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THE NECESSITY OF TRANSITION FROM INDUSTRY 4.0 TO INDUSTRY 5.0: SWOT ANALYSIS OF TURKEY'S SCM STRATEGY

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ABSTRACT

The purpose of this study is to explain the importance of the benefits provided by the applications of Artificial Intelligence (A.I.) and robotic technologies in the logistics industry at different stages. In parallel with the developments required to adapt to the global competitive environment in the globalizing world economy, it is aimed to determine the most accurate predictions for the future in creating savings opportunities in logistics processes. It aims to explain the expectations about Supply Chain Management (SCM) strategies that have become obligatory to change due to COVID-19, a global health problem threatening the world today. The analysis is made with Multi-Criteria Decision Making Method. In this analysis, first, an evaluation is made with the approach of developments followed since the first industrial revolution and the necessity of transition from Industry 4.0 (4IR) to Industry 5.0 (5IR). As a result, a SWOT (Strengths – Weaknesses – Opportunities – Threats) analysis of Turkey's SCM performance was made.

Keywords: *Artificial intelligence, Logistics, A.I. technology, SWOT analysis, Logistics industry.*

INTRODUCTION

With the impact of Digital Transformation in the world, the usage areas of A.I. and robotic technologies, which are among the most prominent developments of 4IR, are becoming widespread in various sectors. Equipped with advanced features and skills possessed by humans, robots are getting usable in different processes of logistics such as packaging, storage and transportation. On the other hand, the use of humanoid robots in logistics services brings along features such as autonomous decision-making and responsibility, thus increasing the work on managing robots in logistics services. Positive views on using robots in the logistics industry have increased during the COVID-19 that continues to prevail today.

Developments in information technologies trigger a major transformation in terms of logistics businesses, and the COVID-19 process also forces logistics businesses to accelerate technological applications. For these reasons, the study aims to emphasize the importance of Logistics 4.0, which is under the influence of 4IR applications, which are increasing today and explain the importance of predictions for the future in connection with historical developments.

The study is conceptual, informative and theoretical, accompanied by technologies in the field of logistics and examples from sectors using these technologies. This study aimed to explain the

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findings from the literature that will shape logistics in the future with A.I. and contribute to determining the most accurate predictions.

Literature Reviews

In the research, a multi-criteria decision-making method was used. In this study, the developments in the logistics sector are examined especially concerning the industrial revolutions. Statistical analyzes of used development of A.I. and robotic technologies in the logistics sector. Suggestions are explained depending on the findings obtained from the analysis. In addition, the literature on the subject is included.

Development is being experienced in robotic technologies as a new industrial revolution in the present day. Companies in different sectors are trying to adapt to the developments in A.I. and robotic technologies to reduce costs, raise productivity, and increase productivity, quality, and competitive power (Ivanow, 2017). As the use of artificial intelligence is moved to the trade circles, the course of the work has started to change, particularly in the logistics sector. The advantages include driverless vehicles whose utilization has started to increase in logistics, robots used in warehousing and shelves, and data use providing convenience in logistics. Revolution changes have occurred until the present day as industrial revolutions in the logistics field (Wang, 2016);

- The first revolution is the process by which transportation is mechanized. In this process, transportation with human and animal power has ended. Trains, ships and trucks have started to be used on railways, seaways and highways. It started in the second half of the 19th century.
- The second revolution started in the 1960s, partially mechanized with logistic equipment that performs storage and inventory
- The third revolution started in the 1980s when logistics management was systematized. Information technologies are being used extensively in logistics management
- The fourth revolution continues to evolve with the digitalization of logistics processes since 2000
- The fifth revolution is under development. In this system, robots can do anything a human can do. Robots can record the data they obtain in the cloud system. They can communicate with each other.

The logistic industry covers many processes such as order, shipment, warehousing, collection, packaging, delivery, inventory and routing. Robotic logistics means that robotics is applied in one or several of these processes. Among these processes, there are many functions such as; warehousing, order, shipment, collection, packaging, disposal, delivery and inventory, aggregation during shipment, routing, recycling, and acceleration. Those that are the most common among the potential robotic applications in logistics processes (IFR, 2018);

- Robotic palletizing: In this field, robots are used for loading or discharging products to and from pallets.
- Robotic packaging: In this field, robots are used for packaging the products and then packaging the packaged products into bigger boxes.

- Robotic collection: In this field, robots are used for selecting the products from shelves in the warehouse and sorting them.

