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An Evaluation on the Relationship of Society 5.0, E-Government Applications and Artificial Intelligence

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ABSTRACT

The Fourth Industrial Revolution (4IR), often referred to as Industry 4.0, is swiftly advancing due to the widespread adoption of innovative artificial intelligence (AI) technologies and applications. The potential for significant advancements in operational efficiency, cost reduction, and overall effectiveness within business processes is undeniable. This paradigm shift holds the promise of not only reshaping socioeconomic frameworks, but also addressing global challenges like climate change, resource scarcity, pandemics, and health crises. Nevertheless, the global integration of AI practices brings to the fore a spectrum of risks, queries, and obstacles concerning human values, fairness, decision-making, privacy, security, and accountability. In the face of such challenges and threats, it becomes imperative to devise and uphold fresh principles of AI ethics. This entails establishing guidelines for the responsible use of AI technology, ensuring its vigilant supervision, and effectively channeling its enhanced cognitive capabilities. These measures are crucial not only for progressing towards Society 5.0 but also for ushering in an era of intelligent governance. This study undertakes a comprehensive analysis, encompassing a literature review, sector-specific reports, and logical assessments, aimed at leveraging the potential of AI and 4IR applications. Moreover, the study critically evaluates the essential requisites for informed decisions within smart societies and corporate strategies, particularly in the context of Turkey's unique realities.

Toplum 5.0, E-Devlet Uygulamaları ve Yapay Zeka İlişkisi Üzerine Bir Değerlendirme

Makale Bilgileri

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ÖZ

Dördüncü Endüstri Devrimi (4ED), genellikle Sanayi 4.0 olarak adlandırılan, yenilikçi yapay zeka (YZ) teknolojileri ve uygulamalarının yaygın benimsenmesi nedeniyle hızla ilerlemektedir. İş süreçlerinde operasyonel verimlilik, maliyet azaltma ve genel etkinlik açısından önemli ilerlemelerin potansiyeli inkar edilemez bir durumdadır. Bu paradigma değişimi, sadece sosyoekonomik yapıları yeniden şekillendirmekle kalmaz, aynı zamanda iklim değişikliği, kaynak kıtlığı, salgınlar ve sağlık krizleri gibi küresel zorlukları ele alma vaadi taşır. Bununla birlikte, YZ uygulamalarının küresel entegrasyonu, insan değerleri, adil davranış, karar alma, gizlilik, güvenlik ve sorumluluk konularında bir dizi risk, sorgu ve engeli beraberinde getirir. Bu tür zorluklar ve tehditlerle karşı karşıya kalındığında, YZ etiği konusunda yeni prensipler geliştirmek ve bunları sürdürmek elzem hale gelir. Bu, YZ teknolojisinin sorumlu kullanımı için kurallar koymayı, dikkatli gözetimini sağlamayı ve gelişmiş bilişsel yeteneklerini etkili bir şekilde yönlendirmeyi içermektedir. Bu önlemler, yalnızca Toplum 5.0'a doğru ilerlemek için değil, aynı zamanda akıllı yönetişim dönemini başlatmak için de önemlidir. Bu çalışma, YZ ve 4ED uygulamalarının potansiyelini kullanmayı amaçlayan kapsamlı bir analizi içermektedir. Ayrıca, Türkiye'nin benzersiz gerçekleri bağlamında, akıllı toplumların ve kurumsal stratejilerin bilinçli kararları için temel gereksinimleri eleştirel bir şekilde değerlendirmektedir.

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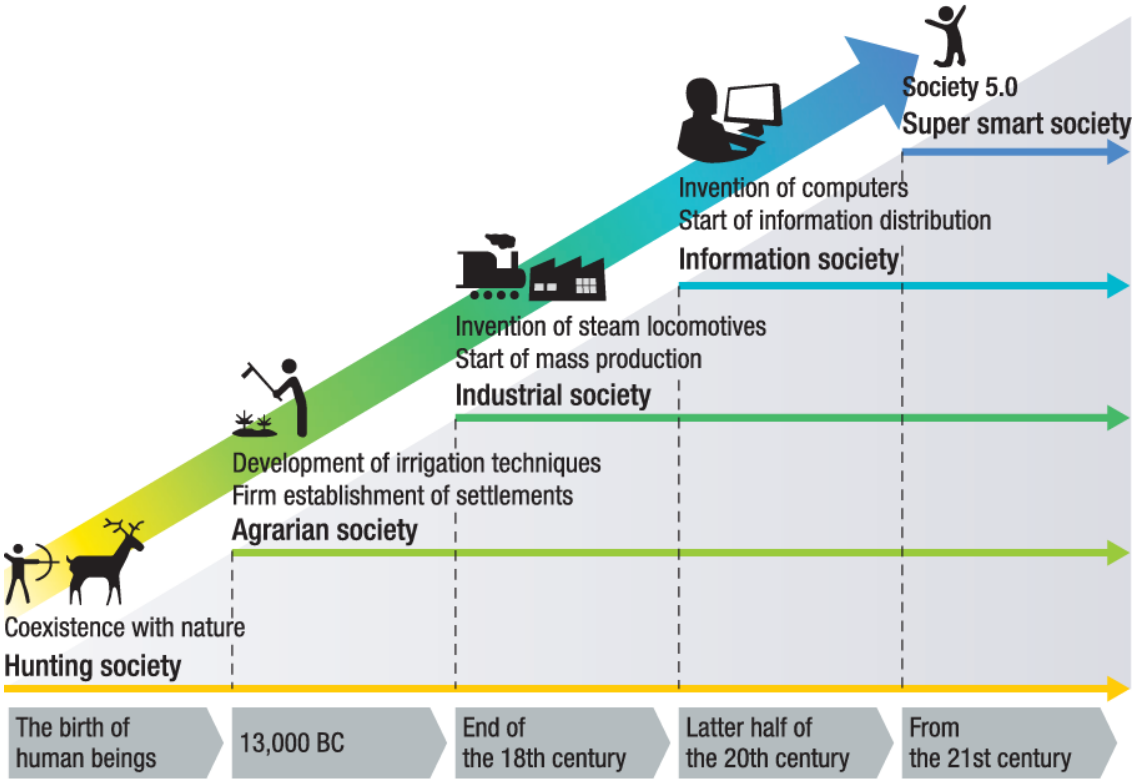
Introduction

The unlimited use of digital technologies in automation processes is one of the main advantages of the fourth industrial revolution. All developed and developing countries have started to digitize mundane tasks as much as possible. Thus, digital technologies for intelligent management information systems (MIS) have gained high market space in infrastructure creation, job creation, education sector reforms, fund mobilization, electronic governance, hardware production, and software development. Since IT or digitalization has penetrated every segment of society, serious efforts are being made to guide us towards sustainable development, with the latest revolution, Society 5.0, which has developed in parallel with Industry 4.0. Figure 1 compares Society 5.0 with Industry 4.0.

