

MARITIME STRATEGIC EVALUATION FOR ISRAEL 2022/23

Chief Editor: Prof. Shaul Chorev

Editor: Dr. Ziv Rubinovitz



Disruptive Technological Changes in the Field of Shipping and Ports as an Opportunity for Israel¹

Ehud Gonen

The shipping sector, and parts of the maritime logistics industry related to it, are included in the 'blue economy' sector,² i.e., economic activity related to the sea.³ The development of maritime technologies has been described by the OECD as one of the key factors in the development of a blue economy. In a detailed report published in 2016, predicting the development of blue economy until 2030, the organization notes a series of technologies such as sensors, satellites, autonomous systems and big data that are merging into new formations, changing the face of blue economy, and specifically shipping, navigation, maritime transport and "the smart ship".⁴

It should be noted that the field of shipping and ports is relatively conservative and operates according to global regulations, including large investments of capital. This is one of the reasons that this field experienced a relatively late digital revolution, and the introduction of disruptive technologies only during the past decade. The global bodies that regulate shipping, and especially IMO – the International Maritime Organization, have been working in recent years to create a regulatory framework for the introduction of new technologies, including autonomous technologies, into the field. Even so, the issue of advanced technologies for shipping has not yet been established according to clear international standards, and clear technological leadership of one company or another is

-
- ¹ This article is based on a research paper 'Determining Feasibility for a Test Area for Autonomous Vessels in Israeli Waters and its Future Expansion to the Area between Israel and Cyprus', prepared for the National Economic Council at the Prime Minister's Office (Hebrew).
 - ² The European Union divides the blue economy sector into six branches: (a) maritime traffic and shipping, (b) food, nutrition, health and system services, (c) energy and raw materials from the sea and the seabed, (d) leisure, recreation and residences, (e) protection of beaches and cliffs, (f) monitoring, conservation and control. See: [United for Mediterranean](#).
 - ³ For a comprehensive overview of blue economy in Israel: Ehud Gonen, Overview of Blue Economy in Israel – Current Situation and Opportunities, Maritime Policy & Strategy Research Center (Hebrew).
 - ⁴ "[The Ocean Economy in 2030](#), OECD, 2016, pp. 119–126, 128–130: "These include Automated Identification System (AIS), Electronic Chart Display and Information System (ECDIS), Integrated Bridge Systems/Integrated Navigation Systems (IBS/INS), automatic radar plotting aids (ARPA), radio navigation, long-range identification, and tracking (LRIT) systems, Vessel Traffic Service (VTS) and the Global Maritime Distress Safety System (GMDSS). Moreover, ships now carry global satellite navigation systems (GNSS) and will soon all have reliable ECDIS".

not yet evident. For this reason, the distinct technological changes that have taken place in the field of shipping in recent years are an opportunity for Israel on a national level.

This article addresses the implications for Israel related to technological developments in the field of commercial shipping and maritime logistics. These developments include opportunities for Israel on three levels: economic opportunity: autonomous shipping technologies as a catalyst for growth and employment, both nationally and for the city of Haifa and the northern region, a regional opportunity: blue economy as a platform for regional cooperation in the eastern Mediterranean and the northern Red Sea, and a strategic opportunity: maritime technology as a tool for disillusionment from Israel's "maritime blindness", as a tool for increasing Israeli soft power, which can be an opportunity for possible Israeli influence on the international community. In addition, shipping technologies, and especially 'autonomous shipping' related to international trade, enable the collection of information and influence related parties beyond the specific field of shipping.

Economic Opportunity

On a national level, Israel is internationally known for its local ecosystem in the fields of technological innovation to the point of branding the country a "startup nation".⁵ Even in the 1990s, Israel was a global leader in the field of unmanned aerial vehicles (UAVs). While many are proud of this fact, as the Biblical proverb goes, 'For riches are not forever', and the development of an ecosystem for new fields must continue. The coming years are a window of opportunity for Israeli industry, with a possibility of taking over a significant part of the global shipping industry market, as it has done with UAVs, the space industry and autonomous terrestrial vehicles, and beyond its relative impact on world economy or trade.