Pallets have created a global logistics revolution and played an important role in the world economy since the 1920s. Forklifts have provided an important solution for carrying heavy loads within warehouses and pallets, making transporting and storing bulky products easy and fast until the 1950s. Once the industrial robots emerged, their utilization for palletizing firstly started with the industrial robots in 1963. The robotic palletizers can be reprogrammed, occupy a small space, and palletize different product types and palletize in mixed cases. Thus, it becomes possible for the suppliers to take mixed orders in the same product instead of bulk orders. Robotic packaging and distribution are gradually becoming more important thanks to the preference for e-trade and distributed supply chains worldwide. Using cooperation-based robots for palletizing and unloading from the pallet means the palletizer robots create a competitive advantage. For example; there are 7 best robotic applications for packaging food products (Owen-Hill, 2018);

- Selection and location of randomly directed foods,
- Any kind of food package,
- Removing the cooked products from mold smoothly,
- Removing the empty package from the batch and inserting the products into,
- Box (Inserting the separately packaged products into boxes),
- Palletizing (taking the boxes and preparing for the shipment),
- Storing (enabling the products to be collected in a certain place automatically).

As robotic collecting solutions develop, it is accepted that the supply chain will provide an important advantage. The use of mobile robots and collecting levers have provided important solutions. Thanks to the collaborative robots, it is seen that the opportunities for utilizing the collaboration-based robots have been created throughout the supply chain, including the production and storage. For these reasons, the following opinions are generally accepted; the implementation of robotic systems can increase the productivity in businesses, the faults can be minimized, and safety can be increased by keeping the people both from heavy and dangerous tasks. Two important factors are increasing the need for autonomous logistics solutions (IFR, 2019);

- Growth of e-trade; Product distribution has changed and increased in the last ten years. Currently, the products are packaged one by one and sent to the customers. In this field, the distribution rate of the dispatches is extraordinarily increasing in the stage of different packaging requirements and selling of heavier products in the businesses.
- Lack of existing labor; the need for the skill exceeding the manpower in the logistics accounts for the support of the robot technology in the production. A robot is a solution tool in the logistics sector during the COVID-19 pandemic process we are witnessing.

Mobile robots generally mean robots that can autonomously move anywhere to reach one or several goals (Tzafestas, 2014). Mobile robots are used in various applications such as automated guided vehicles in plants (AGV), unmanned location exploration tools in military operations,

delivery of pharmaceuticals, medical products in healthcare services, and search and rescue operations by security guards.

AGVs were invented in 1953 and are generally used for carrying the materials in the industrial practices around any production plant or warehouse. Typical AGV types are taggers (AGVs towing away the cars), unit loaders (AGVs having built-in wheeled tables for transfer of part tray), and forklifts (robots being similar to manual forklifts). As the areas of use, such as plants, hospitals, and office buildings, are increasing, their use is also increasing (Shneier *et al.*, 2015). Today, load-handling robots use cameras to view the ground band in warehouses. They monitor the lane lines as a boundary mark instead of a single line. Robots' motions are guided through the intervention of the detection system, ceiling-mounted barcodes, laser, and reflectors. In large warehouses, they can be used for selecting, packaging and palletizing the products. They can also position the vehicle's location to be loaded with about 5cm of margin of error and are used in hard work fields such as target-specific wall monitoring and typically loading on a truck (Shneier *et al.*, 2015).

As another alternative, a current robot model is offered, a four-footed, parallel robot equipped with clamping devices at the end of every foot. It is not compulsory to keep it on a flat surface since it can climb. The CAD model is a four-footed, parallel walking robot equipped with a locking mechanism (locked) in such a required manner for walking or load manipulation on some passive joints at the end of each foot and clamping device (Yang *et al.*, 2011).

As another alternative, DHL (Logistics Trend Radar, 2020) explains 29 main trends which will affect the logistics sector in the next years. The report covers the findings from a wide partner network, including research institutes, technology players, beginners, and customers, and an extensive analysis of macro and micro-trends. Trends that will shape logistics in the future, such as A.I., robotics, quantum calculation, sustainability, and global mobility, are explained (Baykasoğlu & Subulan, 2016).

Data obtained as a result of the study conducted by DHL demonstrate that COVID-19 has facilitated the future of digital and automation in the logistics sector, and the following future predictions are explained (Wilding, 2020);