Figure 1. Economic and social innovation by deepening of Industry 4.0 and Society 5.0



Source: Fukuyama (2018)

Smart governments are trying to reunite several organizations to improve their communities or regions socially and economically. Effectiveness levels can affect the achievement of group goals and thus affect all citizens in their geographic area (Albert and Fetzer, 2005). Society 5.0 is a concept that was first announced to the public at the CeBIT fair in 2017. This industrial revolution concept, which Japan has switched to trying to solve its significant handicaps (aging population, declining birth rate and increasing cost of production), which is also familiar with many European countries, is fed by the previous variant Industry 4.0. Aiming to evolve the information society-based Industry 4.0 into a human-oriented information society, "Super Smart Society" that focuses on improving people's quality of life produces new opportunities and risks. One of the biggest challenges of urbanization is congestion in big cities. As the "*Our World in Data*"[*] report suggests, this problem is growing, with an average of 1.3 million people dying in traffic accidents a year. These figures are incomparably higher than terrorist attacks and pandemics. However, congestion is currently considered an enormous problem. An INRIX study indicates that it causes $300 Billion of financial damage each year in the US alone and that drivers in cities can spend more than 100 hours a year in traffic (Alonze, 2014). Depending on the development of technology, smart cities seem to be structures that have been started to be created to provide public services effectively and efficiently and to contribute to

[*] To review related statistics and detailed reports, see: https://ourworldindata.org/

sustainable development in this way. In the smart city, it is expected that the citizens of the city will be at the level of knowledge and culture compatible with the system created. In terms of urbanization processes, this represents a transformation. However, the important dimension of the subject is how the relationship between urban management and citizens in smart cities is constructed (Leblebici and Kalyoncu, 2019). But before smart city systems are implemented, the benefits of the technological system to be used should be investigated, the unique structure of each city should be considered, and citizens should be included in all decision-making mechanisms that concern the city through smart city applications (Erkek, 2017).

Although AI provides many conveniences, it also contains severe risks and insecurities. A person must complete his work faster and more effectively and work continuously without a break. Today, while it is possible to enjoy a much easier and more comfortable life with the contribution of technology, fast and unhealthy environments are increasing in a way that is more and more intense and misses life. Thus, AI has become indispensable, but without it, our world would be in chaos in many ways today, although it is not needed.

The purpose of this study is to identify the potential benefits and risks of integrating these technologies, particularly in the context of Turkey's Society 5.0 approach. The study is divided into several sections, including a problem statement, assumptions and hypothetical assertions, a literature review, risk analysis and assessment, an analysis of the blessings or calamities that come with AI, an evaluation of Turkey's Society 5.0 approach, and a concluding section. Through this study, we aim to provide a comprehensive understanding of the potential impact of these technologies on society and offer insights on how they can be utilized to create a more advanced and efficient governance system.

Problem statement, assumptions and hypothetical assertions

The fourth industrial revolution has led to the digitization of various tasks, resulting in the development of intelligent management information systems (MIS) using digital technologies. With the rise of Society 5.0, which is a concept aimed at creating a human-oriented information society, there is a need to investigate the relationship between E-Government applications, Artificial Intelligence (AI), and Society 5.0. Although AI has significant benefits, its implementation in Society 5.0 and E-Government applications also poses several risks and insecurities that need to be addressed.

Assumptions of our study in line with the literature knowledge are as follows:

1. Society 5.0 is a concept that aims to evolve the information society-based Industry 4.0 into a human-oriented information society, with a focus on improving people's quality of life.

2. E-Government applications are crucial in improving communities and regions socially and economically, and their effectiveness affects the achievement of group goals.

3. Smart cities, enabled by technology, are expected to provide public services effectively and efficiently and contribute to sustainable development.

4. AI has become indispensable in modern society and can be applied to various areas such as big data processing, healthcare, and customer lifetime value reduction.

5. The implementation of AI in Society 5.0 and E-Government applications poses several risks and insecurities that need to be addressed.

Hypothetical assertions are as follows:

1. The use of AI in E-Government applications can lead to improved decision-making processes, better service delivery, and greater transparency and accountability.

2. The implementation of AI in S ociety 5.0 can lead to the development of smart cities and the creation of a sustainable and efficient living environment.

3. The use of AI in healthcare can lead to improved diagnoses, more accurate predictions of disease outcomes, and better surgical outcomes.

4. The implementation of AI in Society 5.0 and E-Government applications may also lead to job displacement, data privacy and security concerns, and potential biases in decision-making.

5. The development of Society 5.0 and the implementation of AI in E-Government applications require the inclusion of citizens in decision-making mechanisms and consideration of the unique structure of each city.

Literature

When searched in Scholar database with "Society 5.0" it is found *allintitle* around 1.260 articles, but with "Industry 4.0" it is 12.300. So, the research in the former is quite less than the latter. When it is searched with "Society 5.0, E-Government and Artificial Intelligence" it is found 15.100 in general but nothing in *allintitle.* This is an indication that our research has a high potential to add value to the literature.

