Society 5.0 as a Contribution to the Sustainable Development Report

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Abstract. In this work, we intend to understand the context of Society 5.0 in business and deepen its potential for proactivity in the Sustainable Development Goals, as well as potential implications on accounting and sustainability reporting, based on recent publications. Taking into account that the changes imposed by the 4.0 industry are comprehensive, it becomes relevant to understand the current impacts and future expectations of this evolution with cross industry 5.0.

In a Society 5.0 it is intended that all citizens get dynamically involved, introducing digital technologies in a variety of systems and accelerating their implementation. It is thus proposed to deepen the concept and the potential of the individual-technology relationship in the promotion of their quality of life enhancement and that of society’s, in favors of sustainable development, sustainability and its reporting.

For this reason, it is a contribution that seeks to collaborate in this very urgent and necessary discussion, presenting its evolution. It is concluded that Industry 4.0, and recently the so-called 5.0, have come to stay and put artificial intelligence, robotics, big data, etc., at men’s service, in which everything will be connected and society will have to be adaptable.

Keywords: Accounting · Agenda 2030 · Industry 4.0 · Society 5.0 · Sustainable development · Sustainability reports

1 Introduction

We are in a challenging era of uncertainty, with increasing levels of complexity in the world, which increasingly faces global challenges such as depletion of natural resources, global warming, growing economic disparity and terrorism [1].

Today’s globalization faces the challenge of meeting the growing world demand for capital and consumer goods while ensuring Sustainable Development (SD) of human existence in its social, environmental and economic dimensions (Triple Bottom Line) [2].

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Moreover, due to the rapid growth and change of digital technologies and Artificial Intelligence (AI) based solutions, it is increasingly difficult and challenging to be at the top [3].

The rapid evolution of Information and Communication Technologies (ICT) is bringing dramatic changes for society and industry. Successive industrial revolutions demonstrate that manufacturing systems and strategies have been continuously shifting towards higher productivity and efficiency, often discouraging social and environmental aspects. However, technology continues to be developed in order to improve and facilitate human life.

Like Industry 4.0, Industry 5.0 will have an impact on the manufacturing industry and the economy as a whole, both from the point of view of productivity and sustainable value creation, as well as from the economic, social and environmental point of view. In this sense, Social Responsibility and Sustainability are increasingly important in business and organisation discourses [4]. Thus, it is observed that all over the world a growing number of organizations are reporting on their impact, in addition to internal governance mechanisms [5]. There is an emphasis given by organizations to the activity related to the concept of Social Responsibility and to one of its main platforms: the notion of Sustainability, in particular of SD [6]. Businesses should therefore integrate sustainability principles into their corporate processes and strategic policies, as sustainability affects Triple Bottom Line\(^1\) (TBL) and the long-term profitability of an organization [7]. Hence there is a growing importance of boosting ICT as an effective and efficient means of solving problems in society [1].

This article aims to understand the context of Society 5.0 in business and to deepen its potential for proactivity in the Sustainable Development Goals (SDOs\(^2\)), as well as potential implications in accounting and sustainability reporting. For this purpose, it is necessary to analyze the current changes and future perspectives of the industry 4.0 and the evolution to the industry 5.0 from the reflection on different studies. This paper is a theoretical essay on the subject. Therefore, from the reflection on all the studies listed, a panorama of changes and perspectives arising from industry 4.0 to industry 5.0 is presented.

The article begins with the development of the theoretical framework. It deals with the Brudtland report until the 2030 agenda, the SDOs for Sustainability in Industry, Industry 4.0 and finally Industry 5.0. It ends with a conclusion.

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\(^1\) This term was introduced in 1997 by Elkington for the disclosure, in a single report, of tripartite results: economic dimension, environmental dimension, and social dimension.