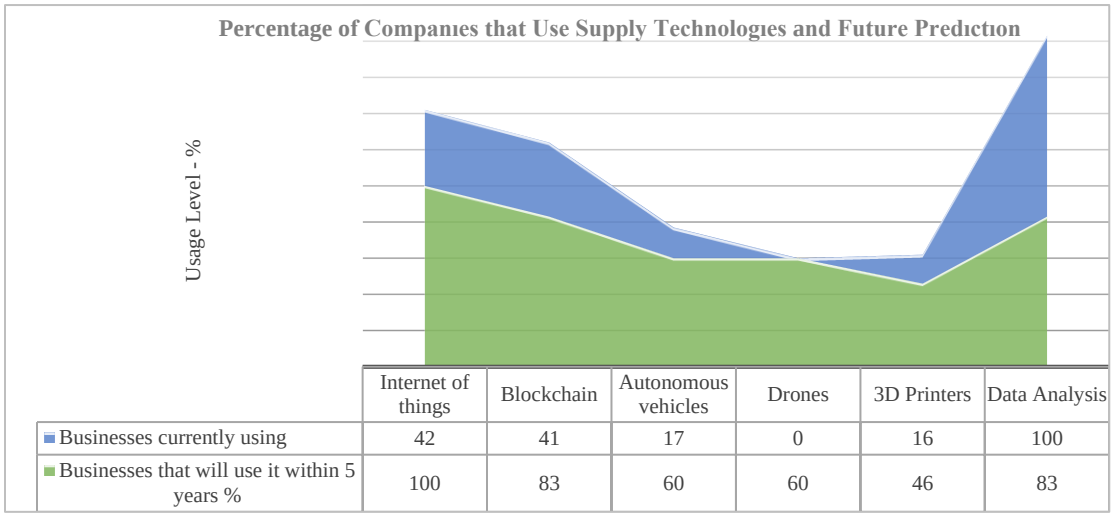
- The leaders of the supply chain are shifting from the supply era for the cost to the supply period for durability,
- Changes in consumer behavior require adjustments in the transportation flow and warehouse networks,
- New working styles will impair the traditional processes and bring a new acceleration in digitalization and automation attempts.

As a result of the comparison performed in the retrospective studies searching the contribution of robots to the annual labor productivity increase in the world (Muro & Andes, 2015);

> *"It is announced that the contribution of the use of steam engines into the annual increase of the labor productivity was at a rate of 0, 34% between 1850 and 1910, on the other hand, the use of the robots in manufacturing increased the annual increase of the labor productivity at a rate of 0, 36% as a result of the analysis of the use of the industrial robots in 14 industries in 17 countries between 1993 and 2007, they have about the same amounts. This rate does not seem high; however, it*

represents 10% of the total. The same research demonstrated that the C.T. revolution (computer technology) supported 0,60 % of the labor productivity increase in Europe, the USA and Japan between 1995 and 2005. This is twofold the amount provided by robotics".

For deliveries made by autonomous vehicles, the carrying capacity will increase further. The time losses are expected to decrease as shown in the percentage of companies that use supply chain technologies and will use them in the next 5 years in **Figure 1**. The importance of using robotics and artificial intelligence in logistics has increased with the effect of the pandemic. It has become almost mandatory. We see that its use will increase in the coming years. We expect the use of the internet of things (IoT) and blockchain to increase in 5 years in the logistics and transport industry. At the same time, we expect the use of data analysis only to decrease in 5 years.



	Internet of things	Blockchain	Autonomous vehicles	Drones	3D Printers	Data Analysis
Businesses currently using	42	41	17	0	16	100
Businesses that will use it within 5 years %	100	83	60	60	46	83

Figure 1. Percentage of companies that will use them in the next 5 years (Created by the author from UNCTAD, 2021)

The findings obtained in the literature regarding robot applications used in the logistics industry are shown in **Table 1**. The subject and purpose examples of scientific publications on the use of artificial intelligence in the logistics sector are explained.

Table 1. Literature on the use of A.I. and Robotics in the logistics industry

Authors	Article Subject	Purpose of the Article
DHL Logistics (2020)	Logistics Trend Radar	The benefits of the augmented reality systems were presented. It was explained that the vehicle's windshield was used as a display to enable the vehicle operators to use augmented reality to make safer driving as driver support systems; it can

Özbek & Eren (2012)	Multiple Criteria Decision Making Methods for Selecting Third Party Logistics Firms: A Literature Review	This paper is an exploratory study investigating the literature for current 3PL selection and evaluation research. The methods of 3PL evaluation range from simple analytical techniques to multi-criteria methods. Most of the analyzed methods for 3PL selection and evaluation consisted of hybrid approaches that considered qualitative and quantitative data and were not based on real cases. These articles are classified according to evaluation methods.
Sayın & Erol (2020)	Modeling The Supply Potential For Setting Of Paper Waste Collection Centers Under Reverse Logistics	The study is different in transferring production to a different dimension by adding the quality type of collected wastes to the location-allocation problem. In addition, the model has been made dynamic with the decision support system.
Ekol Logistics (2021)	Warehousing Examples	Ekol puts its massive multi-user-operation facilities at the service of the pharmaceutical and medical industries in Turkey, Hungary, and Ukraine with an understanding of the importance of compliance with the GMP/GDP practices and Ministry of Health regulations of each country it operates. These facilities serve many diverse product groups, including prescription drugs, OTC drugs, cosmetics, health ministry-approved food nutrition products, diabetes medicines, controlled drugs, clinical products, cold-chain drugs, and animal health drugs.
Jahanzeb *et al.* (2021)	Covid-19	Servant leadership has received its fair share of attention from organizational behavior researchers who have identified it as one of the positive leadership styles that promises a wide range of positive employee outcomes
Navarro Cid *et al.* (2022)	Covid-19	To assume this challenge and expand the frontiers of knowledge on the dynamics of work motivation, we would have to increase the rigor of our temporal designs in the assessment of within-participant variance by going beyond the use of informal rules.
Patrono *et al.* (2021)	Covid-19	Some authors, investigated the symptoms of physical and mental health associated with lifestyle changes due to a lockdown among the students of a university in Northern Italy, one of the most affected areas in Europe during the first wave of COVID-19
Carvalho *et al.* (2022)	Covid-19	Studies related to the competencies of clinical nurse leaders as an advanced practice demonstrate that they are an asset to health organizations