The literature shows that AI can be applied to big data processing (Roger, 1991). However, when we look at the picture from a larger perspective, a new revolution is taking place in the industrial field, a new social period called Society 5.0 is being entered, social life is changing rapidly and social life is being rebuilt with new rules from start to finish (Erdal and Papuşcuoğlu, 2021). Ontology studies are an essential part of Society 5.0, where large amounts of data combined with environmental and human biological analyzes increase with the increasing complexity of the processes required to achieve global sustainability (Russel and Norvig, 2009). Big data analytics can be used to guide predictive innovation with planned processes (Jerry, 2016). Digital innovation results in a reduction of customer lifetime value (Diana, 2016). This requires flexible manufacturing systems with intelligent human-machine interaction technologies for human resources (HR) that are not "digital-native" (people unfamiliar with digital systems) (Meera, 2016). AI is also entering the healthcare industry by helping doctors diagnose, locate the sources of diseases, suggest various ways of performing surgery, and predict whether the disease is life-threatening (Dina, 2016). A recent study by surgeons at the National Children's Medical Center in Washington successfully demonstrated surgery with an autonomous robot (Meera, 2016). It shows that robotic-assisted surgery can overcome the limitations of pre-existing minimal surgical procedures and increase the capacity of surgeons performing open surgery. (Jakop, 2016). AI has largely been incorporated into today's environments. For example, search engines and credit assessments in security assessments. It is argued that examining AI algorithms and demanding transparency from AI developers will negatively affect innovation (Masterson, 2017). However, the same innovation can lead to the mass murder of innocent civilians (Etzioni, 2017). He also made evaluations about the autonomous systems that received a petition not to be developed, considering that they are incredibly harmful to society (A. Etzioni & O. Etzioni, 2017). While regulated AI is safe for society, unregulated AI is not. Some of the notable regulated and ancillary AI systems are language translation and medical image analysis systems (Brunage et al., 2018). Society 4.0, ontology Although it integrates the web technology used to obtain and analyze data without their work, a significant gap remains between information sharing and relevant information (Kaplan, 2019). Misclassification of unknown diseases because AI is not all-powerful to solve all the problems of the human species. There are times when AI encounters a stalemate and moves indiscriminately to pursue its mission, resulting in more problems. Therefore, careful monitoring of the function of AI cannot be neglected. This reminder is the doctor in the cycle (Kindig, 2020). Secondary data sources were used for data collection and analysis to assess unregulated AI. This focused on existing unregulated AI systems, their benefits, and drawbacks, and whether they are suitable for use in society (Hill, 2020). This research successfully evaluated unregulated AI and why all AI systems should be regulated (Gatharia, 2020).

Although these problems have been known for some time, many companies are not yet ready to manage big data with smart analytical tools, especially information technology (IT) systems (Rory, 2014). One of the main challenges in gathering information from automated processes lies in

renewing production systems that must respond to market changes by reengineering them by integrating new production machines or adopting technologies developed by different manufacturers (Kindig, 2020). NeurIPS can be programmed to target a specific race or to decide as possible suspects of criminals or troublemakers (Gibney, 2020). In her article published in Nature, Elizabeth Gibney raised an ethical AI question to warn against bias and possible societal harm (Gibney, 2020).

A study, "Framing management for an emerging technology: Insights from AI policy" reviews AI and robotics governance (Ulnicane et al. 2020). An interdisciplinary conceptual framework developed for this research approaches AI as an emerging technology characterized by rapid growth, significant effects, uncertainty, hype, and positive and negative expectations. This research on AI governance contributed to the Human Brain Project (HBP) work on AI's social and ethical aspects and led to several outcomes. He would like to highlight the last two scientific papers that emerged from this research (Ulnicane, 2021). In addition to scientific publications, this research has contributed to education, outreach, and other activities within and beyond the Human Brain Project. The recently launched HBP Ethics and Society team's Opinion gave input for 'Trust and Transparency in AI' (Aicardi, 2021).