\(^2\) SDOs is the model for achieving a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice (Transforming our world: the 2030 Agenda for Development Sustainable Development - A/RES/70/1 - UNITED NATIONS. Accessed at: https://sustainabledevelopment.un.org/post2015/transformingourworld/publication).
2 Literature Review and Theoretical

2.1 Background

Social responsibility was defined in the green paper (2001) by the European Union as a concept according to which organizations decide, voluntarily, to contribute for a fairer society and a cleaner environment, which should be seen as an investment and not as a burden. It also states that most definitions describe Corporative Social Responsibility (CSR) as a voluntary integration of organizations’ social and environmental concerns in their operations and interactions with stakeholders [8–10].

Over the last decade, governments have introduced CSR into public policies as a priority issue, encouraging organizations to act more responsibly and sustainably [9]. CSR is founded on the notion that corporations have relationships with other interests, for instance, with economic, cultural, environmental, and social systems because business activities affect—and are affected by—such interests in society [11]. So, since the introduction of the Coalition for Environmentally Responsible Economies (CERES) Principles in 1989, sustainability reports have been the main tool companies use to show the outside world their social responsibility [12].

With the epic global challenge of countries’ inequalities in the face of successive industrial revolutions, concepts such as sustainability and social innovation emerged and quickly attracted global attention as possible resolutions. The United Nations global initiative for SDOs sent a strong message of commitment to inclusive economic and social development [13].

Organizations adopting sustainability as part of their corporate culture explore TBL as part of their business strategy and simultaneously create value for all their stakeholders [14]. A citizen’s organization develops sustainable products and services and assesses its own contribution to society and the planet.

Thus, social responsibility practices have stimulated several debates, especially when related to the use of new ICTs highlighting and promoting sustainability in industry. However, sustainability must be incorporated throughout the organisation, i.e. in its own strategy, even though it is difficult to balance innovation and sustainability resources on an ongoing basis, particularly as regards the introduction of new technologies [15, 16].

Adopting sustainability in business implies incorporating ODS, such as social equity, economic efficiency and environmental performance, into company operating practices. Companies competing globally increasingly need to commit to and report on the overall sustainability performance of operational initiatives [17].

We can state that the broader context of corporate sustainability is implicit in the development of Industry 4.0 and the technologies related to the evolution of the production process and industry.

2.2 Sustainable Development: From the Brundtland Report to Agenda 2030

The SD was presented in the Brundtland Report, published in 1987, as a guarantee of the satisfaction of the needs of humanity, without compromising the ability of future
generations to meet their own needs [18]. It was with this report, under the title “Our Common Future”, that the concept and essence of sustainability or SD was popularized and became increasingly relevant in the agenda of corporate executives [19]. In this context, the European Union (EU) published the Green Paper, initiating a broad debate on how the EU could promote Social Responsibility at European and international level [10]. As a result, new societal relations in the contemporary world, such as globalisation, technological advances, political changes, accelerated economic growth and rapid information processing, have had major impacts on society. Therefore, governments and companies have sought to practice their activities in a sustainable manner, reconciling the responsibility to promote solutions that meet the needs of a population without compromising resources for future generations [20].

The SDGs, launched at the United Nations Summit on Sustainable Development in 2015, adopt a universal approach of the SD agenda [21]. They introduce a new era of global development goals aimed at addressing the world’s most pressing problems. Thus, there is a growing recognition of the value of corporate non-financial reporting, making transparency a new paradigm for conducting business [22]. SDGs promotes transparency and corporate responsibility [23].

SDGs explicitly asks companies to use creativity and innovation to address development challenges and to recognise the need for governments to encourage sustainability reporting [21]. Businesses can play a critical role in achieving SDGs [24]. The SDGs integrate a broad and transformative agenda that adequately reflects the complex challenges of the 21st century and the need for structural reforms in the global economy [25].

With the new Global Commission on Business and Sustainable Development, the role of businesses in achieving SDGs has become even more pronounced and the Global Reporting Initiative (GRI) has advocated a strong private sector role in achieving the SDGs adopted in September 2015 [26]. By adopting Agenda 2030 as their 17 SDGs, United Nations member states created a framework for national action and global cooperation on SD [27]. Portuguese companies covered by Directive 2014/95/EU may use national or international systems to provide non-financial information. Among these we highlight the Global Initiative on reporting, the so-called GRI [28].

