

# The Impact of the Israel-Hamas war on bioeconomy

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Abstract:

Israel has a mature biotechnology ecosystem marked by a strong international presence. Israel's institutions are involved in both research and development (R&D) and manufacturing of bio-based products, majorly targeting the US and European markets. The ongoing Israeli conflict with Hamas has had a limited impact on operations within the biotechnology sector. If the war ends, the biotechnology industry will likely resume operations to pre-conflict levels. However, if it continues for a long time, the confidence of foreign investors and companies will likely diminish. This could stall the progress of the biotechnology sector in Israel. However, this could create an opportunity for India to attract these companies to set up facilities within India.

*This is a working paper that has been prepared for the purpose of discussion and debate and does not necessarily constitute Takshashila Institution's policy recommendations.*

## **I. Introduction**

Israel's spending on research and development is the highest in the world. In 2022, Israel spent 5.44% of GDP on research and development (R&D) in 2020. The country is a notable biotechnology hub with a mature ecosystem consisting of domestic and international funders, specialised regulators, startups, domestic and international R and D centres, specialised service providers, and manufacturing hubs. Figure 1 depicts the current structure of the biotechnology ecosystem in Israel.

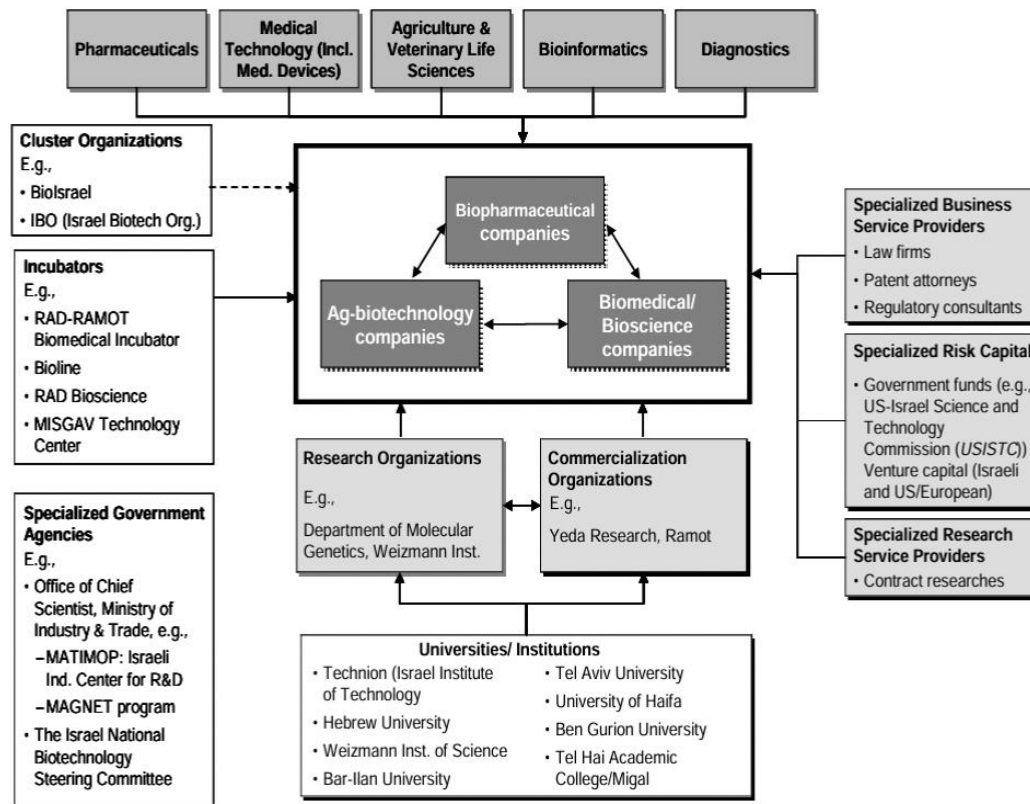


Figure 1: Schematic [representation](#) of the biotechnology ecosystem in Israel.

There is a focus on cutting-edge research in biotechnology, predominantly in the medical sector. Israel has an integrated healthcare system, with electronic record keeping, centralised insurance schemes, and an interconnected medical and governance system that allows it to quickly discover problems and trial solutions in its relatively small population. This was apparent during COVID-19 when Israel became

one of the [first](#) countries to open up from lockdowns after a rapid vaccination drive. This focus also reflects in its biotechnology industry, with MedTech, pharmaceuticals, and the emerging field of bio-convergence as key areas of development.