Figure 2. Road traffic deaths, 1990 to 2017

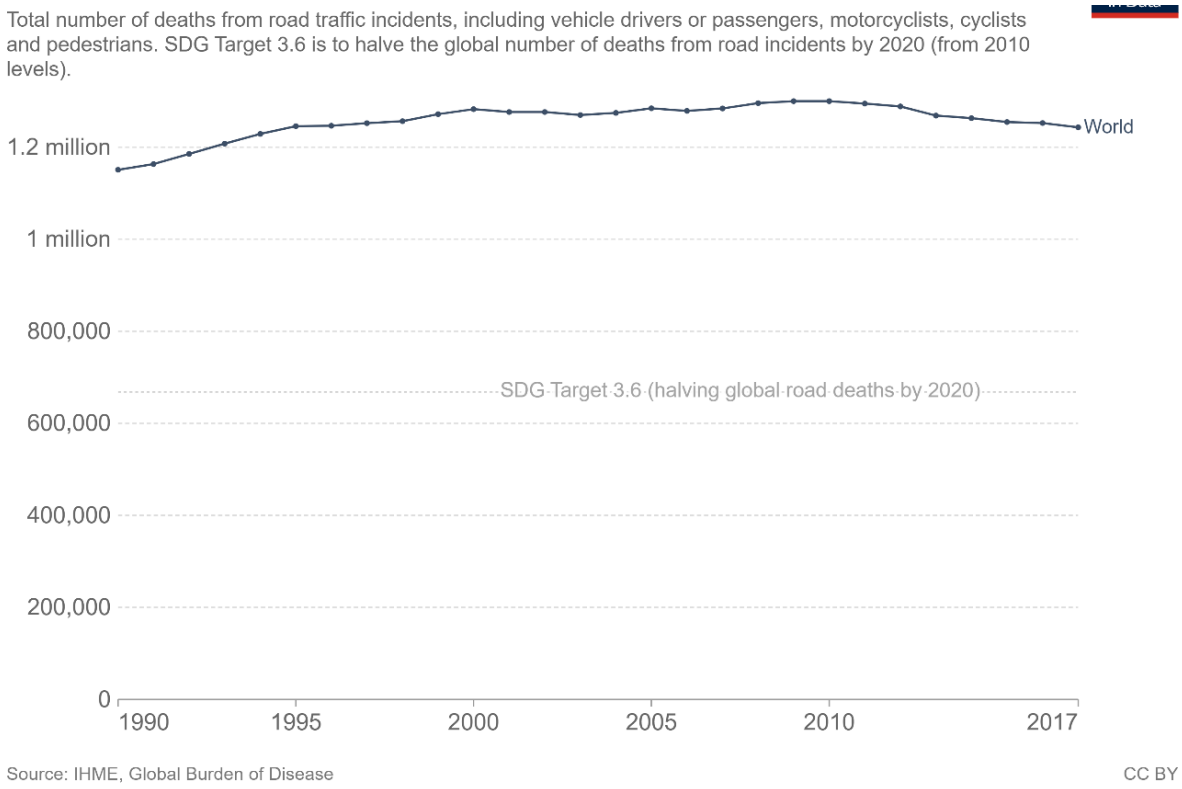


Figure 3. Road traffic deaths, EU, 2000-2019

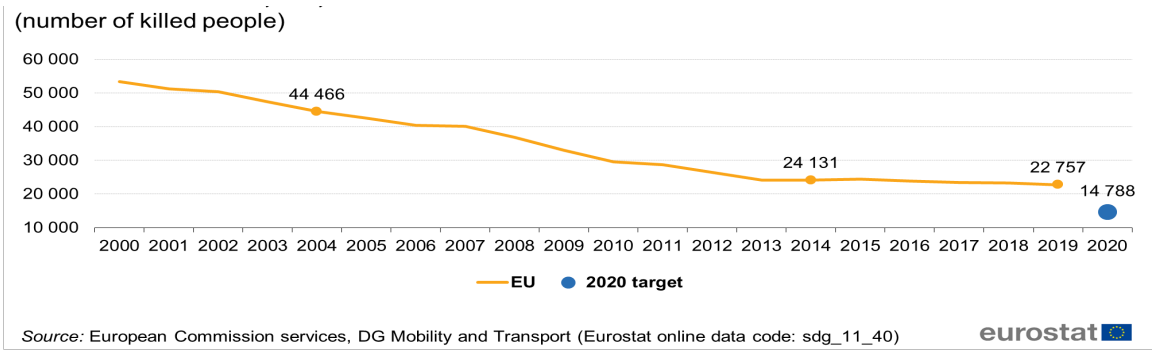
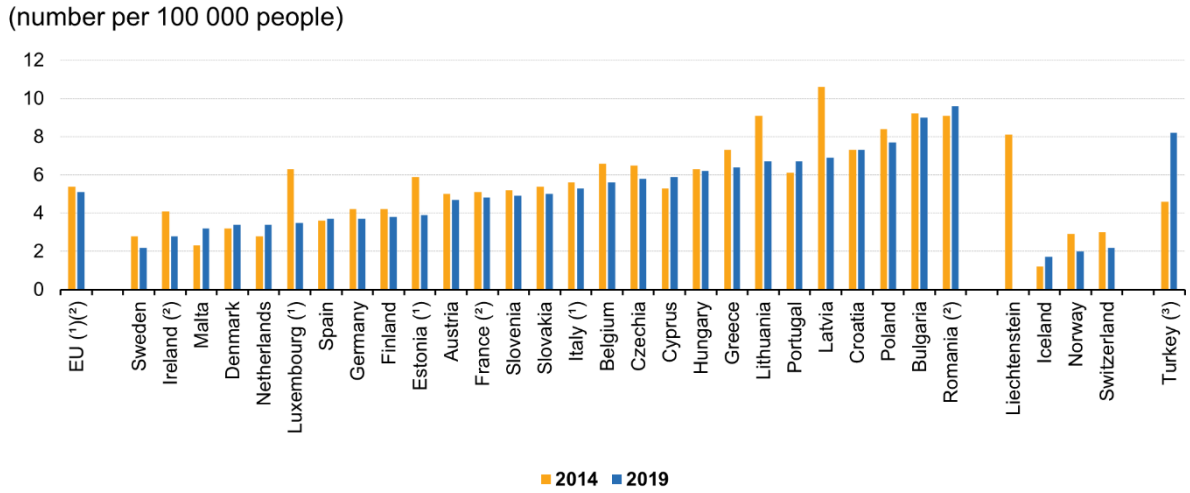


Figure 4. Road traffic deaths, by country, 2014 and 2019

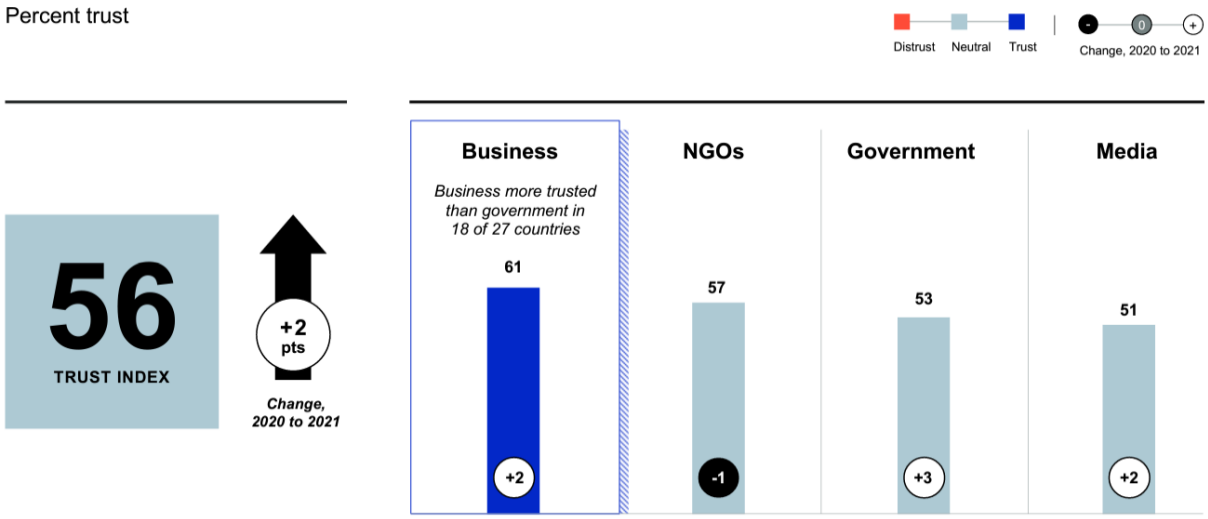


(¹) Break(s) in time series between the two years shown.
(²) 2019 data are provisional and/or estimated.
(³) 2018 data (instead of 2019).
Source: European Commission services, DG Mobility and Transport (Eurostat online data code: sdg_11_40)

eurostat

Automation technologies are already being implemented to reduce such traffic figures. For example, *Vehicle to Infrastructure=V2I* technology is making traditional traffic signals smarter and more efficient (Bayless et al., 2015). In 2018, the Edelman Trust Barometer (Adelman, 2018) detected a global decline in trust in all four major social institutions—business, media, government, and NGOs. In the United States, 53% agree with the statement that "everyday Americans understand better than so-called 'experts' what the government should do" (Moore, 2016).

Figure 5. Adelman Confidence Index 2021



Source: https://www.edelman.com/trust/2021-trust-barometer

Risk Analysis and Assessment

E-Government applications play a crucial role in the implementation of Society 5.0. Furthermore, the development of artificial intelligence (AI) technology is another significant aspect that contributes to the creation of Society 5.0. However, this integration of technology and society poses potential risks, and a risk analysis and assessment is necessary.