In the context of transportation, two noticeable parallel national initiatives have occurred in Israel in recent years, promoting elite technology in the fields of unmanned vehicles in the air and on land. In the field of aviation, the Civil Aviation Authority at the Ministry of Transport in Israel authorizes unmanned aircraft to fly in civilian airspace. Israel is the first country in the world to approve such activity. This, as the Hermes Starliner UAV manufactured by Elbit, which is considered the most advanced of its kind, received a civil aviation license, completing its compliance with the international (NATO) standard conditions for the integration of UAVs in civil aviation areas. It should be noted that the approval of this move by the Civil Aviation Authority enables significant economic

⁵ Dan Senor and Saul Singer, *Start-up Nation: The Story of Israel's Economic Miracle* (New York: Twelve, 2009).

possibilities for the UAV manufacturer (Elbit), which has already signed contracts to supply the Hermes Starliner UAV to the Swiss Federal Department of Defense, Civil Protection and Sport and the Canadian Ministry of Transport and supplies the Hermes UAV to more than ten other countries.⁶

Furthermore, in January 2021 the "Drone Initiative" was launched by the Israel Innovation Authority. During this experiment, drone flights are carried out over residential areas in Tel Aviv-Jaffa, Ramat Sharon, Herzliya and Hadera,⁷ and will be operated in Brazil as well, using the same Israeli control system. Together, the participating companies are expected to perform about 300 flights a day over open areas, and perform various types of missions on air routes assigned by the joint control system.⁸ This is a joint venture of many commercial companies together with the Israel Innovation Authority, the Civil Aviation Authority at the Ministry of Transport, the Ayalon Highways Company and the relevant municipal authorities. Additionally, the first drone field in Israel is being established in Yeruham.⁹ This combined activity of government authorities, commercialization of military technologies, government companies and private companies, according to a suitable regulatory framework, are catapulting the field forward on a global level.

Autonomous vehicles are another relevant field. Here too, Israel is a global leader when it comes to certain systems, a status reached thanks to an entrepreneurial culture, military investments, and appropriate governmental and regulatory programs. In 2017, a national plan for smart transportation was announced. The first part of the plan is "Promoting the establishment of an autonomous vehicle testing center that supports smart transportation."¹⁰ Over the years, hundreds of companies in the field of smart transportation have been established in Israel, some of which, such as "Mobileye", are world-class leaders in their field.

The Department of Smart Transportation at the Ministry of Transport, in cooperation with the Ministry of Transport and other relevant government agencies, is making efforts to initiate, assist and promote activities that will advance the operation of autonomous

⁶ ["A Global Aviation Revolution"](#), Ministry of Transport, February 13, 2022 (Hebrew).

⁷ ["The National Drone Initiative Began with a Pilot over the City of Hadera"](#), *TechTime*, June 30, 2021 (Hebrew).

⁸ ["The Third Phase of the National Drone Project is Underway"](#), Israel Innovation Authority, October 12, 2021 (Hebrew).

⁹ Keinan Cohen, ["The Demand for Experiments has Taken Off, and the first Drone Field in Israel will be Established in Yeruham"](#), *Walla News*, April 8, 2021 (Hebrew); Nurit Sommer, ["A Unique Test Field for Drones Will Soon be Established Near Yeruham"](#), *YNET*, December 20, 2020 (Hebrew).

¹⁰ ["The National Plan for Smart Transportation"](#), Government Resolution No. 2316 of January 22, 2017 (the 34th government led by Benjamin Netanyahu).

vehicles.¹¹ The Ministry of Transport notes that among the actions taken for this purpose are the passing of the 'Law on Autonomous Vehicle Experiments in Israel', and the preparations for sub-legislation on the matter (the law entered into effect in April 2022).¹²

In the context of innovation and development, the National Economic Council at the Prime Minister's Office stated:

Leveraging technological innovation in Israel: While Israel has not been a player in the traditional automobile industry until now; it is emerging as a major player in the field of smart transportation, where it has a comparative advantage. The transition from the development stages to the implementation stages of smart transportation creates another significant opportunity for Israel, which can also become the focus of beta sites.¹³

This Israeli technological leadership in the fields of aviation and autonomous vehicles, as well as in the field of space (not detailed in this document) was achieved even though Israel does not have a distinct production of terrestrial or aerial platforms.

