

India-Israel: Science & Technological Collaboration

Mukul Pandey^{1,*}, Utkarsh Kumar¹, Aditya Kumar²

¹School of Mechanical Engineering, Vellore Institute of Technology, Vellore, Tamil Nadu, India

²Mechanical Engineering Department, Motilal Nehru National Institute of Technology, (Allahabad), Prayagraj, India

Email address:

mukulpandey98@gmail.com (M. Pandey)

*Corresponding author

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Abstract: India and Israel both speak to antiquated developments and offer a British pilgrim past. They were the main states to get autonomous (in 1947 and 1948, individually) in the post–World War II wave of decolonization. Both were conceived out of messy partitions and have kept up vote based systems from that point onward under adverse conditions. Yet, regardless of the two states' likenesses, it took more than forty years for them to build up a warm relationship including full discretionary relations, prospering respective exchange, and key collaboration. The rapprochement among India and Israel is a significant part of another key scene in the more noteworthy Middle East that incorporates Central Asia and portions of the Indian Ocean littoral. Although both the countries differ in size, population, area and culture, but are similar in their way of Scientific as well as Diplomatic dealings. The bond between Narendra Modi & Benjamin Netanyahu has further strengthened the bilateral ties on technological and healthcare front. We will look upon the collaborations and ties between India & Israel in the field of science and technology, right from the start and its evolution since inception.

Keywords: India, Israel, Space, Military, Culture, Cooperation

1. Introduction

India and Israel share a lot in common, practically speaking during the most recent sixty years they share a common foundation of parliamentary majority rule, customary law frameworks, modern educational standards, English language information, and a history of English imperialism. India and Israel as working vote based systems have endured in an ocean of aggression encompassed by intractable foes and a militarized security condition. The two countries have battled wars in each decade of their reality. The two nations face outer and inside security dangers as dread assaults from radical Islamic gatherings.

Simultaneously, they are safe havens in a befuddling region that stretches from Maghreb in North Africa to the ranges of Hindu Kush mountain, which has long described the dangerous region of Indian neighboring countries. [1]

We will expect to follow the historical backdrop of this relationship and gauge its future direction. Aside from changes in the global monetary and political landscape following the Cold War, the fact that India's vicinity had

become increasingly perilous guided that safety and security problems, as well as ensuring supplies, became and remained the backbone of the partnership during the 1990s.

Through imbuing the relationship with an inherent value based on the characteristics of the two groups with similar agendas, the future seems safe, free of the ups and downs of their military and diplomatic objectives. [2]

The agreement reached during SM Krishna's for the establishment of an Israeli Consulate in Bengaluru during his Israel's visit was a resounding indication that the two-sided partnership has matured enough to reveal the sheer unadulterated reality. India's small and dwindling Jewish population, despite being one of the world's most established, has never been subjected to the same level of persecution as the rest of the world. Soon after India's independence, one of the most important foreign policy decisions it had to make was how to deal with the then-established State of Israel.

India opted to view that State of Israel was a result of the Partition's damage, but only allowed diplomat interactions on a non-corresponding basis. There were sporadic and intermittent attempts to move the partnership forward from beginning but it was achieved through Madrid Peace Process

in 1992 where in India established full discretionary ties with Israel. [2]

Today, they have a partnership that has been polished by forming relationships in trade and joint endeavors in areas of cutting-edge developments such as programming, correspondence, and data, biotech and nano-innovation, and choice vitality. In the last two decades, their trade has grown at an unprecedented rate to \$ 4.7 billion in 2010 from \$ 200 million in 2001, excluding defense purchases.

The year 2012 marked the twentieth anniversary of the establishment of full strategic ties between India and Israel. Mr. SM Krishna, went Israel to underscore the significance of this occasion for the two countries. Despite the fact that the birth pangs of this partnership is intense, it has metaphorically primed a confident young man for a bright future. The partnership expanded to include trade, business, info, and greetings software advancement, venture, and person to individual communication for the first time in the second decade. As a result, in contrast to the withered decades since the two countries' independence, the last roughly 20 years have seen a dangerous growth in the various types of interaction between the two countries. [2]

2. Science and Technology Collaboration: The Timeline

In 1993, throughout the visit to Asian nation of then Israeli government minister Shimon Peres, Asian nation and Israel consented to an appointment on science and innovation, that allowable for direct scientific participation between the 2 governments. express territories of collaboration enclosed information innovation, biotechnology, lasers, and electro-optics.