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3 In the area of accounting and sustainability reports, the terminology for these communication and disclosure reports varies greatly. We may have reports with the following titles: social and/or environmental, corporate social responsibility, sustainable development, towards sustainability, among others. As it is stated in the GRI (2006), the expression “sustainability reports” is inclusive and is considered a synonym of other words and terms used to describe the communication of the economic, environmental, and social impacts, that is, triple bottom line, corporate responsibility reports, and so on.

4 The Global Commission will bring together business, labour and civil society leaders, and articulate and quantify the compelling economic case for companies to become involved in achieving ODS.

5 GRI is an independent international organization that has been a pioneer in corporate sustainability reporting since 1997. GRI’s mission is to empower leaders worldwide, through its sustainability reporting standards and multi-stakeholder network, to make decisions for the planet and a more sustainable economy.
According to Vukić et al. [29], with Directive 2014/95/EU on non-financial reporting, there has been a rapid increase in the volume of regulations and standards requiring transparency on environmental, social and governance issues. Following Agenda 2030 for SD and its 17 SDGs, a broad and transformative agenda is incorporated that adequately reflects the complex challenges of the 21st century and the need for structural reforms in the global economy [1, 25]. However, the “2019 Sustainable Development Goals Report” demonstrates progress in some critical areas, and countries are taking concrete actions to protect our planet. A response is needed to trigger the social and economic transformation needed to meet the 2030 targets [30].

The GRI is mobilizing companies to understand and contribute to SDGs, helping them to align the overall picture with guidelines on how to put them into practice. The GRI is the bridge between businesses and government, enabling both to contribute positively to UN SDGs [21]. In this sense, it helps governments to understand the contributions of businesses to the goals while monitoring progress and helping them to report and take action to achieve SDGs. The GRI helps organizations to emphasize the SDGs approach in their G4 reports [26].

Benefits for companies to engage in SDGs include significant economic rewards through new markets, investment and innovation opportunities, reduced risk and resource competition, and a future with inclusive and sustainable growth and job creation [26].

Thus, GRI, the United Nations Global Compact and the World Business Council for Sustainable Development (WBCSD) have developed a document that establishes the connections between SDGs, the business theme and GRI indicators. This document links SDGs to the indicators of the GRI G4 Sustainability Reporting Guidelines and sector disclosures [31].

SDGs is a challenge to be achieved in a broad system in which all nations work together for a sustainable world that expects to achieve economic development and solutions to social issues. The main guiding principle is to achieve peace and prosperity for all people and for the planet, responding to challenges with an inclusion that “leaves no one behind” [1, 32].

The Agenda 2030 SDGs apply equally to all countries in the world and have 17 indivisible and self-sustaining objectives, which aim to serve as a basis for the transformation of global economies towards SD. This transformation process must be built on economic development in accordance with social equality and within ecological limits. Thus, the three-dimensional or three-pillar model (TBL) approach is commonly used to structure the fields of action for a fundamental and integrating SD [33].

### 2.3 SDGs for Sustainability in Industry

SD has been increasingly central to the world’s economic policies due to the various challenges related to limited resources, rapid population growth, industrialisation and globalisation faced by humanity. In this sense, these challenges lead to the emergence of new paradigms centralized in industrial organization, that is, with an intrinsic focus on resource efficiency and greater social responsibility, such as Industry 4.0 or more recently Industry 5.0, aligned with the conquest of sustainable companies, which is one
of the main aspects to achieve SD in the contemporary era and disseminate the principles of sustainable production [18].

Bonilla et al. [34] consider that only through the integration of Industry 4.0 with SDGs in an eco-innovation platform can environmental performance be guaranteed. Although the industry contributes to social welfare by providing high quality products, adapted to human needs, and ensuring other suitable working conditions for employees, the current production pattern is not environmentally sustainable.

Since the year 2010, the so-called fourth industrial revolution (Industry 4.0) and an additional technological evolution of production systems can be observed. Industrial organizations, as key stakeholders for a global SD, need to shift to a new paradigm that emphasizes sustainable value creation. Industrial value creation has undergone radical changes in recent years and this can contribute, in many cases, positively to a global SD. On the other hand, growing socio-economic inequality, climate change, increasing environmental degradation, urbanization and growing cyber dependence can be highlighted as some relevant and negative global trends [33].