In the past decade, there are indications of a substantial change in the way the shipping and ports sector operates, and it is possible to identify a number of operational areas in which a substantial change is taking place. The first is process automation and autonomous shipping. Another trend related to automation is the development of cyber for the maritime domain, and the third is big data. Israel has distinct bodies of knowledge and development capabilities in all of these fields. Thus, there is room to expand activity in the fields of space, air and land technologies to the sea as well.

Process automation and autonomous shipping: Difficulty in recruiting shipping personnel and a wish to reduce ship operating costs are pushing the industry to cut down on crews by introducing advanced technology in the fields of navigation and ship operation. This is related to the remote operation of ships from offshore control centers or completely autonomous shipping on fixed lines, such as ferry lines, supply to fixed rigs at sea, and the like.

Cybersecurity: the emergence of cyber warfare and the increasing involvement of state and non-state actors in cyber-attacks on critical infrastructures such as ports, both in

¹¹ ["Autonomous Vehicle"](#), Ministry of Transportation, April 5, 2021 (Hebrew).

¹² ["The Knesset has Begun Debating a Bill that will Allow Conducting Tests on Autonomous Vehicles for the First Time in Israel"](#), Ministry of Transportation, December 8, 2021 (Hebrew).

¹³ Roni Bar, "Israel is Preparing for the Smart Transportation Revolution: Autonomous, Electric Vehicles, the Economic Consequences of Connected and Collaborative", Economic Council, Prime Minister's Office, April 2019 (Hebrew).

terms of information technology and in terms of operational technology, and in the process the use of private entities and advanced technologies in order to achieve strategic value, all turn the maritime domain into a most vulnerable arena. In the past decade, the civil maritime industry (shipping industries, vessels, passenger ships, shipyards, ports, terminals and gas and energy infrastructures) has become very dependent on computer and control systems based on operational technologies. These systems are mostly based on outdated operating systems, without security updates, have limited (if any) monitoring capabilities and most have no cyber protection at all.¹⁴

Big data for the maritime sector: in the maritime sector, many systems, such as ships, cranes, freighters and more, operate and produce great amounts of data. This is in fact the Internet of Things (IoT). These "things" range from ships and cranes to a single container. This data can be processed and analyzed with big data and AI tools. The insights from these processes improve and optimize the flow of products in the logistics value chain.

It should be noted that in recent years Israeli entrepreneurs are discovering the maritime field and the potential inherent in it as a 'vertical field' for technological developments, and there is already a fairly solid foundation for the expansion of this industry; however, complementary government activity is necessary for the development of the field. Among the commercial activities in the field of maritime technologies that already exist in Israel, the following should be noted:

Venture capital activity: theDOCK Maritime-Tech venture capital firm announced a second round of fundraising in the amount of 30 million dollars in 2022.¹⁵ The Arieli Capital holding and investment company deals, among other things, with maritime technologies. The company operates the innovation center in Eilat (including activities in the field of aquaculture in the Negev) and also announced cooperation with the China Merchants Company, to manage an innovation center for maritime technology that will be established in China.¹⁶

The Beta site at Haifa Port: The port is working to establish projects in the field of technological innovation for the world of shipping, ports and logistics. However, it should be noted that due to the privatization processes of the port (the announcement of the winner of the privatization of the Haifa Port was made in August 2022, but the Israeli-

¹⁴ For a discussion on the topic, see Itai Sela, "Estimate of the Cost of Protecting the Sea Ports in Israel Against Cyber Threats", in Shaul Chorev and Ziv Rubinovitz (eds.), *Maritime Strategic Evaluation for Israel 2021/22* (Haifa: Maritime Policy & Strategy Research Center, University of Haifa, 2022), pp. 346–357.