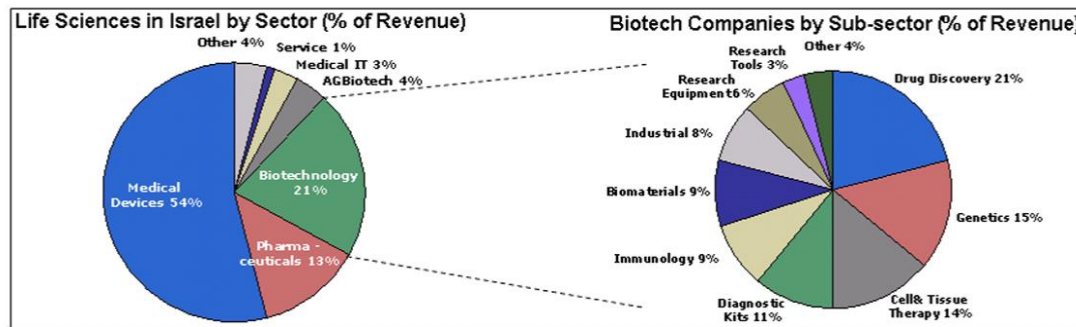


Figure 2: Biotechnology [activity](#) in Israel

### 1.1 Medtech:

Israel's medtech industry has some notable innovations such as:

- The Pillcam, a miniature ingested camera developed by Given Imaging
- Medinol's closed-cell stent design which facilitates blood flow to the heart
- A surgical sealant named Quixil, developed by Omrix and acquired by Ethicon

- InSightec, pioneered the MR-guided Focused Ultrasound Surgery (MRgFUS) and is now global leader in the segment
- MediGuide, acquired by St Jude Medical, developed the Medical Positioning System, for real-time tracking of sensors mounted on devices for minimally-invasive intra-body navigation.

Israel's success in this space reflects in the interest foreign biotechnology firms have had in acquiring or investing in Israeli companies. A few examples:

- In 2010, Roche [acquired](#) Medingo for \$160 million to expand its position in the growing insulin delivery systems market
- Medtronic bought an 8% stake in Ventor, whose flagship product is an aortic valve that can be implanted through the chest wall, without the need for open heart surgery.
- In 2006, Johnson & Johnson (J&J) acquired ColBar, which makes collagen-based products for tissue engineering.
- In 2012, Covidien bought SuperDimension, which develops minimally invasive interventional pulmonology devices.

## 1.2 Pharmaceuticals:

In addition to medtech, Israeli companies and institutions have also made breakthroughs in pharmaceuticals. Select examples are:

- Doxil, a chemotherapy for ovarian cancer, was developed at the Hadassah Medical Center and sold to J&J
- Teva/Weizmann Institute developed Copaxone, a treatment for multiple sclerosis (MS)
- Azilect, a Parkinson's Disease therapy, was developed by Teva, based on research at the Technion in Haifa
- Rebif, another MS treatment, was developed by the Weizmann Institute in conjunction with Serono's subsidiary InterPharm
- Exelon, a drug used in treating Alzheimer's, originated at the Hebrew University and was developed and marketed by Novartis.

Biopharmaceuticals are a small but [growing](#) sector with \$1 billion in exports (3.4% of all exports).

### 1.3 Bio-convergence:

Israel currently has close to 300 research groups and 30 academic centres working on bio-convergence R&D. Bio-convergence is an interdisciplinary research area such as AI and biology and is supposed to be at the cutting edge of biology research.

