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National strategies and programs for artificial intelligence

Summary

This document was prepared at the request of Knesset Member Orit Farkash-Hacohen, Chair of the Science and Technology Committee's Subcommittee on Artificial Intelligence and Advanced Technologies. It reviews national strategies and programs for artificial intelligence in Israel and several leading countries worldwide, presenting key issues that arise in them.

The field of artificial intelligence is currently perceived by countries as a crucial link in their ability to maximize capabilities in economics, education, healthcare, and other areas. The transformation of this technology into a growth engine alongside it's harnessing for public benefit on one hand, and concerns about its implications for various aspects such as the future job market, individual freedoms, discrimination, and more on the other, are prompting countries worldwide to establish a strategy or national program in the field of artificial intelligence.

Israel

In December 2020, the Artificial Intelligence and Data Science Committee submitted its conclusions to the Chair of the TELEM Forum (National Infrastructure for Research and Development). According to the conclusions: "**There is a significant gap in Israel between the advanced research and development in the field of artificial intelligence and the lack of government strategy in the area, which is also reflected in a shortage of adequate computing infrastructure**".

Government Resolution 212 from August 2021 tasked the Minister of Innovation, Science, and Technology with leading the government's policy in the field of artificial intelligence on issues of regulation, data and information policy, ethics, international civil cooperation, implementation in the civil public sector, and more. To achieve these goals, it was decided to establish an inter-ministerial team led by the Director General of the Ministry of Innovation, Science, and Technology in order to address issues relating to artificial intelligence and submit recommendations in the field. The decision also stipulated

approval of the TELEM Forum's outline for artificial intelligence and data science. TELEM's recommendations include: "Developing research human capital in core areas of artificial intelligence technology; establishing a national supercomputing center for use by the broader public sector, industry, and academia; advancing natural language processing capabilities in Hebrew and Arabic; creating an enabling regulatory environment for the development of these fields, and more".

Government Resolution 173 from February 2023, titled "Strengthening Israel's Technological Leadership," approves the artificial intelligence program, including: accelerating basic and applied research in the field; creating a leap forward for Israeli industry in developing infrastructure for the field and implementing artificial intelligence applications in the civil public sector for its efficiency. The decision states that the program is approved in continuation of the TELEM outline approved under Decision 212 above. According to the decision: The Ministry of Finance will allocate authorization to contract budget not exceeding 500 million NIS, and the bodies participating in the TELEM Forum will provide the outline budget designated for allocation by them, to be implemented from 2023 to 2026.

The dedicated investment in Israel's artificial intelligence outline currently stands at about one billion NIS in two phases (in budgets approved so far, including 2023-2024 budgeting), and at this stage, a third phase has not yet been formulated or approved. According to the Innovation Authority, decisions regarding resource allocations are made in coordination with the scientific advisory committee headed by Prof. Yoav Shoham, and additional budgets for artificial intelligence topics are also directed to the subject in funding that is not part of the outline in allocations by the Innovation Authority, the National Digital Agency, and other government bodies. Israel's national program currently focuses on three main axes of action: formulating government strategy, developing infrastructure, and establishing an operational environment and implementation of artificial intelligence. Among the issues on which policy is focused in 2023-2024 are: market concentration and the place of open source; artificial intelligence and the chip race; artificial intelligence as a generic technology and dual-use applications; generative AI and its impacts; protection of human rights, democracy, and the rule of law. Israel also participates in international processes in regulatory areas.

Some argue that the limited scope of the adopted national program hinders Israel's ability to position itself as a leading, influential player with market power in the field of artificial intelligence - similar to Israel's strength in cybersecurity, which stems from early identification and concentrated efforts in that domain.

Regarding regulation - in December 2023, it was announced that the Minister of Innovation and Science decided to adopt the policy document on regulation and ethics in the field of artificial intelligence in Israel. This document was largely published as a draft for public comment in October 2022 by the then Minister of Innovation and Science, Orit Farkash-Hacohen. **According to the document, the Israeli government's approach to artificial intelligence is not to promote comprehensive legislation on the subject at this**

stage, but rather to rely on existing regulatory systems and arrangements. The document instructs regulators to: act within the framework of sectoral regulation rather than horizontal regulation; align with regulation in developed countries and international organizations; conduct a risk management process for technology development and use, adapting regulation to risk; utilize advanced and flexible regulatory tools; and develop regulation in collaboration with knowledge holders, experts, and stakeholders to create a professional and technological infrastructure that balances between different rights and interests.

Operationally, **the document recommends that the Ministry of Innovation, Science and Technology, in cooperation with the Office of Legal Counsel and Legislative Affairs of the Ministry of Justice, establish a government knowledge and coordination center for artificial intelligence**. This center will address issues related to regulation, information and data policy, ethical issues, international civil cooperation, and implementation in the public and civil sectors.