Also, a joint panel to screen cooperation between the 2 countries was engineered up and set to fulfil biyearly. \$3 million joint science and innovation subsidize was got wind of to encourage joint research efforts between the 2 nations in 1994. [3] This prepared for India-Israel political affiliation that has been on rise from that time forward.

In 1996, Indian researchers visited a workshop on Materials Science in Israel. In 1997, Israeli researchers visited a workshop on biotechnology in Old Delhi. In 1998, Republic of India and Israel had 20 continuous joint examination ventures. attributable to the impact of the conference, In Nov 1999, Republic of India and Israel concurred on four proposals for joint examination ventures within the field of human ordering analysis. In 2000, considerably additional joint undertakings known with human ordering analysis were conceded to, and a standing workshop on this field was command in Republic of India. In right time 1999, in more than twenty Israeli researchers partook in a very material science discussion on Condensed matter in Delhi. [3]

In 2001, a comparative conference was command in capital of Israel, with eighteen Indian researchers planning to as a serious side of the board framed throughout the 1999

joint examination venture. This trade of analysts from each the nations helped in vast development of the exploring capacities of the counter-parts. [4]

In 2003, the two nations talked about multiplying their interest in their continuous science and innovation coordinated effort to \$1 million each, beginning in October 2004. [5] This permitted the way path towards greater interest toward science from both the nations, which was a noteworthy advance considering the future.

India and Israel marked a declaration of intent to line up a store to support reciprocal speculation into fashionable innovative work additionally, specific ventures in the year 2005. Under the understanding, at any rate one Indian and one Israeli organization must work together on a venture for that task to meet all requirements for the subsidize. [6, 7] This permitted a few organizations to get an opportunity at teaming up on such huge venture and assemble assets for their future tasks too.

The reserve, named i4RD, has been used in seven ventures. This happened during the period from 2006-2014. In 2012, the 2 nations marked a erudite examination for 5 years understanding for advancing communitarian analysis over a good scope of disciplines, together with clinical and information innovation, social and life sciences, humanities, and expressions of the human expertise. This demonstrates the speculations were broadly speaking distributed among completely different controls not concentrating completely on one phase. [8]

In 2012, Israel expressed its goal to increment mechanical and financial collaboration with the Indian province of Bihar, within the fields of commercial enterprise, water management, daylight based mostly vitality, and clinical protection, that additional shows Israel enthusiasm towards serving to Indians states produce and moreover reinforce our relationships. [9]

Israel created arrangements to open 2 agriculture Center of Excellence in Bihar, concentrating on increasing profitableness of vegetable and mango crops, as Bihar being the second biggest maker of Mango in Asian country. This likewise allowable them to research completely different selections through that they might support the state. This indicated Israel's good goal for forming the state into a superior place in the year of 2014. [10]

Israel has agreed to assist the India government with AN enterprise to wash the Ganga. AN Israeli appointment visited India in August 2015 and met with authorities of the Union Ministry of Water Resources, stream Development and Ganga Restoration. [11] Israel was fast to assist in India meet its water needs for business enterprise and drinking, and was pushing for larger government-to-government understandings.

The two counterparts noted with satisfaction the commencement and implementation of India-Israel development cooperation - three-year work program in Agriculture from 2018 up till 2020, below the post of the Israeli Ministry of Foreign Affairs (MASHAV) and therefore the Ministry of Agriculture of India aimed toward increasing farmers' productivity and improvement of water use potency.

[42]

2.1. Scientific Relations

Scientific relations are an extra layer in the individuals to individuals collaboration between the nations. India and Israel consented to on culture trade arrangements. In New Delhi, India built up The Israeli Cultural Centre. In the field of science, India and Israel marked a convention of collaboration in research, which would concentrate on joint exploration ventures, trade research programs and universal gatherings. [14] The shared social exercises between the two nations were consistently expanding until it arrived at a top in the years 2007- 2008. [15]

The grant program for understudies is being overseen by the Israeli Council for Higher Education. The grant program started as an uneven Israeli activity. [16] This activity originated from the significance the Israeli government places in creating relations with the Asia-Pacific nations. The CHE (Community Health Evangelism) works alongside the Ministry of Finance to subsidize, work and execute the program. This would permit the generally advancement of the understudies, which is one of the fundamental adages of CHE.

