to protect the economies of developing nations. This section remains perhaps as the most relevant section for the regulatory part of your agenda item.

VI. International Frameworks

Since AI is a new and emerging technology, there has been a lack of internationally adopted global frameworks. The ones that have been implemented (or are being planned to be) are often firsts of their kinds.

For instance, one of the most important frameworks is the EU AI Act. It is officially in force as the world's first comprehensive legal framework governing AI. The EU AI act uses a risk-based regulatory model, in which AI technologies are split into four categories depending on their risk levels. The four categories are "unacceptable risk," “high risk,” “limited risk” and “minimal risk.” [25]

As the first of its kind, the EU AI Act will pave the way for future regulations. For example, future international AI regulatory laws and systems established by UNIDO can use a similar tiered structure. This can help to create a distinction in the different types of AI technologies used in manufacturing.

Another important example is the OECD AI Principles. They are non-binding standards for AI. They are also the first intergovernmental standard on AI. They were first adopted in 2019 by 42 countries and were last updated in 2024. The OECD framework splits into two distinct sections: ethical principles for AI actors and actionable recommendations for governments [26]. Similar non-binding recommendations supported by the UNIDO can help developing countries especially. Also the creation of international ethical principles may be an important step in combatting the possible social and ethical challenges that may emerge with Industrial AI.

VII. Recent Developments

A. Strengthening of Industrial Cybersecurity

Over the last couple of years, some crucial developments surrounding the agenda were made and cybersecurity is far from left out. As technology kept rising, so did the cyberattacks, especially in the form of **ransomware**. Ransomware is a malicious software that takes over a computer or some files, demanding money if one wants back access, and as factories become increasingly connected, they have become attractive targets for cyberattacks and ransomware. This combined with the fact that Operational Technology (OT) security is becoming as important as Information Technology (IT) security, and the need for secure AI deployment, forced governments to introduce more regulations and standards for cybersecurity. E.g. EU **NIS2 Directive, NIST Cybersecurity Framework,** and **IEC 62443 industrial cybersecurity standards.** [27]

B. Emergence of Smart Factories

Smart factories implemented AI to optimize production in real time, predictive maintenance reduced downtime, collaborative robots started working alongside humans. Through these, factories have reached the next milestone. Alongside these advancements the technology called **Digital Twins** got to the top of the world's agenda. Via this, manufacturers can create virtual replicas of any section of the productive workflow, including entire factories, and test all the production schedules, equipment, algorithms, energy consumption data, and most importantly, factory layouts. Aside from that, **Edge AI** technologies also lended a helping hand in the emergence of smart factories. The concept of Edge AI implies the AI models' independence from remote servers. If it had not been for Edge AI, each unit that has AI integrated would need to send to and receive data from external AI servers, which would take some time and a lot of computing power. AI models now run on industrial cameras, PLC's (Programmable Logic Controller), embedded controllers, etc. [28]

C. Increase of Public and Private Investment in Smart Manufacturing

"You can't build a great building on a weak foundation. You must have a solid foundation if you're going to have a strong superstructure." [29]

– Gordon B. Hinckley

In this sense, if AI is the building then the investment in AI is the foundation of it. Thanks to industrial modernization programs, digital transformation grants, and national AI strategies some government investment heavily supports development. Alternatively, private investment is vital for the development of specific AI models through industrial robotics, factory automation, initiation of AI and so on. [30]

Several examples can be found and here are some of them:

Government initiatives

- EU Industry 5.0 initiatives
- Germany's Industrie 4.0
- U.S. CHIPS and Science Act
- China's Made in China 2025

Private companies

- Siemens
- FANUC
- NVIDIA
- Microsoft

- Amazon

D. Rapid Advancement of Generative Artificial Intelligence

The backbone of smart factories are AI models, and they evolved in a way that allowed them to do most things a human could. Some improvements were mandatory should the AI malfunction or should any variable within the loop differ, and these improvements are as follows. AI stepped foot in the design field; generative and predictive design assisted by CAD (Computer-Aided Design) optimization exceeded expectations. AI copilots helped engineers refine their work and automatic programming models began generating their own PLC's and manufacturing documentations. And lastly, it got much better at knowledge management which, at this point, allowed it to ditch the need for human intervention. [31]

However, it is not all sunshine and rainbows since although generative AI significantly lowers barriers to industrial innovation, its widespread adoption raises new questions regarding accountability, intellectual property, cybersecurity, and the reliability of AI-generated decisions.