¹⁵ theDock Company website: thedockinnovation.com.

¹⁶ Gonen, Overview of Blue Economy in Israel (Hebrew).

Indian consortium that won the tender has not yet started the actual operation),¹⁷ activity regarding technological innovation has been hampered.¹⁸

The technological incubator at the Ashdod Port: Ashdod Port established an innovation incubator in the field of logistics, shipping and ports. Furthermore, the 500 Global accelerator, which specializes in managing technology incubators, joined the port's operations.¹⁹

Israeli National Center of Blue Economy: In July 2022, the National Center for Blue Economy was launched by the Municipality of Haifa. The center is managed by the municipal corporation HiCenter, which encourages the development of entrepreneurship in the city.²⁰

Vessel production: there is one shipyard company in Israel intended for building ships. "Israel Shipyards" manufactures medium-sized vessels of up to 70 meters in size, such as Shaldag-class patrol boats or missile ships, mainly for military and law enforcement purposes (Coast Guard, etc.). These are shipyards with an international reputation in their niche of activity. Furthermore, unmanned military vessels were/are being produced by Rafael (the Protector ship), Elbit (Sigol), and IAI (Katina).

At the end of 2021, the Israel Aerospace Industries (IAI) signed a contract with the EDGE company from the United Arab Emirates for the joint production of autonomous vessels for a variety of military and commercial applications.²¹ In the underwater field, ELTA (a subsidiary of IAI) has developed an unmanned submersible vessel with capabilities to replace sensors and tasks according to operational needs.²²

Private companies: in the civil sector, a number of relatively large companies such as 'Totem Plus', which deals in navigation systems and is a leading company in the field of

¹⁷ ["Gadot Won the Tender for the Privatization of the Haifa Port for NIS 4.1 Billion"](#), *Calcalist*, July 14, 2022 (Hebrew).

¹⁸ ["The Port of Haifa Publishes a Request for Tender for a Technological Innovation Project in the Field of Shipping"](#), *port2port*, January 24, 2019 (Hebrew).

¹⁹ ["Innovation at Ashdod Port"](#), Ashdod Port, retrieved November 2022 (Hebrew).

²⁰ The National Center for Blue Economy Website. blueeconomy-il.com.

²¹ Press Releases ["EDGE Announces Strategic Deal with IAI to Develop Advanced Unmanned Surface Vessels"](#) IAI, November 18, 2021.

²² Roy Nagler, ["The Challenges in Operating Autonomous Vessels in the Era of Globalization – the Case of Autonomous Cargo Ships"](#), in Shaul Chorev and Ehud Gonen (eds), *Maritime Strategic Evaluation for Israel 2019/20* (Haifa: Maritime Policy & Strategy Research Center, University of Haifa, 2020), 1–14.

maritime navigation systems and decision support systems, as well as the 'Orca', may be mentioned. The website of the Israeli Advanced Technologies Forum lists several dozen maritime companies, but this is only a partial list of the companies operating in Israel.²³ Zim is a large Israeli shipping company, but the company's core business is maritime and integrated transport and not technological developments. However, given the appropriate context, the fact that 'Zim' is an Israeli company may allow experimental installations of innovative technologies.