The guiding principle of Industry 4.0 was not initially focused on providing solutions to the ecological problems faced by production, but on increasing productivity, growth renewal and competitiveness. However, in this complex scenario of pressure from global environmental challenges, Industry 4.0 emerges from the synergy of the availability of innovative digital technology and consumer demand for high quality, customised products [34]. The concept of sustainable industry aims to create manufactured products that meet their designed function throughout their life cycle, causing a managed amount of impacts on society and nature, while delivering the proposed socio-economic value. Thus, the issue of sustainability in production processes has become one of the main challenges industries face in the contemporary era [18].

Thus, we consider that industry 4.0 brings up new opportunities and as these new opportunities arise, they increase the relationship between sustainability and technology, as companies increase their profitability by eliminating inefficiencies in the manufacturing process. On the other hand, they make optimal use of existing and available resources to create value in the supply of products and services to consumers, reinforcing the idea that sustainability is more economical.

The main objective of society is to ensure the integration of technological developments into society. So, instead of fearing technology, this is meant to support and cooperate with life in society [32].

**Industry 4.0**

Digital transformation is an industrial policy pillar in many countries and will create new values [1]. In this age of digitalization, with the rapid development of technology, the term Industrial Revolution 4.0 or Industry 4.0 becomes a terminology that is a reference for research and development in technology in various sectors [35].

The concept of Industry 4.0 originates from Germany, 2011, and is a strategic initiative of the German government that traditionally strongly supports the development of the industrial sector, in which it is a global leader, as an action to sustain Germany’s position [36]. It aimed at developing technologies in industries, aiming above all at increasing competitiveness through “smart factories” [2, 32, 37, 38]. This concept includes a variety of concepts and technologies related to the organization of
the value chain, that is, it encompasses the main technological innovations related to automation, control and information technology, applied to the means of production [18, 39].

Industry 4.0 can also be perceived as a natural transformation of industrial production systems triggered by the digitalisation trend. Industry 4.0 is often considered a disruptive technology that will pave the way for a new generation of industrial manufacturing systems that will be completely different from the existing ones [36, 39].

According to the Report “The Future of Jobs”, the emergence of the Internet of Things (IoT) is the great divisor and promoter of the new industrial revolution. Artificial intelligence and robotics with automation will be added to IoT, thus complementing the tripod that will serve as the engine for the rapid advancement of the 4th industrial revolution [40]. This relationship was crucial for the growing use of technologies at the service of industrial development, becoming indispensable. In this sense, industry 4.0 is an increasingly constant reality in the world economy, especially in more developed countries, where it is recognized both as a way to generate new businesses and to make economies more competitive through high productivity at low cost [2]. All this reinforces the importance of analysing its socio-economic consequences, with enormous technological, commercial, social and other implications of the value chain [41].

However, the report - “The Future of Jobs” - of the WEF [40] considered that the new production models that started within the so-called “industry 4.0”, will also have an impact and application in trade and provision of services, causing a drastic change in the labour market and in employment relations, giving rise to the idea of job cuts or even the disappearance of professions. However, this position is not unanimous and Gorecky et al. [42] consider that Industry 4.0 does not meet a reality of production without a worker. The individual characteristics of people should be taken into account as part of the cyber-physical system in order to optimize production to the maximum. The yield is higher if Man and Machine work in close articulation. Thus, from this interaction the human being assumes the power of decision, as the controlling and supervisory entity, being able to monitor the production on site or at a distance. On the other hand, IoT offers the opportunity for innovation, requiring skilled workers who are able to plan, monitor and supervise the manufacture of processes and facilities [2].

Akhter e Sultana [43] show in their paper that technology will not vanish the accounting profession, rather reshaping with new and challenging responsibilities. Advancement in machine learning, AI and robotics are also contributing to the overall development of the profession. As technologies are widening the scope of this profession, accountants need to be more adaptive and improve their skills to keep pace with machine. Need to work hand in hand to survive at the age of the fourth industrial revolution.