2.2. Technological Relations

Since Israel's bit of advantage lies in innovation, which are very attractive and required in India, we suggest making a community oriented stage that empower the usage of thoughts and advancements in the Indian market. The "Make in India" activity, which was proclaimed by PM Narendra Modi, is a genuine case of such learning. Israel is depicted as a solid characteristic accomplice in this venture considering the current information Israelis have. The execution of such tasks, in numerous various angles and enterprises, could make the reason for growing and extending Indo-Israeli participation.

These stages will unite agents from significant organizations also government services. Subsequently, they could give a quicker and that's only the tip of the iceberg strong condition for joint efforts of Israelis with Indian organizations and staff, and would associate every nation's favorable position to that of its partner. [17]

In May 2013, Israel declared that it will assist India with expanding and raise the yield of its leafy foods crops by offering the nation trend setting innovation. Israel will help set up 28 focuses of greatness across India concentrated on explicit foods grown from the ground crops. By March 2014, 10 Centers of Excellence worked all through India offering free instructional meetings for ranchers in effective agrarian methods utilizing Israeli mechanical aptitude. Vertical cultivating, drip irrigation system and soil solarization are some of what is instructed at the focuses. This would assist local people with ensuring their harvests in a superior way and furthermore yield better yield.

The 10 previously working spotlight on mangoes, pomegranates and citrus products of the soil the thought is to

extend to blossoms, honey bee keeping and dairying, with 28 focuses by 2015. [17] The permitted the path for the exchange of thoughts in applied exploration and advances to the ranchers in different states across India.

India's journey for the most recent military innovations supplements Israel's to innovate its military research and production. India's key indigenous protection ventures, for example, the Arjun principle fight tank and the light battle airplane, have brought about noteworthy expense on time invades. [17] New Delhi experienced troubles in creating automated airborne vehicles (UAVs) and different rockets, furthermore, with Russia incapable to convey guaranteed weapons on financial plan and on time, it went to Israel, which has become New Delhi's second biggest guard provider after Russia, with France positioning third.

Following Prime Minister Modi's visit to Israel in 2017, there has been a greater integration of joint development efforts between Israel and India. TAVtech Ventures, a non-profit organization, is also promoting a programme that connects understudies from Israel and the United States with nearby Indian understudies to create tech-based new businesses, which will also help our honorable Prime Minister's Make in INDIA crusade. [12, 13]

India and Israel have planned to intensify collaboration in science and technology since 2017 up to a planned deadline of 2022 through \$40 million fund, Water, oil, agriculture, and information and communication technologies are all areas of focus.

Both the country plans to contribute \$4 million per year for five years towards the collaboration. The fund was established with the goal of encouraging private sector R&D investments in India through a public-private partnership model.

2.3. Space Collaboration

In 2002, India and Israel consented to an agreeable arrangement advancing space cooperation between the two countries. [18] This denoted the commencement of cooperation between two nations in Space area.

In 2003, the Israel space Agency, communicated enthusiasm for teaming up with the ISRO, in utilizing satellites for improved administration of land and totally different assets. Israel likewise communicated enthusiasm for taking AN interest in ISRO's projected 'Chandrayaan - 1' of causing an automatic art to the moon. [5] it's been quite ten years since the standard conciliatory association between each the nations occurred. Prior, it absolutely was restricted to collecting and important ties, however as time passed each the nations understood every other's latent capability and kicked off their arrangements in house phase. [20]

Accordingly, the 2 nations consented to a meeting plotting the causing of 'TAUVEX' an Israeli house telescope exhibit, on GSAT-4, an organized route and correspondence satellite. [5, 18, 19]

Israel selected to dispatch 'TecSAR' its artificial Aperture measuring instrument imaging satellite, on India's Polar Satellite Launch Vehicle (PSLV) in the year of 2005. [21]

TecSAR was picked to dispatch through India's PSLV attributable to Israeli worries concerning the unwavering quality and specialized impediments of its own 'Shavit' house dispatch vehicle, money contemplations, and moreover attributable to Israel's desire to increment key participation with Asian country.