Neogi, *et al.* (2022)	Covid-19	To conclude, health financing parameters and preventive activities with regard the emergence of pathogens were better predictors of cumulative COVID-19 cases and deaths per million population compared to other health systems and global health security indicators
Brubacher *et al.* (2022)	Covid-19	Investigating the influence of institutions, politics, organizations, and governance on the COVID-19 response in British Columbia, Canada: a jurisdictional case study protocol.
Frost & Sullivan (2020)	Industry 5.0 - Starts the process of using trained manpower in the field of production with humanoid robots doing heavy work	Roles such as machinery maintenance and quality assurance will combine in the plant operations and become a single work. Requiring employees to be trained in numerous and various work roles. Industry 5.0 is a model of the next industrialization level characterized by smart supply chains and hyper-privatization, where a qualified labor force will be used in plant production once human-like robots take the place of manpower in heavy work.

*Created by the author

An example of a storage solution with the use of A.I. in logistics (BAYKASOĞLU & Subulan, 2016); Ekol's warehousing management services include temperature- and humidity-controlled storage for health industry customers, dedicated and varied temperature-range storage for special products, order management and shipment, sales xml file notification to the country's ministry of health, sample product management, cold-chain storage and order preparation, return management, clinical trial products storage and logistics management, health industry-specific warehouse management and order preparation systems, automated storage and order preparation areas, online KPI, and order status tracking. Ekol puts its massive multi-user-operation facilities at the service of the pharmaceutical and medical industries in Turkey, Hungary, and Ukraine with an understanding of the importance of compliance with the GMP/GDP practices and Ministry of Health regulations of each country it operates. These facilities render services to diverse product groups, including prescription drugs, OTC drugs, cosmetics, health ministry-approved food nutrition products, diabetes medicines, controlled drugs, cold-chain drugs, and animal health drugs (Bubner *et al.*, 2016).

Ekol built a health industry-specific bonded warehouse with temperature and humidity control for Turkey's pharmaceutical and medical industries. The bonded warehouse offers two different temperature ranges: a normal area ranging between 15°C and 25°C and a cold area ranging between 2°C and 8°C. It is also suitable for storing pharmaceutical raw materials and has a designated area for products subject to controls. Ekol meets customer requirements for all forms of packaging procedures in its secondary packaging areas in its facilities. With one of Turkey's largest Ministry of Health-approved secondary packaging areas on its grounds, these facilities provide the following services (Demirel *et al.*, 2011):

- Data matrix printing and labeling
- Aggregation for data matrix second phase
- Ink-jet printing on boxes

- Box changing
- Adding prospectus
- Decal labeling
- Converting into sample
- Export product preparation

The storage and distribution of promotional items are essential for pharmaceutical companies. Ekol renders this service to the industry's largest companies, making the process simple and easy to manage, thanks to the systems it has specially put together for the logistics management of promotional items. A web-based system communicates order status and warehouse inventory tracking, making promotional item logistics management uncomplicated. After the product reaches the warehouse from the supplier, a photograph is taken, and manager approval is obtained. Next, an order is created for the distributing sales team or company. Distributed promotional items can be tracked until they reach their destination with the delivery information displayed online in Ekol's distribution network. Robotic systems store and retrieve a load, such as a pallet, bin, or carton, to and from assigned storage locations as required. ASRS applications offer Ekol customers the following advantages (Ozguner & Ozguner, 2019):

- Reduced storage space: This system requires less aisle space and reaches higher racks, allowing for approximately 2.5 times more products stored in a unit space than conventional storage methods.
- Reduced labor cost: Fully automated storage and retrieval from racks eliminates the need for stacking machine operators employed in conventional warehouses. Thus, the risk of industrial accidents is also reduced.
- Reduced storage and retrieval cycle times: The time required to store or retrieve products is reduced by nearly 80 percent as compared to the performance cycle of equipment utilized in conventional systems,
- Minimized risk of errors: The operation is free of risks and mistakes that may occur due to human error. Thus, both inventory and order preparation is nearly 100 percent accurate.
- Optimized delivery: The system's algorithms allow items to be retrieved and carried faster to addresses within proximity.