In this document, we reviewed the national strategies of: the United Kingdom, Canada, Germany, the United States, South Korea, Singapore, and Israel. Despite the differences between the national strategies in the reviewed countries and the fact that the types of documents reviewed are not identical in all countries, there seems to be some similarity between them - in the sense that most deal directly or indirectly with similar issues, including:

- **Areas of focus in strategy documents**: While in countries like Canada, the main strategy appears to focus on policy and encouraging research and development in artificial intelligence, in other countries such as South Korea or the United States, the strategy addresses many more diverse aspects, including issues like reducing privacy infringement and civil rights, artificial intelligence safety and security, maintaining global leadership, implementation in the public sector, and more. Singapore's strategy also emphasizes the importance of integration between industry, government, and research bodies. A common theme in all strategies is addressing the issue of human capital in artificial intelligence - competition for experts alongside training for the entire workforce and the public. The Israeli document refers to ethical principles in the field that align with OECD principles, which will guide the development, use, and regulation of artificial intelligence: responsible use of AI to promote growth and sustainable development, social welfare, and advancing Israeli leadership in innovation, without setting definitive rules on the matter.
- **Level of policy detail**: National strategies differ in the level of detail in which they define specific tasks or alternatively leave things as principles or rules. For example, some U.S. executive orders define specific tasks, government bodies responsible for their implementation, and implementation dates; South Korea's strategy includes an appendix detailing 100 concrete tasks and government ministries responsible for them; Germany's updated strategy also includes an appendix detailing various implementation tasks, but without full details of the entity responsible for implementation; other countries, including Israel, have defined relatively few tasks and left a significant part of the strategy

at a declarative level, defining a general direction for the government but not detailing a "comprehensive basket" of tasks.

In most of the countries reviewed, the strategy documents (or national program) do not detail the government budget allocated for implementing the program. In Germany, the updated national strategy document states that the government is expected to allocate 5 billion euros for its implementation by 2025.

- **Coordinating Entity**: Most surveyed nations recognize that AI intersects with multiple governmental domains, including health, industry, and education. According to the OECD review, the United States has designated the White House Office of Science and Technology Policy as responsible for its national AI strategy, while also establishing a dedicated National AI Initiative Office. The United Kingdom has created a new AI Office under the Department for Science, Innovation and Technology. Singapore has also established a governmental office for agenda-setting and coordination, though current information on its status and operations is limited. Israel's strategy recommends establishing a knowledge hub led by the Ministry of Innovation, Science and Technology, resembling the British model, albeit with potentially different scope and authority. The smaller number of executive bodies in Israel compared to larger nations may facilitate more efficient synchronization within shorter timeframes.
- **Legislative Approaches**: Broadly speaking, the American approach focuses on market dynamics and aims to avoid impeding progress, while the German approach—largely aligned with European Union policies—attempts to influence the market through legislation and regulation. South Korea presents a third approach, promoting legislation as a means to remove barriers and create certainty. Singapore's strategy of fostering a supportive regulatory environment for innovation, with risk-based regulatory adjustments, occupies a middle ground between the U.S. and South Korean approaches. Israel's strategy appears more closely aligned with the U.S. approach than with those of Germany or South Korea.
- **Expert Advisory Committees**: The OECD review indicates that some countries have established expert advisory committees. Canada has formed an AI Advisory Council, while the United States has created a Select Committee on Artificial Intelligence under the National Science and Technology Council. According to Dr. Ziv Katzir, who leads governmental AI activities in Israel, the country has a scientific advisory committee chaired by Professor Yoav Shoham, involving experts from academia, industry, and the defense sector.
- **Ethics Oversight Bodies**: The OECD review notes that some nations have established specific bodies to address ethical issues in data and AI. Examples include Germany's Data Ethics Commission, the UK's Centre for Data Ethics and Innovation (CDEI), and Singapore's Advisory Council on the Ethical Use of AI and Data. No equivalent national body focusing on data or AI ethics is known to exist in Israel.

- **Monitoring Reports and Observatories**: According to the OECD review, many countries, including Canada, the UK, the U.S., and Germany, produce annual or periodic reports on the progress of their national AI strategies. Additionally, some nations have established "observatories," such as the German Federal Ministry of Labour and Social Affairs' AI Observatory, and Quebec's Observatory on the Social Impacts of AI and Digital Technology.

International Rankings: This document examines three international rankings in the field of artificial intelligence. According to one of these, the AI Index by Tortoise from June 2023, **Israel ranks seventh overall (a decline from fifth place in 2021)**. Israel is second among all countries in terms of AI intensity (below Singapore) and third in commercialization (an index reflecting startup activity, investments, and AI-based business ventures). **Conversely, Israel ranks 47th in government strategy** (an index representing the government's commitment to AI, including budgetary allocations and national strategies) **and 28th in infrastructure** (from internet and electricity to supercomputing). It remains unclear whether Israel's low **governmental strategy ranking is due to the strategy not being published at the time of the ranking or its content. Among Middle Eastern countries, Israel (7th in the overall rank) ranks significantly higher than the United Arab Emirates (28th), Saudi Arabia (31st), Qatar (42nd), and Egypt (52nd)**.

In another annual ranking by the consulting firm Oxford Insights, titled "Government AI Readiness Index," **Israel ranked 30th globally in 2023** (out of 193 countries), below Saudi Arabia (29th) and Belgium (28th). For comparison, **in the 2022 ranking, Israel was placed 20th**, below Estonia (19th) and above Belgium (21st) and the United Arab Emirates (22nd).

It should be noted that in the field of artificial intelligence, there is global competition with characteristics of a geo-political inter-bloc struggle, including a race to develop advanced chip manufacturing technologies and capabilities (the "chip war"). Access to advanced chips is perceived as a bottleneck for developing advanced AI capabilities and as a significant aspect of competition between China, the United States, and other Western nations. Further discussion on this matter can be found in the international rankings chapter.