TecSAR was effectively embedded into house by India's PSLV in the year 2008. One in all TecSAR's essential capacities is to screen Asian country military exercises. [22, 23]

In 2009, Republic of India effectively propelled RISAT-2, associate designed gap measuring instrument imaging satellite. RISAT-2 was created by Israel region Industries or IAI, associated with ISRO. [24] The dispatch of the RISAT-2 satellite pointed to present Republic of India additional distinguished earth perception power, which might improve catastrophe the executives, and increment intelligence and safeguard skills.

The getting and succeeding dispatch of the RISAT-2 satellite was quickened once the 2008 Bombay Attacks to support India's future observation capacities. [25]

The two countries signed associate agreement outlining the readying of TAUVEEX, associate Israeli house telescope array, on India's GSAT-4, a planned navigation and communication satellite. In 2010, the TAUVEEX array was aloof from GSAT-4 by the ISRO, and therefore the array was ne'er later on launched.

Republic of India and Israel determined sign agreements to deepen cooperation on the progressive technologies within the area sector throughout Prime Minister Narendra Modi's visit to Israel throughout that year of 2017.

In 2018, throughout the visit of Israeli PM Benjamin Netanyahu to Bharat, India's Indian Institute of area Science associate degreed area Technology and Haifa's Technion-Israel Institute of Technology have signed an MoU to determine cooperation within the matters of area studies.

The MoU seeks to reinforce the cooperation between the India-Israel not solely within the area fields however additionally in corporations and tutorial establishments. It absolutely was necessary to acknowledge India's strength in launching of area sure vehicles and added that by the top of 2018, there'll be three nano satellites designed by Israel which will create history by creating the primary ever flight formation of its kind. He any aforementioned that the note of Understanding can permit the in-depth analysis in area in an exceedingly a lot of economical manner. [42]

2.4. I4F ISRAEL – INDIA

The India-Israel Industrial R&D and Technological Innovation Fund (I4F) is a collaboration stage between the Department of Science and Technology (DST), Government of India, and the Israel Innovation Authority (IIA), Administration of Israel. [26] The thought process was to advance encourage and backing joint Industrial R&D ventures between organizations from India and Israel, which would prompt fruitful commercialization and advantage for the two nations and additionally address the difficulties in the

engaged divisions.

Focused Sectors:

1. Agriculture
2. Energy
3. Healthcare
4. Information and Communication Technologies (ICT)
5. Water

DST and Innovation Authority have jointly created a \$40 Mn USD I4F fund with equal contribution from both sides over the period of five years [2017-2022]. [26]

This can lead to co-development and commercialization of innovative technologies benefiting both the countries.

2.5. India-Israel Innovation Bridge

The India-Israel Innovation Bridge has welcomed new companies to create answers for a portion of the world's most basic difficulties in the territories of social insurance, horticulture and water innovation.

Under medicinal services, new businesses ought to create answers for constant wellbeing checking, home consideration, distant consideration, intermittent guiding and exhortation on wellbeing the board for non-transmittable maladies. These ought to be inventive, comprehensive, ease diagnostics and prescient arrangements in rustic zones.

Under Agriculture, answers for diminish post-collect misfortune and improve market linkages. These ought to be reasonable simple to-utilize answers for improve rural profitability and increment ranchers' income.

Also, for water, the test welcomes new companies to grow low-vitality and cost-effective economical answers for wastewater treatment, desalination, reusing or on the other hand filtering huge water sources and surface water. These ought to be creative furthermore, reasonable arrangements that produce consumable drinking water at purpose of utilization in both provincial and urban regions. [27]

2.6. Water Management

Israel is likewise a world chief in wastewater reusing, or recovery, which now represents around 30 percent of its total supply. [28]

Israelis are cautious as to saving water and making the tight gracefully they have more beneficial. It is anything but difficult to perceive the significance of one Israeli development: drip irrigation system. Utilizing this procedure, generally limited quantities of water are conveyed legitimately to plant roots. This sets aside to 33% of the water that would some way or another be lost during splash applications and empowers ranchers to twofold reaps utilizing a similar measure of water. This method if broadly taught to Indian Farmers, can turn into a defining moment in the field of Agriculture ventures.

2.7. Israel to Help India in Water Management

By far most of water is utilized for mechanical purposes, for example, cooling, and water system, and shouldn't be unadulterated. By reusing urban waste water for water

system, Israel spares valuable groundwater, yet forestalls the natural harm brought about by the release of waste water into waterways and the ocean.