In addition to the maritime technology field being a potential catalyst for national growth, it can also encourage distinct growth in the Haifa Bay and the Western Galilee region. Since 2015, the government has been determining a social and economic development policy for the north of Israel and the city of Haifa. In the process, government decision No. 2262 was accepted in 2017 on the subject of 'Economic development of the northern district and complementary measures for the city of Haifa', which included a reference to the issue of the port and its infrastructure.²⁴ In 2020–2021, in accordance with a government decision on the 'development and advancement of Haifa Bay',²⁵ a committee of Director Generals from relevant government ministries was convened within the framework of the National Economic Council, and conducted a long and comprehensive procedure that focused mainly on the petrochemical industries in Haifa Bay, but encompassed all aspects of the economy and employment in the region. The committee determined the following:

Analysis as part of the committee's work found that the relative advantages of the bay area include: knowledge-intensive industry, seaport and logistics, "green" production industries for energy and chemistry, and leisure tourism. Based on this analysis, there is great potential for employment in the Haifa Bay, and for the realization of the "Innovation Bay" plan.²⁶

One of the committee's recommendations was the development of knowledge-intensive industrial areas in the Haifa region for the purpose of shifting the industrial focus of Haifa from the petrochemical industry to knowledge-intensive industries. This trend is in line with the Haifa Municipality's own policy for the development of the city as a center for knowledge-intensive industries. This policy is based on the fact that growth engines for the city are tourism, sea, aquaculture, environment, sustainability and security.

²³ Maritime Technologies Forum website. israelmaritime.org

²⁴ "[Economic Development of the Northern District and Complementary Measures for the City of Haifa](#)", Government Resolution No. 2262, January 8, 2017.

²⁵ "[Development and Advancement of Haifa Bay](#)", Government Resolution No. 472, October 25, 2020 (Hebrew).

²⁶ "[Recommendations of the CEOs' Committee for the Development and Advancement of Haifa Bay](#)", National Economic Council at the Prime Minister's Office, June 7, 2021 (Hebrew).

Advanced technologies in the field of shipping and ports can contribute to the economic development of the Israeli economy and growth within a sector in which hundreds of companies will operate, employing thousands of workers at high wages, and creating wide circles of employment and technological exchange, as is the case in the fields of space and unmanned aircraft and vehicles. There is a need to build an economic infrastructure that includes dedicated development plans for the field, beyond the activities of technology companies and private venture capital funds that already operate in this field, as well as the development of appropriate regulatory infrastructure, such as test and trials facilities.

The first step in this direction was the Ministry of Innovation, Science and Technology's statement regarding the sea as one of the five national priority areas. This decision must continue to be supported with an appropriate budget and regulatory activity, a process that is indeed taking place.²⁷

Regional Cooperation Opportunities

Cross-border economic cooperation is one of the ways for building regional security stability, and this goes beyond the direct economic benefit inherent in them. The economic potential inherent in the joint project for each party drives a mutual desire to preserve the cross-border ventures despite upheaval and external events. Furthermore, direct channels of communication are opened between individuals and organizations on both sides of the border, which, in turn, also contribute to general stability. In the Israeli context, the QIZ project between Israel and Jordan and between Israel and Egypt,²⁸ as well as past collaborations between Israel and Egypt in the field of agriculture may be mentioned. Examples of these in recent years are cooperation in regard to gas fields, such as the agreement between Israel and Egypt and the establishment of a regional alliance in the eastern Mediterranean (see below).²⁹

Technological collaborations with Cyprus and Egypt in the field of shipping technology and ports are unique, in light of the maritime characteristics of these countries (see below). It is possible to plan joint international experimental areas for shipping and logistic technologies, demonstration and feasibility testing facilities (beta site), international

²⁷ The National Council for Civil Research and Development, "[Bioconvergence, foodtech, Renewable Energies, Space and Blue-tech: these are the National Priority Areas for the State of Israel](#)", the Ministry of Innovation, Science and Technology, September 4, 2022 (Hebrew).

²⁸ Qualify Industrial Zones – QIZs are industrial zones in Jordan and Egypt where Israeli-owned or joint-owned factories benefit from duty-free exports of goods (mainly textiles) to the United States under the auspices of Israel's free trade agreement with the United States.

²⁹ Danny Zaken, "[It's official: Israel, the European Union and Egypt have signed a gas export agreement](#)", *Globes*, June 15, 2022 (Hebrew).

cooperation to obtain funding from international organizations (such as the World Bank or European funds), to support joint projects and more.