MATERIALS AND METHODS

A vast increase in the utilization of robots in the logistics sector in recent years and the elevation of the sales from 19.000 pieces in 2015 to 189.700 pieces between 2018 and 2020 are accepted as an indicator of the required increase in the logistics sector. The robotic systems only used in the covered storage sites in the previous years were replaced by faster technologies equipped with high technology and high safety, which is effective in these outcomes. While the applications of A.I. emerged in any field in the world, the cooperation process of robots and manpower started once the robots called collaborative robots started being used in recent years. Service robots sales worldwide up 32%, logistics robots up 110%, medical robots up 28%. Once the market value of the logistic robots is investigated in the world, it is seen that it has climbed to 1,9 billion $ with an increase of 110% for totally sold and leased ones between 2018 and 2019 **(Figure 2)**. It is expected that the market value of the robots will further increase in the next

years, and it is estimated that the increasing requirement for faster production and delivery of products at competitive prices will be the most important incentives provided by the A.I. and robotic technologies. Service robots sales worldwide up 32%, logistics robots up 110%, and medical robots up 28% (IFR, 2020).

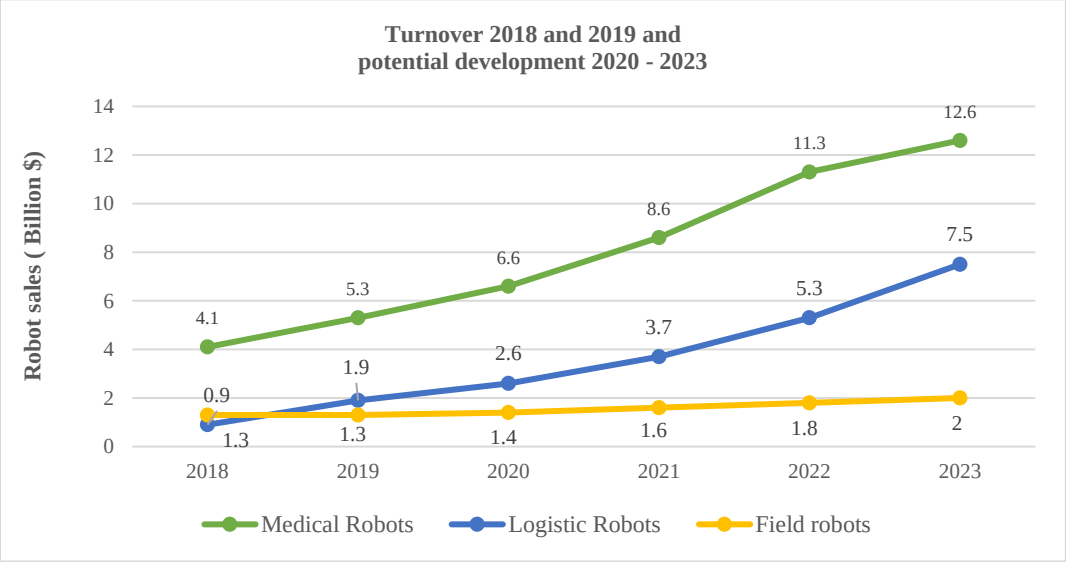


Figure 2. Service Robots for Professional Use – Major Applications. (IFR, 2020)

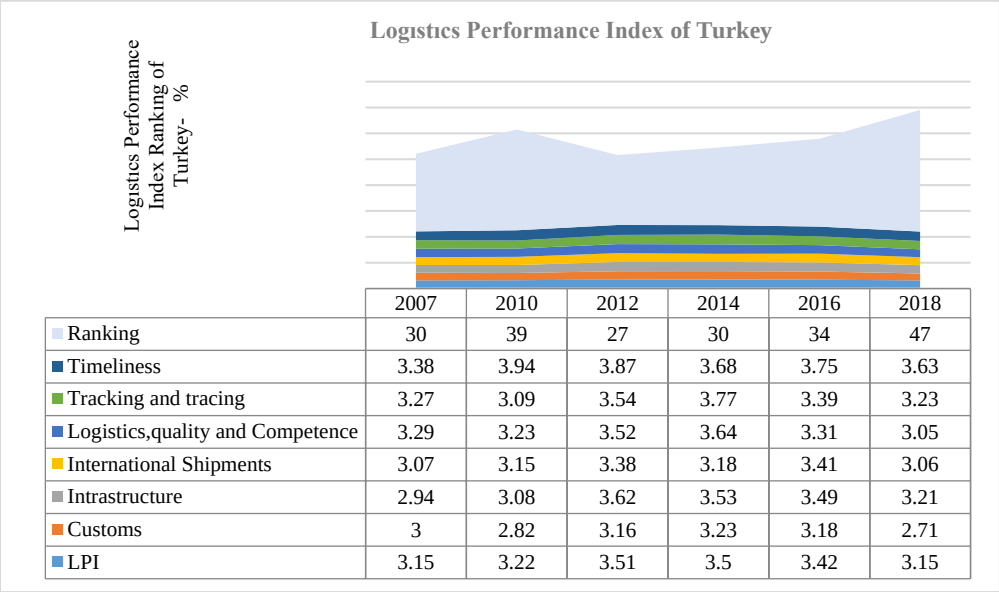
As the robots proved their value in assisting in eliminating labor shortages and undertaking dangerous tasks in 2019, it is seen that the robotic world has continued to expand the new markets in the production and supply chain/logistics world. For this reason, it is emphasized by Robotics Business Review (January 2020) that the companies being successful in the automation of any process of work in the supply chain and logistics can increase their success when any robot successfully takes any product and transports it from the warehouse to packaging station, another robot takes over the task and takes it for packaging or assisting workers in the next step. Robot use in the industry has been highly slow and consistent. Even in logistics, they are used for tasks like palletizing for a while.