VIII. Bloc Positions

A. Developed Economies

Here are some countries with developed economies:

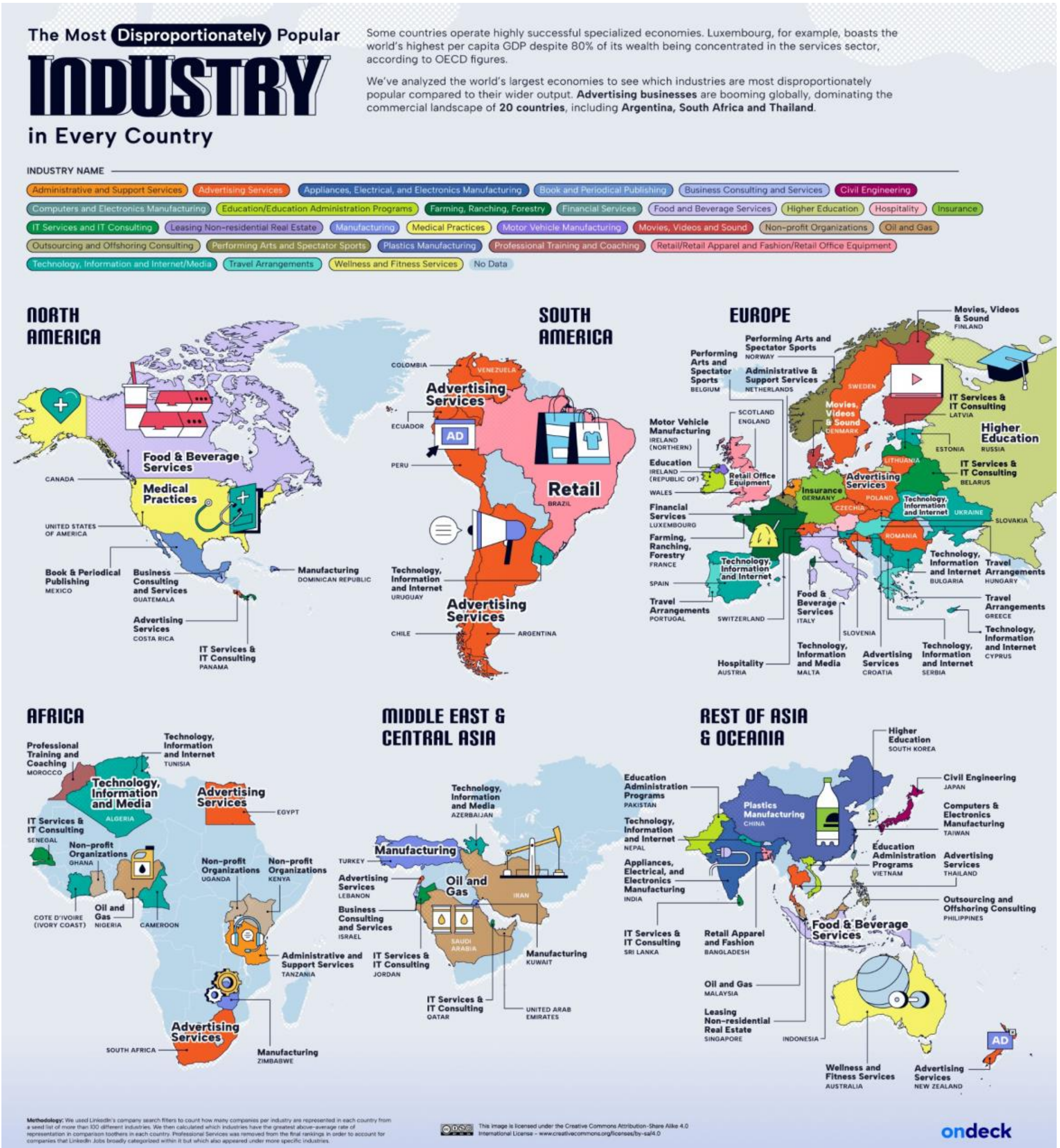
- **Australia** has a high-income economy with advanced technology and industry.
- **Austria** is highly industrialized and technologically advanced.
- **Belgium** stands as an advanced, high-income European economy.
- **Canada** benefits from a highly developed economy featuring advanced manufacturing and technology.