Risk Analysis

Society 5.0 is heavily reliant on advanced technology, which could lead to the exclusion of certain groups of people who do not have access to such technology. In addition, the integration of

technology into society can lead to job displacement and further widen the income gap between skilled and unskilled workers (Yamamoto & Tanaka, 2020).

E-Government applications have the potential to improve the efficiency of government services, but they also pose significant security risks. These risks include data breaches, hacking, and identity theft (Alsharafi, 2019). Furthermore, there is a risk of algorithmic bias in E-Government applications, which could lead to discrimination against certain groups of people (Mittelstadt et al., 2019).

The development of AI technology poses several risks to society. One significant risk is the potential loss of privacy due to the collection and analysis of personal data (Schwartz, 2019). In addition, AI technology can be used to automate decision-making processes, which could lead to unintended consequences if the algorithms are biased or flawed (Floridi & Cowls, 2019). There is also a risk of job displacement due to the automation of certain tasks (Brynjolfsson & McAfee, 2017).

Risk Assessment

The risks associated with the integration of Society 5.0, E-Government applications, and AI technology must be carefully considered and addressed to ensure the creation of a safe and sustainable society. The following strategies can be implemented to mitigate these risks:

- To address the potential exclusion of certain groups of people, efforts should be made to ensure equal access to technology and digital literacy programs.
- To reduce the risk of security breaches in E-Government applications, strong security measures should be implemented, and regular security audits should be conducted.
- To address the potential for algorithmic bias in E-Government applications, measures should be taken to ensure that the algorithms are transparent, accountable, and unbiased.
- To address the loss of privacy due to the collection of personal data, strict data protection laws should be implemented.
- To address the potential unintended consequences of AI technology, such as bias and job displacement, ethical guidelines and standards should be established for the development and deployment of AI systems.

AI has some critical risks besides the efficiency, effectiveness, and economy it brings for societies:

Lack of Talent

A major industry-wide challenge where AI can change the game has to do with the scarcity of cybersecurity experts. Today, there is a significant shortage of cybersecurity professionals in companies who must perform different tasks, from maintaining security configuration to responding to security incidents. Industry 4.0 and Society 5.0 will pose far more cyber risks and hence, great need for key talents.

Pervasive Active Intelligent Defense

Digitization in all aspects of life can foster the development of mobility, networking, and intelligence and accelerate the transformation and innovation of the global society with solid influence and driving force (Chen *et al.,* 2020). Thus, where AI has the potential to address a significant portion of threats that deterministic solutions cannot correctly address today, the transition to active defense is inevitable.

Double-Edged Sword

AI is especially complementary to individual intelligence, improving quality, accuracy, and precision. However, another conclusion is that AI is a double-edged sword in the workplace. It quickly demonstrates reinforcing effects in individual and organizational learning, which are the reverse side of undesirable effects (Wilkens, 2020). Also, a threat that has yet to emerge would be cyberattacks that empower themselves with AI.

AI alienation

Some researchers argue that the inclusion of intelligent computer systems in workgroups will blur the distinction between human and machine consciousness. In this article, Jaron Lanier, who coined the term virtual reality, argues that intelligent agents will devalue human intelligence and creativity and reduce the role of conscious experience (Lanier, 1995). The outbreak of revolts against the expert class that characterizes US and European politics is likely to accelerate. How can governance itself work for the ruled while innovation and complexity are beyond the reach of so many? (Mayernick, 2019)

Privacy and confidentiality Risks

Future homes will be filled with multiple robots with functions ranging from chore robots to aged care robots to recreational robots. While home robots provide numerous benefits, they also have the potential to introduce new security and privacy vulnerabilities to the home (Denning *et al.*, 2009). Consumers' privacy is slipping on a slippery slope, where more and more companies collect information about us, and structured data such as demographics and behavior patterns are implicitly scrutinized when using digital services.

Challenges for Policy Makers

Our privacy is misused by market forces pushing for profit optimization, with consumer protection at the top of priorities (Lauterbach, 2019). AI is a universal language, and while the setting of global ethics against national preferences creates a natural conflict, people worldwide are different in many ways. In a world where algorithms can harm, ownership and liability of algorithms are open with many different views. It gets complicated as platforms are global, and rules are often local. There are other alternatives beyond the idea of a basic income for millions of people who will not be part of the information ecosystem. Because not every person who loses their job will find a new job, preventive measures should be taken to avoid market turbulence in deteriorated industries. An interesting question is how population growth on the planet affects this equation. A strategic and inclusive discussion must be initiated about the modalities of global governance in the age of AI and other emerging technologies.

This is exactly where AI fits into global governance is such a challenge. The United Nations University (UNU-CPR) promotes this "*AI and Global Governance Platform*," which seeks to bring together world-renowned experts and practitioners in a range of fields that intersect with AI to generate interdisciplinary discussions on a range of strategic questions, including (UN, 2018):

- To what extent are national and international governing bodies equipped with AI governance knowledge, insight, and analytical tools?
- What kind of international competition will AI ignite?
- How can various stakeholders collaborate to predict the risks and sources of inequalities and constraints of AI designs?
- How can policymakers give corporate leaders the regulatory certainty to bring AI innovations?

The blessings or calamity that come with AI

The real problem is establishing the social and political will to assign and maintain accountability for the works when these works are produced or used (Bryson, 2019). Bad outcomes are also possible: while the rest lag behind, a few countries and individuals from China, the US, and southern Europe will take the big pie in AI with for-profit algorithms that invade privacy, disrupt democracy, and savage the planet (PWC, 2018).

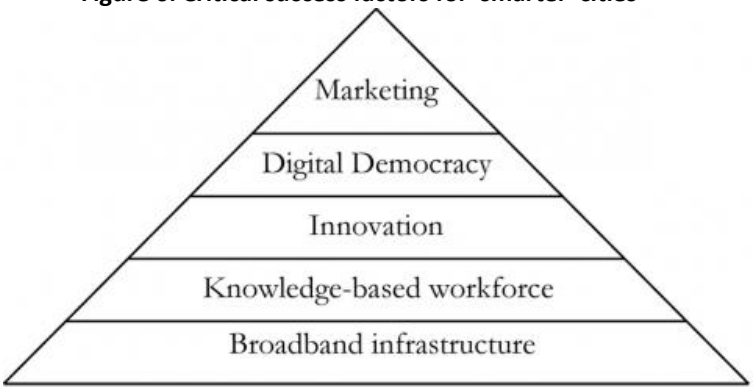
Critical factors of being 'smart'