The innovations such as drone deliveries are on the onset, and it seems that robotics will continue to grow within logistic applications. 5. Intelligence Robotics (5. I.R.) revolution is considered the commencement of the equality potential in global trade. It is also defined as Industry 5.0 in unmanned technologies or super smart robotics technologies. The robots can repair, control, and reprogram on their own in this system (Reagan & Singh, 2020). The world is changing thanks to artificial intelligence applications, and the supply chain in logistics should also be operated very quickly to meet the demands of the e-trade customers under the quarantine conditions with the impact of the COVID-19 crisis experienced in 2020 (IFR, 2021).

The scores give feedback to countries to identify the strengths and weaknesses of their logistics services and their partners to improve logistics performance (D'Aleo, 2015; Arvis *et al.*, 2007). The changes over time in Turkey's LPI scores are shown in **Figure 3** below.

The LPI score of Turkey decreased in 2018, as shown in the **Figure 3**, there has been a decline in all areas from 2016 to 2018. When we compare 6 dimensions, the customs score is the most

decreased area. Turkey's logistics performance index was at the same rate in 2007 and 2018 (3,15). The lowest score is in the customs area of logistics performance in Turkey. Scores received in the customs area of Turkey work together with customs in digitization can be increased (Töngür *et al.*, 2020).



	2007	2010	2012	2014	2016	2018
Ranking	30	39	27	30	34	47
Timeliness	3.38	3.94	3.87	3.68	3.75	3.63
Tracking and tracing	3.27	3.09	3.54	3.77	3.39	3.23
Logistics,quality and Competence	3.29	3.23	3.52	3.64	3.31	3.05
International Shipments	3.07	3.15	3.38	3.18	3.41	3.06
Intrastructure	2.94	3.08	3.62	3.53	3.49	3.21
Customs	3	2.82	3.16	3.23	3.18	2.71
LPI	3.15	3.22	3.51	3.5	3.42	3.15

Figure 3. Logistics Performance Index of Turkey (Turkey's LPI Scores 2007 – 2018. World Bank, 2022)

According to the Logistics Performance Index (LPI) Ranking, Turkey, which was in the 30th rank in 2007, rose to the 27th rank in 2012, but there was a decrease after this year. As of 2018, Turkey ranks 47th. In this decline, customs criteria were at the forefront; bottlenecks at customs and cost factors were effective. There has also been a decline in the quality of shipment criteria and logistics services in recent years (Logistics Voices, 2022).

The robots working in collaboration with people are the "collaborative robots" supporting the man's workmanship by accelerating manpower excellence. The stages change in the logistics (Frost & Sullivan, 2020). It is foreseen within the scope of transition from the supply chain to the blockchain with 5IR in the future of logistics that the added value to be created by the blockchain will be higher in the foreign trade and customs clearance fields. The instruments provide the best technology for developing 5IR (Frost & Sullivan, 2020).
Consequently, it is shown in the logistics sector that the use of robots positively affects labor productivity.

Turkey's SWOT Analysis

For example, a SWOT analysis was made of Turkey's logistics performance in this section. Criteria used in this analysis;

- Exports by mode of transport,
- Imports by mode of transport,
- Logistics Performance Index of Turkey,

- SWOT Analysis of Turkey

Table 2 shows the distribution of exports and imports by mode of transportation. The largest amount of transportation was done by seaway and roadway in Turkey. The lowest amount of transportation in Turkey is done by railway.