Kruskopf et al. [44] present in your paper the technological disruptions shaping accounting and auditing fields and also at how they might influence future jobs and required skills. Many organisations still do not know how the Industry 4.0 impacts their business and such as how to find the right talent and knowledge to know how to adopt to the changes. However, the future of the accounting and audit professions are changing. These will perform higher value work, while transforming into more advisor roles in finance and business, with more specific expertise focusing their brain power
on more fulfilling tasks. To Melnyk et al. [45], highlight in their study the trends that positively impact business growth until 2022, according to the report “The Future of Jobs”, demonstrating how disruptive technologies will be accelerated until 2025 and how positive and negative impacts on business will grow.

In Portugal, “The Industry Program 4.0 - Phase II”, considers it necessary to act on 3 strategic lines: Generalize i4.0, Enable i4.0, and Assimilate i4.0. Innovation, particularly digitalization and Industry 4.0, which represents the transformation of business models of companies, through the adoption and integration of cyber-physical technologies that allow them to increase their agility, assume a fundamental role in promoting growth and competitiveness of the Portuguese economy” [46, p. 9]. This Programme is “a booster of the National Strategy for 2030, contributing directly to 2 of the 3 cross-cutting priority objectives post 2020”. Industry 4.0 is a potential lever for efficient resource management, circular economy and sustainability” [46, p. 15].

Burritt and Christ [39] seeks to examine how the Industry 4.0 could be used successfully as a basis for improvements in corporate sustainability through greater take up of environmental accounting, with more accurate, high quality, real time and external environmental reporting, in relevant sectors, company sizes, across different management roles and collaborative settings, as well as in supply and value chains.

Morrar et al. [13], use in their study an exploratory approach to discuss how we can face Industry 4.0 not only from an economic but also from a social and environmental perspective. It presents a framework that can facilitate the interaction between technological and social innovation, under the aegis of sustainability, which can leverage economic rewards, enrich society in general and protect the environment, continuously creating proactive, timely and sustainable strategies. New future opportunities will be generated in the next industrial wave and will be gigantic at all levels. These authors design a creative platform for “Sustainable Industry 4.0” that would include experts from different disciplines - including engineers, economists, social scientists, environmentalists, futurists, artists and other creative people - people who can work together as part of this structure and with new solutions.

Khan and Tiwari [47] empirically formulated a mapping between three levels of Industry 4.0 attributes and the material disclosure topics of the GRI framework. They concluded that Industry 4.0 offers dual benefits in the areas of automation and efficiency of operations, and in accounting and sustainability reporting. However, the adoption of new technologies may require continual evolution of technical and training programs with the 4.0 industry maturity for sustainability accounting and reporting in an organization.

Industry 4.0 promises to increase efficiency and flexibility on the one hand, and reduce time-to-market and overproduction on the other. On the other hand, it is closely related to changing workforce skills, data security concerns and expired businesses models. Thus, it has several implications for manufacturers in terms of economic, ecological and social aspects of TBL for sustainable industrial value creation. It requires an extension of TBL, established by three additional dimensions: technical integration, data and information and public context. Only then can IoT achieve added value in the three dimensions of TBL and create competitive advantage [16]. In this sense, IoT often conveys the idea of taking emerging technologies to reduce production costs, improve productivity and promote industrial growth. But it also enables the
transformation of the industrial sector, leading it to more flexible and customized productions for the consumer, quickly responding to their new requests, improving the standard of living of people by meeting their needs.

However, as with all development processes, there are also some anticipated and/or unpredictable problems. The SD process itself is an unpredictable problem and its complexity requires the use of highly capable approaches, such as artificial approaches and intelligence methods. SD is the development of the quality of all aspects of life of the current generation without creating negative impacts on the lives of future generations and, in the combination of TBL, political objectives are also involved.

Melnyk, et al. [45], analyze and explain in their research the economic and social challenges in the process of developing “disruptive technologies” for SD.