Communities define five *critical achievement factors* for the creation of 'smart/intelligent

communities', which are also used as evaluation criteria to evaluate and reward various cities' efforts to 'be smart'. These are as follows (Figure 6) (ICF 2008; Bell et al. 2008; Passerini and Wu 2008; Komninos 2009; Stratigea, 2019):

- *Education and training of* the workforce, strengthening the high adoption/use of ICT infrastructure.
- Deployment *of broadband communication infrastructure* used for assessment of local capacity for digital communication (Passerini and Wu 2008).
- *digital democracy* by bridging the digital divide between different groups of society and ensuring that everyone benefits from the broadband revolution (i.e., digital inclusion);
- *Marketing* 'smart' communities as good places to live, work and run a business that exploits the community's potential to attract talented employment and investment innovation capacity, the level of creation of an innovation-friendly environment that attracts highly creative people and businesses. (Strtigea, 2012)

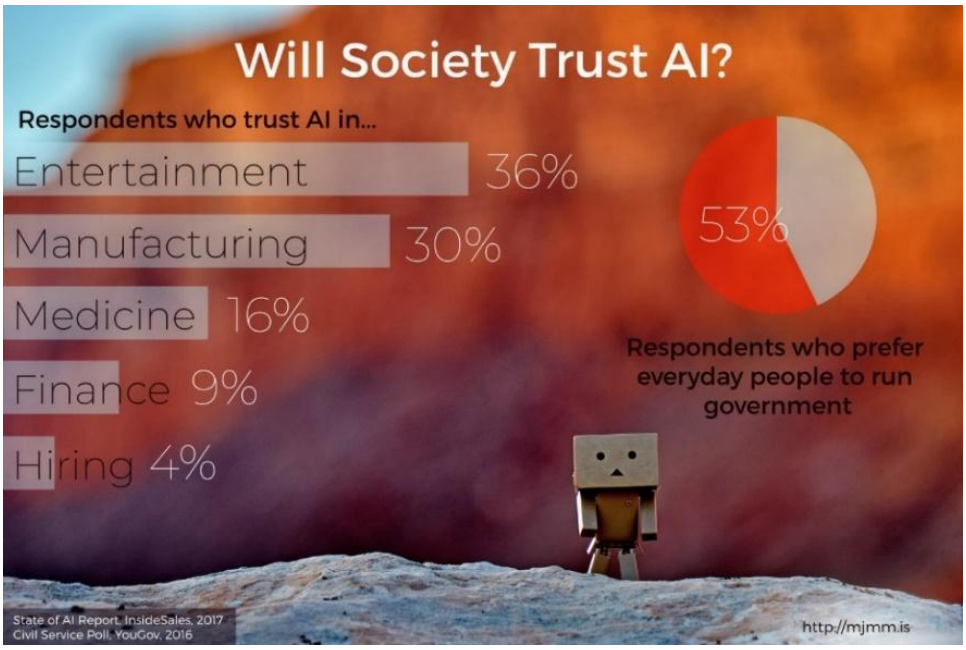
Figure 6. Critical success factors for 'smarter' cities



Source: adapted from the ICF website (Passerini and Wu, 2008),

By emphasizing the need to 'democratize the flow of information, the UNESCO Report (1980) entitled 'Many voices of one world' implies equal access to information for broader groups of society and highlights the need for policy action towards this end. As Lee (1989) states, community development represents a process of change involving participation and collective action. It expresses a community where individuals are helped to acquire skills and competencies and develop their views and attitudes, a requirement for their democratic participation in a wide variety of community issues (Mezirow, 1963) Effective policies are critical to forcing locals to use broadband, among other factors presented in Figure 1, as experience from the world's leading smart cities shows. The critical issue is not 'what' technology is available, but how *'effectively'* this technology is used (Bell et al. 2008; Stratigea, 2019).

Figure 7. From technological innovation to social innovation



In the coming liquid democracy, citizens can delegate their votes to people they trust in their close circle on a particular issue. These votes can then be delegated to people with more and more expertise, but meanwhile, attributable links from one person to another are preserved (Ernst, 2016). New forms of trust and consent are possible. Deliberative democracy combines the role of the expert and the average citizen by randomly selecting persons to serve in a type of issue jury pools, where an individual is asked to examine a single issue and make a judgment on behalf of the entire police (Cox, 2018; Mayernick, 2019).

Socializing AI systems

Specifically, these systems should strive for:

- The commitment to explainability for the AI behind these decisions - a challenge with current technology

- Consistent input from voters throughout so that their participation is seen as constitutive of systems for them

- A revitalized rights framework to establish boundaries and boundaries for any automated system or decision

Achieving this will require new approaches. But the resulting harmony between governance and the ruled can reduce existing political frictions and unlock the full potential of man and machine (Mayernick, 2019).

Society 5.0 approach of Turkey

In a survey titled "*New Industrial Revolution: Prioritizing Key and Leading Technologies for Intelligent Production Systems*" conducted by TUBITAK in 2016, it has been seen that the digital maturity level of our industry is between Industry 2.0 and Industry 3.0. Another point revealed in the same survey is the three technologies that will provide the highest added value: automation and control systems, advanced robotic systems, and additive manufacturing (TUBITAK, 2017).

Industry 4.0 and Society 5.0, a related concept, is necessary to act quickly, and efforts should be made to support all relevant stakeholders, both public and private, as much as possible. It should not be forgotten that no country has such a luxury as to miss the digital transformation that is currently taking place. In the future, the difference between the countries that missed this transformation and

the countries that were able to catch and manage this transformation will be huge. It will affect the communication and functioning of the whole world. It is in our hands to turn this advantage into reality, and the most important thing to be done for this is to work and strive towards the subject without slowing down. In this context, digital transformation should be emphasized in every sector from education, health, trade, and logistics. The issue should be transformed into a national effort rather than a local effort. To increase this national effort, campaigns should be organized, incentives should be given, and it is of great importance to provide all possible conveniences to all stakeholders who want to learn and develop the subject, both in terms of legislation and implementation (BTK, 2020).