Table 2. Exports and imports by mode of transport

Exports by Mode of Transport						
	Seaway	Railway	Roadway	Airway	Other	Total
2014	88.900.953	964.170	61.133.176	14.388.661	1.117.902	166.504.862
2015	79.762.173	861.740	51.946.113	17.400.190	1.011.898	150.982.114
2016	80.139.270	673.816	49.537.436	17.908.782	987.696	149.246.999
2017	93.378.625	699.915	50.988.408	17.217.240	2.210.432	164.494.619
2018	108.802.681	753.544	52.222.468	14.127.905	1.262.157	177.168.756
2019	109.114.264	971.021	54.461.860	14.849.231	1.436.347	180.832.722
2020	100.907.927	1.287.765	53.127.588	12.732.561	1.581.914	169.637.755
2021	120.387.912	1.487.369	62.304.873	16.810.158	2.103.226	203.093.538
Imports by Mode of Transport						
	Seaway	Railway	Roadway	Airway	Other	Total
2014	147.778.523	1.253.892	40.577.283	24.889.608	36.643.124	251.142.429
2015	126.868.187	1.434.902	37.840.932	20.159.751	27.315.439	213.619.211
2016	121.013.276	1.768.602	36.716.500	23.107.208	19.583.655	202.189.242
2017	138.596.809	1.294.504	40.374.083	34.439.948	24.009.784	238.715.128
2018	136.737.402	1.299.419	39.129.380	28.756.745	25.229.537	231.152.483
2019	112.967.845	1.447.897	37.177.012	29.238.406	29.514.041	210.345.203
2020	114.838.355	2.144.863	41.883.477	39.260.478	21.389.634	219.516.807
2021	141.174.732	2.626.105	44.167.395	23.833.328	30.641.730	242.443.290

Resource: General Trade System, Transport Modes, (Thousand $), (TÜİK, 2022)

The highest amount of Turkey's total exports in recent years was realized in 2021. The number of exports decreased because of the COVID-19 pandemic in 2020. The total imports in 2021 are less than in 2014 (Açıkgöz & Acar, 2022).

The logistics performance index (LPI) consists of 6 dimensions. Each country's scores are calculated for each dimension. The dimensions of LPI are as follows (Uca *et al.*, 2019);

- Ease of shipments and competitive pricing
- Traceability of shipments
- The performance with which the shipment is delivered to the recipient in the planned time.
- The efficiency of the customs clearance process, such as speed and simplicity of formalities at customs control points.
- Quality of transportation infrastructure such as ports, information technologies, tracking, etc.

- Quality and adequacy of logistics services of customs

SWOT Analysis of Turkey

A SWOT (strengths, weaknesses, opportunities, and threats) analysis is a framework used to evaluate a company's or a country's competitive position and to develop strategic planning. SWOT analysis assesses internal and external factors, as well as current and future potential. This SWOT analysis is designed to facilitate a realistic, fact-based, data-driven look at the strengths and weaknesses of Türkiye initiatives, or within its industry **(Figure 4)**.

The Strengths (S), Weaknesses (W), Opportunities (O), and possible Threats (T) of Turkey in the field of logistics are evaluated below (Kansız *et al.*, 2020);

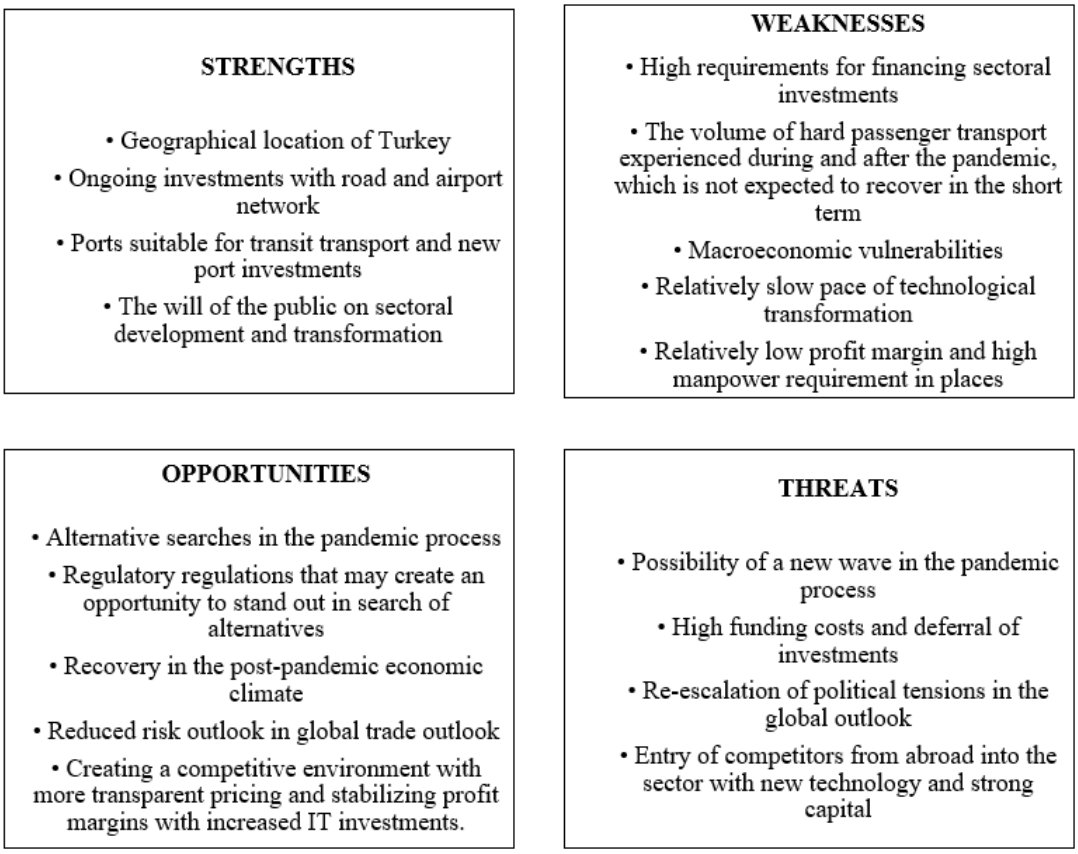


Figure 4. SWOT Analysis of Turkey

Created by the Authors from Data of KPMG (2021)