Despite the continuous process of transformation through digitalization in Industry 4.0 and the technological developments are growing at a high speed, there are some entrepreneurs already looking to the future of the industry (Industry 5.0), which is becoming part of the business scenario [48].

**SOCIETY 5.0**

Industry 4.0, in addition to its negative impacts, also offers opportunities for those who are prepared to adopt it. This is what presents great challenges for any kind of society and profession and can lead to improvement in jobs. For technology cannot replace the emotional intelligence and critical thinking skills of a human being in the near future. For example, some studies [43, 44, 49–51], address this problem, and some of the studies are in the area of accounting.

Nahavandi [3] states that the only focus of Industry 4.0 is to improve process efficiency by inadvertently ignoring the human cost resulting from process optimization, which increases political and union pressures to improve and increase the number of jobs. But this major problem should not neutralize the benefits of Industry 4.0 and proposes that Industry 5.0 be the solution to achieve this goal.

The term “Society 5.0” was created by the Japanese government in January 2016 and was identified as a growth strategy for Japan [1, 35]. Looking at human history, we can define different stages of societies: “Society 1.0”, “Society 2.0”, “Society 3.0”, “Society 4.0” and “Society 5.0” [1, 32, 38]. All these industrial revolutions have resulted in economic growth, increased productivity and advances in the well-being of countries that are able to reap most of their positive impact, including high quality products and services [13].

In view of the dissatisfaction of human resources with the industrial revolution 4.0, Purnamasari et al. [51], they state that in Society 5.0, which represents the 5th form of society in our human history, all aspects of human social life will be facilitated by technology and not only industrial life. Society 5.0 is an idea that explains the revolution in people’s lives with the development of the fourth industrial revolution [35, 38].

While Industry 4.0 focuses on production, Society 5.0 will seek to put human beings at the centre of innovation, connecting the impact of technology and the results of Industry 4.0 with the deepening of technological integration in improving quality of life, social responsibility and sustainability [38].

“The Society 5.0 was first beginning to reveal the causes of Industry 5.0 name, it is located in ensuring the integration of technology with social life” [32, p. 32].
Thus, Industry 5.0 will increase collaboration between humans and intelligent systems like robots, especially in manufacturing, where machines take on all the monotonous and repetitive tasks while humans take the creative side to take on more responsibility and more supervision of systems to raise the quality of production in general [48].

The goal of Society 5.0 is to create a society centered on the human being, where both economic development and the resolution of challenges of social issues are achieved and people can enjoy a high quality of life, life to the full, fully active and comfortable [1, 38].

The vision of individuals Japan Society 5.0’s in terms of economic development aims to solve the social difficulties of building a society focused on the human-centered, achieving quality of life. The main goal of the 5.0 society is to ensure the integration of technological developments into society. So, instead of a fearful and technological society, it aims to create a society in cooperation with its life [32].

Industry 5.0 will enter daily future businesses due to the speed of further technological development and the changing integration of the human process [48]. This will revolutionize manufacturing systems worldwide and bring unprecedented challenges in the field of interaction. Industry 5.0 will increase productivity and operational efficiency, reduce work injuries, shorten production time cycles and remove dirty and repetitive tasks from human workers wherever possible [3]. There will be convergence of technological developments - AI, robotics, automation, big data and the IoT - with society to make people’s lives easier [35].

The work of Nahavandi [3] presents the challenge of the Industry 5.0 concept, in which robots are interconnected with the human brain and work as employees instead of competitors. Thus, productivity will continue to increase without imposing punitive challenges on the economy: without removing human workers from manufacturing.

A new ecosystem of customized robotic hardware and software solutions will be created around the world by start-up companies. This will have a direct impact from Industry 5.0, which will further boost the global economy and increase cash flow worldwide. Unlike immediate intuition, Industry 5.0 will bring more people back to the workplace and improve process efficiency. It will create more jobs than it takes [3].

It is essential to leverage ICT to the fullest to obtain new knowledge and create new values by making connections between “people and things” and between “real and cyber” worlds, providing better living conditions for people and sustaining healthy economic growth. The challenge is to include various stakeholders at various levels to share a common vision of the future [1].