Industry 5.0, in other words, Society 5.0, emerged within the framework of a new idea that emerged in Japan in 2017, when the world was talking about Industry 4.0. In this logic of thought, the idea that a new production model that focuses on the interaction between humans and machines is possible with the construction of a "*super-intelligent society*" in which cyberspace and physical space are highly integrated (Dedebali, 2020). It plans to achieve productive, economic, and commercial results by strengthening the cooperation between more robust and accurate machines and the unique creative potential of human beings day by day. By 2030, the thought that many countries will have robot soldiers in their military inventory recalls the possibility of making science fiction films in that humans and robots will fight together. It is accepted that our country is between Industry 2 and Industry 3. To change this thought, it is necessary to integrate our education system with information and communication technology systems and build technology areas that young people can easily reach. Thanks to the use of new technologies in the production line in our country, it will cause a decrease in imports and an increase in export figures. In this way, the way to a self-sufficient country economy that is not dependent on cheap technology and foreign sources and can offer some of its products to the world markets will be opened.

In many countries where curfews are implemented at almost every level, e-based distance education systems are used, and electronic order methods and home delivery are heavily used in shopping. In addition, the prevalence of using TV and internet resources, especially social media, has increased, especially for the public to obtain information and spend time. It is obvious that businesses and educational institutions with electronic-based infrastructure and experience do not have any difficulties in providing this operation. In addition to this harmony at the institutional level, the policies of the states to facilitate human life in the digital environment have an important role in this context. In China, where the epidemic broke out, it was possible to carry out works such as street cleaning and transportation, which were done by people, by robots to prevent people from going out on the streets and increasing their contagiousness. In addition, Covid 19 has shown once again that not only high-tech devices and electronic devices, but also human capital, human capital, has not lost its importance in social life. In this context, it has been observed that all health personnel, from doctors to nurses and caregivers, play the most important role in eliminating this very serious health problem in Turkey. On the other hand, this latest event that we are faced with has clearly demonstrated that Society 5.0 requires individuals, institutions and societies that can set up, operate, and use e-based systems and have these systems and devices (Saracel and Aksoy, 2020).

In all this process, the obstacles in front of the transition to Society 5.0 in Turkey should be analyzed first. First, there is a need to eliminate the deficiencies in the technological infrastructure. In a world where tools such as 5G technology, artificial intelligence applications, and big data analysis are increasingly being used, Turkey should accelerate its R&D studies. However, physical investments are not the only missing issue; there is also a need to strengthen human capital. Turkey needs qualified personnel to adapt to the digital transformation and paradigm shift. This issue is more essential for the public sector. Therefore, in the following process, it is necessary to improve the existing personnel with in-service training and seek relevant skills and knowledge in the personnel to be recruited. The first thing that needs to be done is eliminating all these deficiencies in the preparation of the political, legal, and social infrastructure. It will be insufficient to make physical and human investments without creating political plans and programs and preparing roadmaps for what

to do, determining how to develop solutions to the problems faced in the legal sense, and providing social adaptation. In this sense, legal gaps in topics such as cyber security and protection of personal data should be filled, and necessary sanctions should be implemented because the privacy of personal data in Turkey has not yet been fully resolved.

Regarding policymakers, studies should be accelerated on how to implement the people-oriented approach of Society 5.0, which aims to improve the quality of life and ensure sustainable economic growth in every field. The state should establish the necessary measures and incentive mechanisms in every field, such as education, health, transportation, and tourism. In addition to many significant social problems such as epidemics, disasters, terrorism, and crises that arise with personalized services, priority should be given to meeting daily social needs quickly and effectively. In this context, the integration of digital technologies is essential. Of course, beyond these, society must be prepared for this transformation. Mental transformation should be ensured. The importance and necessity of digitalization should be explained to society well. Awareness should be increased, and efforts should be made to improve their knowledge and competencies. In this sense, seminars, public talks and information meetings, public service announcements, courses and training opportunities, and innovations in the education system are effective methods. Making society willing and ready in this regard will make the transition to Society 5.0 easier and necessary for a sustainability-oriented lifestyle and quality of life (Uysal Şahin, 2021).

Exports of high-tech products in Turkey are low compared to OECD countries. With investments in qualified human resources and a robust R&D infrastructure, it may be possible to produce digital technologies domestically and reduce foreign dependency. Raising a qualified workforce and producing new technologies is a matter of investment preference and priority. Overcoming these obstacles can only be possible by providing the necessary financing to meet the investment costs required by the social transformation in the transition to Society 5.0, mainly the transformation of economic and production infrastructure. Especially in universities, the capacity for new technologies and the budget allocated to these technologies should be increased. In addition, investments that will be encouraged with government support, R&D studies, and the development of the R&D ecosystem should be emphasized (TED, 2021).

Determining some target indicators and sharing the annual progress report to measure Turkey's success in digitalization are critical in raising social awareness and determining action plans on the way to the goals. Based on the target indicators of the Digital Europe Platform, some target indicators have been determined for Turkey's digitalization path until 2025 (TED, 2021) :

- Currently, 51.5% of individuals use the internet to benefit from public services or obtain information from E-Government services. By 2025, the E-Government usage rate in Turkey should be 80%. By 2025, the e-commerce usage rate in Turkey should be 75% for both women and men. This rate is 36.5% in 2020, while it is 40.2% for men and 32.7% for women.

- By 2025, at least 25% of those working in the IT sector should be women. In 2019, only 9.6% of information technology professionals in Turkey were women. This rate was determined as 1.4% in the Digital Europe report.

- By 2025, Smart Automation, artificial intelligence, and machine learning project incentives should be increased to digitalize the industrial production sector within R&D expenditures. The share of industrial production processes in R&D expenditures is 8.6%, respectively.

- By 2025, cloud computing usage rates should be above 60% for medium and large enterprises. This rate is 40.8% in enterprises with 250 or more employees; 22.2% in enterprises with 50-249 employees; and 11.9% in enterprises with 10-49% employees.

- Until 2025, the support given to initiatives should be increased, and the number of advertisements, incentives, and technology centers that will ensure global investments should increase. In the first nine months of 2020, the total investment in start-ups was 2.2 billion dollars.

- By 2025, data literacy and basic analytics training will be included in the curriculum in every undergraduate department of universities.

- By 2025, the number of undergraduate and graduate programs that will provide training on advanced analytics, machine learning, cyber security, and artificial intelligence should be increased. New technical and vocational high schools should be opened to train qualified personnel with digital technology competencies to increase employment.

- Gaining all primary, secondary, and high school teachers the ability to teach remotely and over the internet By 2025, households in every region of Turkey should be provided with broadband internet access regardless of location. Households accessing the internet via broadband will be 89.9% in 2020. While 50.8% of the households accessed the internet with a fixed broadband connection, 86.9% of them accessed the internet with a mobile broadband connection. Regulations should be regulated by considering the social norms related to artificial intelligence ethics, which has started to be discussed worldwide. E.g., (Policies studied in international norms such as the "Recommendation of the Council on Artificial Intelligence" published by the Organization for Economic Cooperation and Development ("OECD"), etc.)