A group of Israeli Experts as of late had a gathering with the New Delhi Municipal Corporation [NDMC] during which they shared imaginative thoughts for water sanitization, squander the board. Effectively Israeli organizations are running eight water desalination and refinement plants in India, unmistakably in Chennai and Agra.

The international safe haven of Israel in India is working with the Jal Shakti Ministry on a plan to execute progressed Israeli water procedures to ease water worry in India. [28]

2.8. Recent Updates

In April 2020, When Israel's Prime Minister requested assistance with a five-tonnes cargo of drugs, including the anti-malarial medication Hydroxychloroquine, which is believed to be successful in the treatment of coronavirus or COVID-19, India's Prime Minister responded, "We have to battle this pandemic together." In only two weeks, the drugs arrived in Israel. [29] Several countries lauded the effort of India supplying HCQ in time of crisis by saying "India's help during this crisis will not be forgotten."

During May, India and Israel have collaborated on research and technology for rapid coronavirus testing in order to restore normalcy in the wake of the COVID-19 pandemic. The two sides explored collaborating on research and development for rapid coronavirus diagnosis using data analytics and nanotechnology. Israel had previously announced the successful discovery of a monoclonal antibody with the ability to "neutralise" the SARS-CoV-2 virus, which causes Covid-19. The research process of the covid-19 antibody has been completed, according to Israel's defence ministry's premier biological laboratory. [30]

In the month of July, A flight from Israel to Delhi carried higher officials of Israeli MOD R&D team that has been collaborating with DRDO to develop 30 seconds COVID-19 test. Finally, the plane will also carry mechanical ventilators to export to India for which Israeli Government has given special permission. [31] These Israeli technology can be mass manufactured at a cheaper cost and could be mutually sold to third countries in the future by opening the door to India's market with its research and manufacturing capabilities. India and Israel's unprecedented collaboration has helped both countries to properly deal with the COVID-19 threat, and it has the ability to transform how we live in the face of the virus.

In August 2020, As part of Israel-India partnership to combat the current COVID-19 pandemic, Israel has exchanged "state-of-the-art artificial intelligence-based technology and high-end facilities" with AIIMS, Delhi. [32] This cooperation between AIIMS and Israel Healthcare was not new. In 2007, a training program on "Trauma and Mass Casualty Management," in AIIMS was conducted for hospital staff which led to the development of the Trauma Center at AIIMS, New Delhi. Israel and India have signed a mutual

agreement to promote collaboration in national history and archaeology with the assistance of the Israel Antiquities Authority and the Archaeological Survey of India, in addition to organizing literary festivals and art fairs and encouraging the translation of well-known works into each other's languages. It also involves student exchanges grants, enabling film festivals for film makers of both the country to participate, and engagement through various sports activities. [33] The Israeli government and UP government signed a water resources deal on August 21. [34] The 'cooperation programme' seeks to address the water shortage in Bundelkhand, Uttar Pradesh. This pact focuses on three main areas: water management, effective transportation, and advanced agricultural practices.

The United States brokered a landmark peace agreement between Israel and UAE on August 13 that would lead to complete normalization of diplomatic ties between the two countries. [35] The Abraham Accord makes the UAE the first member of the Gulf Cooperation Council (GCC) to develop diplomatic relations with Israel. Keeping in view the proximity of New Delhi with Abu Dhabi & Jerusalem, It places India into a global position to play a major role in stabilization of gulf region.

During September, India, Israel, and the United States have begun a three-way collaboration on computerized initiative and growth, confirming that the three countries play a critical role in delivering cutting-edge 5G innovation for industries with overtaking China as one of the agenda. [36] The International Center for Entrepreneurship and Technology (India) and Start-Up Nation Central (Israel) signed a MoU to collaborate on a reciprocal program to accelerate development and innovation engagement among new companies and business' in both countries. [37]

In October, A sub-working group (SWG) on defense industrial involvement was formed between India and Israel. The SWG's main goal will be to press forward with creativity, co-improvement, and co-creation, machine intelligence, and cooperative export to friendly overseas nations. [38]

During December, Israel's FM recently signed a contract with India, which is linked to Covid-19, collaborating in the advancement of rapid research. A 30-second covid detection test, jointly developed by the two countries, is currently underway. [39] On December 23, Israel's Advanced Defense Systems announced that it had completed a deal with India to supply it with bomb guidance devices, anti-tank guided missiles (ATGMs), and software-enabled radios. [40] The most recent SPICE and other acquisitions were made under the Indian Defense Ministry (MoD's) specially developed "emergency" weapons acquisition arrangements to fulfil vital operational needs prompted by the urgency of military standoff with China along the disputed LAC in Ladakh.