The study by Purnamasari et al. [51] shows that some student communities are still lagging behind to face the new digital age professionally. Faruqi [35] considers that to achieve a large-scale revolution of Society 5.0 it is required quite strong human capital. The quality of human resources is crucial in forming an integrated system. Only with strong technological capabilities and skills, in their respective fields, is it possible to exercise one’s profession digitally, helping to provide better services to the community by simplifying work and human life.

For Ferreira and Serpa [38], the cyber-physical world will cooperate and work side by side with the human world. However, this future can only be viable with the emergence of bold new research to catalyze interdisciplinary social and hard sciences and engineering, as these convergences are necessary to form human technology
partnerships that provide a sustainable world. Society 5.0 is a proposal for human and social development with respect to sustainability.

The work of Özdemir and Hekim [52] describes that Industry 5.0, despite using the open and hyper-connected global IoT network, is ready to move towards a symmetrical design of a sustainable and responsible innovation ecosystem in the digital age, taking advantage of extreme automation and big data with safety, innovative technology policy and responsible implementation science, enabled by 3D symmetry in the innovation ecosystem design.

Paschek et al. [48] analyze and evaluate the business impact of the upcoming Industrial Revolution, called Industry 5.0 and stress the assumption that the company has not yet recognized the upcoming Industrial Revolution due to the lack of entrepreneurship and transformation capacity related to Industry 4.0.

The Fifth Industrial Revolution will emerge when its three main elements - intelligent devices, intelligent systems and intelligent automation - fully integrate into the physical world in cooperation with human intelligence [3]. Although Society 5.0 is Japan’s growth strategy, it is similar to other countries and can contribute to solving similar challenges around the world and contribute to the achievements of SDGs as their challenges are the same [1, 32].

The basic foundation of Society 5.0 is the principle of balance, of alignment between economic development and the resolution of social problems. This is related to the 17 global goals of the SDGs, which are currently the goals to be achieved globally by the community to solve global problems. Therefore, there are future services in new sectors that are expected to be used by the community, maximizing the potential for technological development [35]. See Fig. 1.

**Fig. 1.** Society 5.0 for SDGs (Fonte: https://www.keidanren.or.jp/en/policy/csr/2017reference2.pdf).
Industry 5.0 “accentuates clear change from mass automation to the process of enhancing capabilities of human workers for achieving personalisation by product customization to the next level [48, p. 131].

3 Conclusion

Throughout the article the evolution of the industry over time and its relationship with the symmetric project of a sustainable and responsible innovation ecosystem in today’s digital age was mentioned.

Take the current pandemic – covid.19 - which has involved the governments of all countries in common goals, in the face of the unexpected. The unpredictability of this pandemic essentially causes social and economic problems, fundamental to the SD. However, IoT is a great ally since it allows dynamic and proactive decisions in real time, in response to the rapid changes imposed by crisis circumstances. On the one hand, this crisis is leveraging IoT worldwide, with concentrated efforts of Governments, Academics and Associations. On the other hand, it is leading to growth in the recruitment of specific areas: automation, intelligent systems, big data, digitalization, cloud computing, process engineering, preventive maintenance, logistics and continuous improvement. This whole process will have huge implications associated with large investments, for example, in the main technologies of IoT, skilled workers and innovation of the businesses model. And a conclusive assessment of profitability remains uncertain, mainly due to limited financial resources.

Never before has SD been so present in the policies of major governments, playing a key role in the development of human societies. In this sense, we consider that industry 4.0 has been the evolution of industrial production systems that ensure various benefits for industries, including cost reduction, increased safety and quality and improved process efficiency. Nowadays “Work from Home” and Industry 4.0, or who knows 5.0, have come to stay and put AI, robotics, big data, etc.at men’s service, in which everything will be connected and society will have to be adaptable.

The community must take advantage of the synergies of Industry 4.0 and Industry 5.0, which came to revolutionize society, by improving the quality of life in the community, and mobilizing the productive and technological potential that the Industry offers in our personal and professional lives.

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