Despite all the negatives, Turkey is increasing its role in global trade through alternative routes. With the pandemic, the dependence on China, the largest supply country, has been questioned. On the one hand, the fact that it is the starting point of the epidemic, and on the other hand, its distance has led to the search for new alternative production centers, especially in developed geographies. Turkey has been one of the most prominent countries at this point.

RESULTS AND DISCUSSION

- Primarily, the use of automation systems in the world finds more areas of application in the logistics sector every passing day. It is understood that using A.I. and robotic technologies only in the storage areas is inadequate in the logistic operations in Industry 4.0 process.
- The requirement of making the logistics operations in production departments traceable and manageable is becoming prevalent. It is seen that logistics have become the main usage site in the use of service robots and AGV systems constitute the most important share.
- The goals of making the operations interconnected for which separate solutions were previously implemented only in logistic and production sites and achieving a fully automatic intralogistics process become compulsory for businesses.
- It is foreseen that the expectations of making the logistic operations best may be covered by the systems managed with fleet traffic management and navigation software, supported by drones, human-like collaborative robots, and 5G technologies where it is shifted from supply chain to developed blockchain.
- Within the scope of the storage example of the logistics company, the storage and distribution of promotional items are one of the essential needs of pharmaceutical companies. Ekol renders this service to the industry's largest companies, making the process simple and easy to manage, thanks to the systems it has specially put together for the logistics management of promotional items.

CONCLUSION

This study, it aims to explain the expectations about Supply Chain Management (SCM) strategies that have become obligatory to change due to COVID-19, a global health problem threatening the world today. The analysis is made with Multi-Criteria Decision Making Method. In this analysis, first, an evaluation is made with the approach of developments followed since the first industrial revolution and the necessity of transition from Industry 4.0 (4IR) to Industry 5.0 (5IR). As a result, a SWOT (Strengths – Weaknesses – Opportunities – Threats) analysis of Turkey's SCM performance was made. Research has been done on this subject from different perspectives around the world. Therefore, the literature is quite extensive. The reported results are very different.

COVID-19 emphasized that robotic applications serve to collaborate and increase productivity instead of replacing people. The epidemic in the warehouse has led to simpler automation and the use of collaborative arms that allow for better distance in assembly lines and other tight spaces. Human-robot collaboration has also been seen through applications designed to adapt to today's changing work environment. The examples show how different robotic systems can help maintain work efficiency and improve collaboration despite uncontrollable conditions.

While COVID-19 has led to the adoption of robotic technologies, it has also shown us a new way to work effectively with robots that will have a lasting impact for years. It is foreseen that the concerns regarding the elimination of manpower and some professions will be removed with proper strategies in the industry's process of using A.I. and robotic technologies. It is seen that while removing the need for manpower is not expected and reducing costs in businesses, on the contrary, providing more productive production and service using "robot power – manpower" collaboration will be paved.

It is envisaged that the industrial revolutions where it is targeted to employ people in easier works like only pushing a button and providing the necessary monitoring and control are required to be supported based on the fact that there are both heavy and risky works for the human workers among the disappearing professions. The fact that it is aimed to offer the human workers working opportunities under more humanistic conditions thanks to the self-controlling, more developed robot technology which is consistently operating, and can perform any work which people perform, is emphasized.

In this process, it was concluded that the use of human-like robots has almost become compulsory, and the objectives of Industry 6.0 should be identified in the future depending on fast adaptation to the conditions of the present day.

Turkey continues to have great potential in the transportation and logistics sector thanks to its significant tourism potential and critical geographical location. Recent land and air investments support this potential, but structural problems delay the emergence of this potential.

In addition to the volumetric recovery, the sector is expected to put 2021 at the forefront in increasing control over operational effectiveness. Undoubtedly, this process will run in parallel with itinerary investments. In parallel with its investments (especially pipeline transportation), it will bring increased measures and investments in cybersecurity. The current outlook indicates that the worst is behind us in the outbreak, but the new variants continue to create anxiety and uncertainty.

A new wave in the outbreak, especially in the last quarter of the year, will negatively affect expectations. In this process, companies need to determine recovery strategies, support models with investments and read the data very well. In the meantime, developing corporate adaptation capability is of great importance.

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