- **The Czech Republic** possesses an advanced industrial economy with a strong manufacturing sector.
- **Denmark** is highly developed and recognized as a technological leader.
- **France** remains a major advanced economy with extensive industry and technology sectors.
- **Germany** stands as a major industrial and manufacturing power.
- **Greece** is considered a high-income, developed European economy.
- **Ireland** possesses an advanced, high-income economy with a major technology sector.
- **Italy** remains a major advanced economy with extensive manufacturing capabilities.
- **Japan** is widely recognized as a global leader in technology, robotics, and manufacturing.
- **South Korea** stands among the world's highly advanced economies and is a major technology manufacturer.
- **The Netherlands** possesses an advanced economy with major technological, industrial, and trade sectors.
- **Norway** combines an extremely high-income economy with advanced infrastructure and technology.
- **Singapore** serves as a major global financial and technology hub.
- **Spain** remains a major advanced European economy with diverse industries.

- **Sweden** stands out as a highly innovative economy with advanced manufacturing and technology.

- **The United Kingdom** maintains its position as a major advanced economy with strong technology, finance, and industry sectors.

- **The United States** possesses the world's largest advanced economy and remains a global leader in AI and technology. [32]



B. Emerging Economies

As for emerging powers, it goes as follows:

- **Türkiye** serves as a major emerging economy with a diversified industrial sector and a growing interest in advanced manufacturing and artificial intelligence.

- **India** has one of the world's fastest-growing major economies and is rapidly expanding its manufacturing, technology, and AI sectors.

- **Mexico** is a major emerging economy with a strong manufacturing sector and plays an important role in North American and global supply chains.

- **Indonesia** is one of the world's largest emerging economies and is rapidly expanding its manufacturing and technological sectors.

- **Vietnam** has become an increasingly important global manufacturing hub, particularly in electronics and technology production.

- **The Philippines** is an emerging economy with a growing electronics manufacturing sector and an expanding technology industry. [32]

C. Under-Developed Countries

Finally, the least developed countries:

- **Cambodia** remains heavily dependent on developing industries and faces limitations in technological infrastructure and access to advanced manufacturing technologies.

- **Nepal** faces significant challenges in industrial development, technological infrastructure, and access to the resources required for advanced manufacturing.

- **Uganda** continues to develop its industrial sector while facing limitations in infrastructure, investment, and access to advanced technologies.

- **Myanmar** possesses developing industrial capabilities but faces major challenges regarding infrastructure, technological development, and economic stability. [32]

IX. Points a Resolution Should Cover

The topic of regulating AI and its integration in manufacturing is a vast one. Therefore, there are many points that must be addressed. However, it is important to note that these must be addressed in a way that adheres to UNIDO's core principles of fostering inclusive and sustainable industrial development, promoting a fair global economy, and driving progress that actively reduces poverty and inequality.

Here are some of the aforementioned topics that must be addressed as clauses:

- Acknowledge the rapid expansion of AI in manufacturing and name its key benefits.
- Recognize the past parallels between past industrial revolutions and Industry 5.0 to identify recurring problems.
- Identify the main threats, which are worker displacement, the massive barrier to entry, extreme market concentration, and severe shock to unprepared economies.
- Deliberate upon the creation of a clear and universally recognized definition of AI manufacturing.
- Recognize the importance of Industry 5.0 and debate upon its core principles of human-centricity, sustainability and resilience.
- Draw lessons from existing regulatory frameworks (such as the EU AI Act) to establish UNIDO's own regulatory model.
- Address how high capital concentration may lead to a monopolized market and create regulations to ensure market competition remains.

- Deliberate on ways to lower the high barrier of entry for smaller competitors.
- Propose non-binding guidelines and road maps for smaller competitors to adopt AI without facing overwhelming legal or compliance costs.
- Address the threat of unemployment and displacement with methods like retraining.
- Create policies that ensure a safe and comfortable transition for workers.
- Call for legal frameworks that clearly assign accountability and responsibility when it comes to property damage or workplace injury.
- Assign intellectual property rules for AI-made objects
  .
- Emphasize the risk that developing nations face, whose economy often relies on low-cost labour, which are extreme capital flight and industrial disruption.
- Debate on economic buffer measures to protect the economies of developing countries and to avoid increasing the North-South divide.
- Address the lack of international frameworks and regulations.
- Develop appropriate international frameworks and regulatory guidelines.
- Seek a balance between maintaining technological improvement and global ethics.
- Address ethical concerns regarding automation in manufacturing.
- Mention cybersecurity regarding its increase in relevancy.
- Acknowledge the absence of AI technology in underdeveloped countries.

- Touch on the four industrial revolutions and how they affected the globe.

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