Cyprus

Civil cooperation between Israel and Cyprus, especially in the areas close to the maritime domain, has a high potential for success. Being an island, Cyprus is dependent on the sea for every aspect of its existence. This island, with about one million inhabitants, has a world-class flourishing shipping industry, on a larger scale than that of Israel. The Cypriot fleet flying a national flag included (as of 2020) 1,056 ships with a total load of 35 million tons, in addition to many ships under flags of convenience or in partnership with Greek players (Greece is one of the most important shipping countries in the world).³⁰ Cyprus also supports entrepreneurship and innovation and tries to promote these fields. For example, with a chief scientist position, responsible for research and entrepreneurship.³¹

In recent years, diplomatic relations between Cyprus and Israel have been strengthened, especially in aspects of energy and maritime activity. The catalyst for this improved diplomatic relationship is common interests in energy issues such as gas and electricity on the one hand, and the existence of a common adversary – Turkey, on the other. Cyprus has been a member of the European Union since 2004. Israel and Cyprus have a common maritime border in the economic exclusive zones (EEZ) and thus, practically, Israel has a common maritime border with the European Union. The two countries agreed on the demarcation of their maritime border in an agreement signed in December 2010.³² In 2021, the countries reached certain agreements regarding the Aphrodite-Yashi reservoir shared by both.³³ Israel and Cyprus also signed an agreement to connect the electricity grid between the countries with an underwater cable that will be the longest of its kind.³⁴

³⁰ "[Maritime Profile: Cyprus](#)", *UNCDATSTART*, 2021.

³¹ Cyprus's Chief Scientist for Research and Innovation Website. chiefscientist.gov.cy

³² Avi Bar-Eli, "[Israel and Cyprus Agree on Economic Waters Border](#)", *TheMarker*, December 19, 2010 (Hebrew).

³³ "[Minister Steinitz and his Counterpart from Cyprus – Natasa Pilides, Reach a Solution to the Dispute at the Aphrodite-Yashi Reservoir](#)", Ministry of Energy, March 9, 2021 (Hebrew).

³⁴ "[Israel Connects to the European Electricity Grid: Minister Steinitz Signed a Memorandum for Laying the World's Longest Underwater Electricity Cable](#)", Ministry of Energy, March 9, 2021 (Hebrew).

Egypt

In light of Israel's five wars with Egypt (1948, 1956, 1967, 1967-1970, 1973), a peace treaty signed in 1979 and Egypt's influence on what is happening in the Gaza Strip, the stability of relations with Egypt is a strategic goal.

Egypt is a key country in the field of global shipping, due to the Suez Canal that runs through its territory. About 10% of world trade is transported through the canal. The canal, which was expanded in recent years as part of an Egyptian national project, is operated by a government authority that runs hundreds of different vessels and employs thousands of workers. Port Said, at the northern exit of the canal, is one of the largest transshipment ports in the region.

A maritime border with Egypt has not been officially determined, and there is also the problem of defining a maritime domain for the Gaza Strip, located between the countries. However, at longer ranges in the EEZs, Israel and Egypt share a common maritime border, since there is an underwater gas pipeline between the countries. Economic cooperation in the field of blue economy, energy and shipping technologies between Israel and Egypt is also relevant in the Red Sea, where Egypt is in the midst of a great economic and maritime development boom.

The Israeli government decided on "a plan to promote and expand the economic ties between the State of Israel and the Arab Republic of Egypt".³⁵ This decision includes elements of joint development of a blue economy, in the fields of aquaculture (both in the Mediterranean and the Red Sea), energy from the sea, and marine tourism. Expansion of this program to the fields of shipping technology and logistics should also be considered.