3. India & Israel Diaspora

There are roughly 80,000 Jews of Indian origin in Israel. The larger part is from Maharashtra (Bene Israelis) with

generally littler numbers from Kerala (Cochini Jews) and Kolkata (Baghdadi Jews). Shri Eliyahu Bezalel hailing from Chennamangalam, Cochin has separated himself as a prominent agrarian and turned into the primary Israeli of Indian source to get the Bhartiya Pravasi Samman in 2005. Sheik Ansari, who deals with the Indian Hospice in Jerusalem, an exceptional Indian association with the Holy City, was regarded with the Pravasi Bharatiya Samman in 2011. There are around 10,000 Indian residents in Israel, of whom around 9,000 are guardians. Others are precious stone brokers, some IT experts, understudies furthermore, incompetent specialists. [41]

3.1. Nature of Ties

India had frequently been good in keeping up close bonds with Israel, however not set up to recognize it in the open. New Delhi casted a ballot to perceive Israel in 1950, however Cold War coalitions, dread of distancing its huge Muslim populace, and its need to keep up close binds with the Arab countries for oil, settlement and Kashmir issue prompted India embracing a less thoughtful situation towards Israel. In any case, through the greater part of its post-freedom history, India has fundamentally, however secretly, profited by the two-sided attaches with Israel, without remembering it.

This is of importance as Israel has all that India should be secure, steady and prosperous. This incorporates innovation, development, protection gear, collaboration in counter-fear mongering, preparing in insight gathering and so forth. For Israel, India is a tremendous market for its advances and skill. Moreover, India perceiving Israel as a free country is of noteworthiness, since in excess of 30 UN part countries are as yet reluctant to remember it. This conciliatory relationship, in spite of confronting contrasts, is as yet stable because of the common worth, interests and equitable guideline.

3.2. Challenges Faced

India's binds with Iran are tested in the current circumstance because of its nearby binds with Israel and the US, causing it to pick between these countries. Israel's legislative issues overwhelmed by its hostile disposition towards the Palestinians is additionally making it hard for India to upgrade the strategic relationship. The unyielding position by the current government in Israel and the US makes it exceptionally hard for India to move and offset its binds with Iran and different countries that are against Israel.

4. Conclusion

Adaptability for India's national interest must be made the first concern of the Indian government while managing Israel. India has so far been fruitful in adjusting its inclinations in the Middle East, both reciprocally and multilaterally, without favoring one side with either of the clashing countries interests. Speculations to support the travel industry, training and social ties and building spans with the Indian diaspora in Israel can

help fundamentally in this unique situation. Without a doubt, these are the low-draping natural products in the two-sided relationship that can be culled immediately. Taking signals of Israel's industry-the scholarly world environment, its advancement and start up culture and the condition of workmanship bleeding edge innovation across areas; India can fabricate common coordinated efforts for present and future turn of events. India's conciliatory relationship with Israel is fundamental and vital for India's national interest. Notwithstanding the analysis of India with the Palestinians, in the current point, it is important to attempt an adjusting in the profoundly unsteady West Asia so that there is space for change when the need emerges. In the event that India wishes to be a permanent member in the UNSC, it needs to have steady remain against basic freedoms infringement. Such stand may affect its help among different nations for UNSC membership.

There are numerous advantages of developing binds with Israel, however dealings with encompassing countries must be taken care very cautiously. The wide analysis that India has gotten obviously recommends this expanding closeness with Israel to India is of greatest advantage particularly when India itself is battling the barbaric acts of psychological warfare and rebellion with its neighbors. The relations between the two nations have been expanding in political, financial and defence divisions. There are individuals to individuals communications, vital discoursed between the security powers and vital foundations, among other on-going trades between the two nations. Collaboration in science and innovation, tourism and culture, water management and agriculture, military and intelligence, space participation among different segments is additionally dynamic, and can pave the way for strengthening the future relationship between India and Israel.

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