Evaluation and conclusion

According to the findings of this research based on literature knowledge and sectoral reports, unregulated AI is harmful to societies anyway. Having many AI innovations does not benefit society because of minimal regulatory processes if all security measures are not implemented. Unregulated AI can wipe out an entire nation, as with autonomous weapons. Nations would go to war for revenge that would cause mass murder due to lack of proper controls on AI. In addition, autonomous weapons would cause mass deaths worldwide if the black market, deep wed and dark web fell into their hands. For example, in the black market, terrorists would be able to access autonomous weapons and cause disaster in the world. Unregulated AI or lack of proper controls also raises ethical questions. For example, the Clearview AI app collected people's data without their consent and created a database to identify people based on facial features. Such a practice is advantageous in one way but may be used differently by other individuals or governments. The app is a security breach for the community and can be harmful if a malicious person obtains the information. Therefore, all AI developers must ensure their innovations are regulated. Also, relevant authorities such as governments should ensure that all AI systems are regulated before development begins. The regulation will understand the algorithms to be used in innovation and ensure that the system works according to the regulations. Continuous monitoring and evaluation of system functions should also be done while the system is used to prevent future deviations.

The integration of Society 5.0, E-Government applications, and AI technology holds great potential for the creation of a sustainable and harmonious society. However, it also poses several risks that must be carefully considered and addressed. The strategies outlined above can help mitigate these risks and ensure the safe and responsible development of Society 5.0.

High-risk AI must be tested and validated before it reaches our single market, potentially interfering with people's rights." Assuming that anything that can be automated with AI will eventually be automated, whether a logical or physical effort, we will witness a massive wave of automation that will turn many industries upside down. Since the risk comes from malicious and high-powered intelligent people, the ability to protect against such a threat is a severe problem as it cannot be achieved by adding controls to AI.

- **Interpretability:** It should be possible to understand the decisions made by an AI agent, especially if they have implications for public safety or cause discriminatory practices.

- **Ethical considerations**: As AI emerges, humans have a new challenge relating to something unnatural in themselves. Bioethics typically discusses the relationship within natural entities, such as human beings or their environment, that are parts of natural phenomena (Tai, 2020). From this

perspective, it is understood that AI can harm people and society. AI engineers realized the importance of giving AI discrimination to avoid any deviant action that causes undesirable harm.

- **Open Governance:** The ability of various stakeholders in civil society, government, the private sector, academia, or the technical community to inform and participate in the governance of AI is crucial to its secure distribution.
- **Empowering users:** The public's ability to understand AI-powered services and how they work is key to building trust in technology.
- **Responsibility:** The capacity of an AI agent to act autonomously and adapt its behavior over time without human manipulation requires significant security controls prior to deployment and continuous monitoring.
- **Accountability:** When decisions of AI agents replace human agency, legal certainty and accountability must be ensured.
- **Social and economic impacts:** Stakeholders must create an environment where AI provides socioeconomic opportunities for all.

We can also call the philosophy of Society 5.0, put forward by Japan in 2017, as the understanding of a smart society that will manage technological power correctly. Among the goals put forward by the Society 5.0 philosophy are the following:

- Developing solutions against the aging world population,
- Making the virtual world and the real-world work together,
- Making use of the Internet of things by considering the interests of the society,
- There are solutions for environmental pollution and natural disasters.

While Japan is one of the countries with the highest number of robots in the world today, it cannot be said that the Society 5.0 paradigm is very successful in ensuring human happiness, since it is among the countries with the lowest unemployment rate but still the highest suicide rates. While Japan is pursuing the correct use of industrial technologies to create a smart society by going one step beyond the Industry 4.0 revolution of the Germans, people remain in a spiritual vacuum. While there is access to all kinds of worldly fantasies, they cannot find the true meaning and purpose of life with their soul's need for eternal life. While plans are being made in many areas from supporting the mobile sector to vocational training, "Will I be among the deaths that are around 160,000 on average per day?" questions are not addressed.

On the other hand, for Society 5.0 to develop and continue its way, 5 important walls need to be demolished, which are the most fundamental problems in front of Turkey's development, like other countries:

- Barriers in the legal system
- Scientific gaps in the digitization of objects,
- Lack of qualified personnel,
- Socio-political prejudices,
- Community resistance.

Based on the information and the discussions mentioned above, here are some smart suggestions for policy makers and regulatory agencies in Turkey regarding the relationship of Society 5.0, E-Government Applications and Artificial Intelligence:

1. **Prioritize R&D investment**: Turkey needs to prioritize investment in research and development to catch up with other countries in terms of technology. It is necessary to accelerate R&D studies, especially in 5G technology, artificial intelligence applications, and big data analysis.

This will require both public and private investment, and incentives should be given to encourage such investments.

2. **Strengthen human capital**: Turkey needs to invest in human capital to adapt to the digital transformation and paradigm shift. This includes providing in-service training to existing personnel and seeking relevant skills and knowledge in new recruits. Education systems should be integrated with information and communication technology systems, and technology areas that young people can easily reach should be built.

3. **Create political plans and programs**: Turkey should prepare roadmaps for what to do, determine how to develop solutions to the problems faced in the legal sense, and provide social adaptation. This requires creating political plans and programs to address issues such as cyber security and protection.

4. **Emphasize digital transformation in every sector**: Digital transformation should be emphasized in every sector, from education and health to trade and logistics. This should be a national effort rather than a local effort. Campaigns should be organized, incentives should be given, and all possible conveniences should be provided to all stakeholders who want to learn and develop the subject, both in terms of legislation and implementation.

5. **Address technological infrastructure deficiencies**: There is a need to eliminate the deficiencies in the technological infrastructure. This requires investing in physical infrastructure and strengthening human capital. In addition, policies should be put in place to facilitate human life in the digital environment.

6. **Promote human-robot interaction**: Society 5.0 promotes a new production model that focuses on the interaction between humans and machines. Turkey should invest in technologies that can enhance this interaction, such as automation and control systems, advanced robotic systems, and additive manufacturing.

By implementing these suggestions, Turkey can catch up with other countries in terms of technology and benefit from the advantages that Society 5.0 offers. This will lead to a self-sufficient country economy that is not dependent on cheap technology and foreign sources and can offer some of its products to the world markets.

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