The East Mediterranean Gas Forum

The East Mediterranean Gas Forum (EMGF) is a maritime economic cooperation forum for the countries of the Eastern Mediterranean. This forum began as the 'Hellenic Alliance' between Israel, Cyprus and Greece to which Egypt was also invited. Later, the framework was expanded into an established forum called the "East Mediterranean Gas Forum", which includes Greece, Israel, Jordan, Egypt, France, Cyprus and the Palestinian Authority. The United States and the European Union are observing members of the forum as well. Originally, the forum was established for the purpose of consultations on the construction

³⁵ ["A Plan to Promote and Expand the Economic Ties between the State of Israel and the Arab Republic of Egypt"](#), Government Resolution No. 1522, Israel Government, May 29, 2022 (Hebrew).

of an underwater gas pipeline project that would centralize the export of gas from the economic waters of Israel, Cyprus and Egypt and reach the European markets via Italy.³⁶

In addition to this, a 3+1 forum exists, including Israel, Cyprus and Greece as well as the United States. Within it, blue economy emerges as a relevant and important field to the relationship of the forum members.³⁷

Strategic National Opportunities

On a strategic level, the development of maritime technologies will help to renew essential maritime knowledge that is gradually disappearing from Israel. It will also increase Israeli soft power, and provide diplomatic leverage for Israel in the international arena.

In Israel, there are six commercial ports (Haifa port, the Bay port, Ashdod port, the South port, Israel Shipyards and Eilat port) and three energy ports (Hadera, Ashkelon, Eilat). The cumulative length of the docks in these ports is more than 13.5 km and they use advanced technologies (the vast majority of which are not Israeli) such as semi-automatic bridge cranes, automatic facilities for bulk goods (grains and cement) and more. The ports are operated by Israeli governmental companies, alongside leading international companies such as SIPG from China, TIL from Switzerland and Adani from India.³⁸

On the other hand, Israeli shipping is at a low. The fleet of ships owned and controlled by Israel stands at 35 ships alone (in 2021), of which only 7 ships raise the Israeli flag. The average age of merchant navy ships is 13.3. A total of 129 Israeli sailors are employed at the Israeli-owned and controlled merchant navy, all of them officers without ratings (qualified sailors).³⁹ These numbers are distinctly lower than those of the 'heyday' of Israeli shipping in the 1960s and 1970s, when dozens of ships sailed under the Israeli flag, with thousands of Israeli sailors.

The decline of Israeli shipping and the loss of knowledge and manpower in the maritime field, with only a few ships raising the Israeli flag, about a hundred Israeli naval officers and no Israeli ratings at all, has strategic effects on the country's international trade during emergencies, and it is likely (in view of past events) that global shipping will

³⁶ ["Cyprus, Greece, Israel and Italy Signed a Memorandum today in Nicosia for the Construction of the Gas Pipeline from Israel to Italy"](#), Ministry of Energy, December 15, 2017 (Hebrew).

³⁷ Israel's ambassador to Cyprus, Oren Anolik, on a Zoom call, June 2022.

³⁸ In August 2022, the Adani Group from India won the tender to operate the Haifa Port but has not yet begun this operation.

³⁹ *Shipping and Ports Statistical Yearbook 2021*, Administration of Shipping and Ports, Ministry of Transport, 2021, p. 101 (Hebrew).

avoid Israeli ports in such cases. Furthermore, the decline of Israel's commercial fleet means the loss of maritime knowledge essential to the management of Israel's ports and maritime domain. The development of maritime technologies is a tool for addressing Israel's maritime blindness, and to recognize, once again, the importance of the maritime domain to the Israeli public.

Technological leadership is a significant part of a country's soft power. The exchange of technology is often used as a currency in the diplomatic world. Countries with economic and technological power can exert more influence on other players in the international community in order to advance their goals. In the Israeli context, it is possible to see Israeli leadership in areas such as agriculture, water technology and energy, areas that promote Israel's position in the region and in the world, and allow it room for diplomatic maneuvering.

Global technological leadership allows leading countries to define international standards suitable for their local industry, thus leveraging leadership in a certain sector for further economic development which, in turn, preserves leading positions in that field.

Furthermore, exporting technologies enables the collection of much information that can be used by state or commercial companies in future developments and future economic impact. For example, the political power of a global social network platform – in light of the huge amount of information it contains – is immeasurably greater than the purely financial scope of the activity on it. Another example from the field of transportation is companies such as Boeing or Airbus in the aviation field, Maersk in the shipping field, major car manufacturers such as Toyota and more – all of these have much information regarding global trends that go far beyond the field of transportation in which they operate – this is due to the global aspects of these companies' activities. In light of the cross-sectional importance of the maritime trade, shipping and maritime security fields, a significant future technological presence in these fields also brings with it the ability to collect much information and with it a greater influence in the global arena.

Conclusions and Recommendations

It will probably be many more years before fully autonomous ships with no crew will sail the seas. However, it seems that we are in the midst of introducing advanced technologies to the field of shipping, and should certainly expect an increase in the level of vessel automation and the introduction of decision support systems, which will greatly lower the number of crew members on board the ships. Additionally, there may be ships that will be operated and supervised from the shore, where the crew will operate and

supervise several ships at the same time, or ships and smaller vessels without a crew that will sail on fixed and clear routes.

The development of maritime technologies is a catalyst for national growth, similarly to the fields of space, automobiles and aviation and can also be a major regional growth catalyst in the Haifa Bay area, as an alternative to the petrochemical industry. The development of maritime technologies can strengthen relations with Cyprus and Europe, as well as with Egypt, and can help Israel take a proper and respected place in the field of global shipping. Israel has a maritime heritage, but in recent decades maritime knowledge has been lost. This situation has strategic consequences, among other things, on the country's international trade during an emergency and the control of the Israeli maritime domain.

As in many fields, technology and legislation advance together, and the need for regulation that enables technological development, such as conducting sea trials in Israel on a regular basis as part of an infrastructure for the development of a blue economy, is increasing. This is in line with global trends in the development of blue economy, as well as the economic development trends in Israel, based on entrepreneurship and innovation.

Main Recommendations

1. Action must be taken to build a national plan to promote the field of maritime technologies. The announcement of an Israeli National Center of Blue Economy in Haifa, and the announcement of blue economy as a national priority by the Ministry of Innovation, Science and Technology are undoubtedly noteworthy progress, but these announcements must be broken down into practical plans and budgeted accordingly, and an appropriate regulatory framework must be promoted.
2. The maritime regulators must promote a regulation that allows experiments in advanced technologies for naval vessels, such as autonomous vessels.
3. On the issue of international standardization: the autonomous shipping trend is industry-driven, meaning it grows bottom up. Therefore, there is great significance to technological capabilities alongside standardization. It is recommended to act for the purpose of placing Israeli experts in the fields of technological standardization for the maritime domain, especially when it comes to maritime cyber. For this reason, together with the Standards Institution of Israel, it is recommended to integrate technical experts from Israel under ISO/TC 8 Ships and maritime technology committee, for activity in the next World Organization for Standardization teams.

Ehud Gonen, PhD candidate at the Department of Asian Studies at the University of Haifa and a Researcher at the Maritime Policy & Strategy Research Center, University of Haifa. Ehud's area of research is OFDI (Outgoing Foreign Direct Investment) from China into the Sea-Port sector under China Belt & Road Initiative (BRI) . Ehud held the position of Senior Fellow Researcher at the Harold Hartog School of Government & Policy, Tel Aviv University (2015–2016). He received an MA in International Relationship from the Hebrew University (2000) and a BA in Economics and Psychology from the University of Haifa (1996). Ehud served as a Diplomat (Israel Trade Commissioner) to Singapore (2000–2004) and to Australia (2008–2012) as well as the chief economist of the foreign trade administration, Israeli Ministry of Economy (2012–2016). Ehud wrote and published two books: 'The book of TEA' the only book in Hebrew on the rich history and beautiful culture surrounding TEA, and 'DECEMBER' a novel based on real events at the early 90's in Israel and Eastern Europe. Ehud was the editor of *Maritime Strategic Evaluation for Israel* from 2016 to 2021.