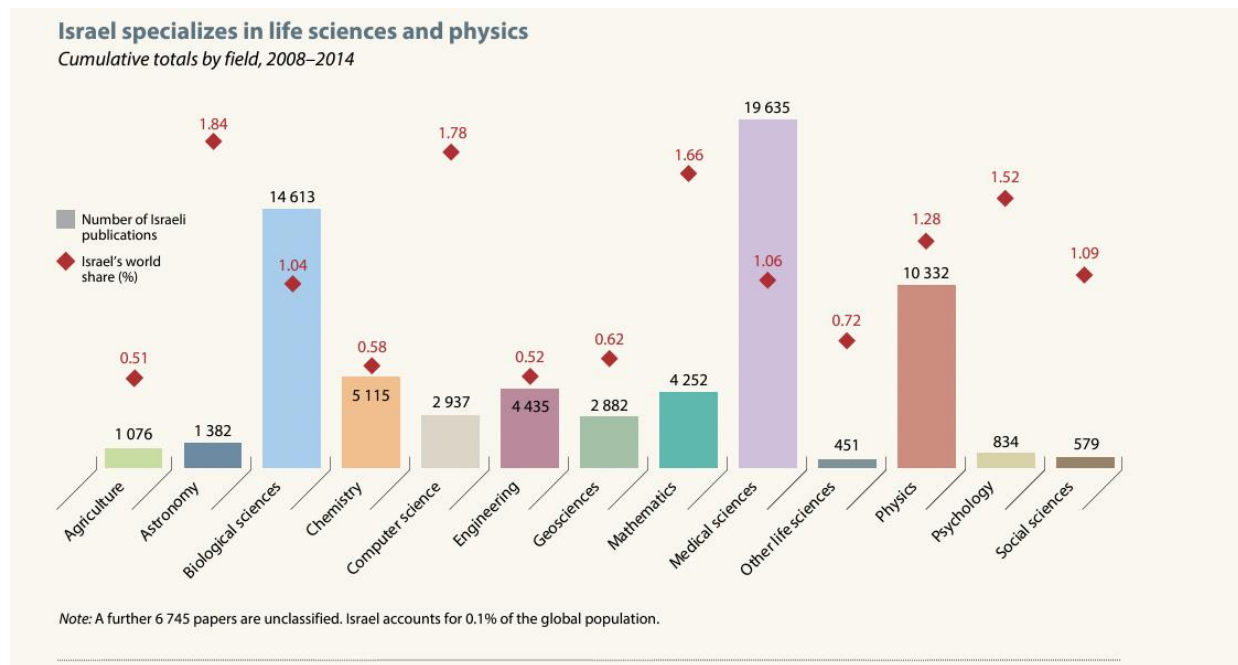


Figure 3: An [analysis](#) of the number of publications (absolute number and percentage share) from Israel

## **1.4 Funding:**

In 1993, the Office of the Chief Scientist initiated Yozma — a vehicle to stimulate a local venture capital industry. Yozma was capitalised with \$100 million from the Israeli government and split into 10 funds, each managed by an experienced foreign venture capitalist with a local partner. After five years, the venture partners of eight of the 10 funds bought out the government's 40% stake in the arrangement. Built on this stimulus programme, Israel's venture industry with over \$10 billion in capital raised now is the second biggest globally, trailing behind the U.S.

The biotechnology sector in Israel largely depends on private investment, and the Israeli government's expenditure on R&D is the lowest amongst the Organization for Economic Cooperation and Development (OECD) countries. Out of the total investment of \$3.7 billion in life science companies in 2021, \$534 million was invested by Israeli VC funds. This investment is a significant increase of more than double as compared to 2020, and a new record for the last decade.



Foreign investors' contribution nearly doubled in 2021 as compared to 2020 — from \$1.1 billion to \$2 billion. The increase in foreign investments was led mostly by US investors, but highlights the key dependence of the Israeli biotechnology sector on access to foreign funding for development.

Foreigners account for nearly 80% of the patent applications filed with the Israel Patent Office since 2002.

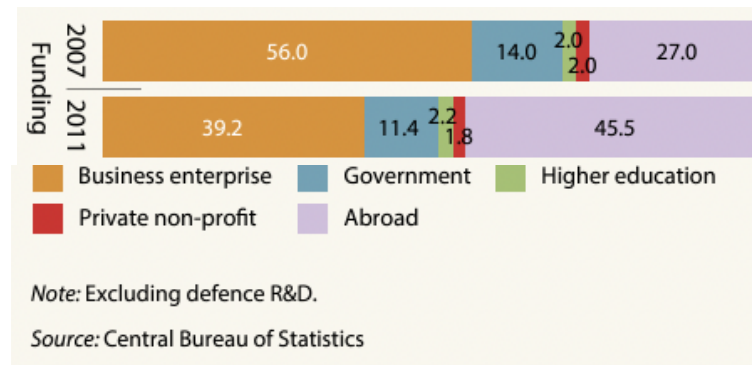


Figure 4: An analysis of GERD funding in Israel for 2007 and 2011.

## **2. Impact of the Israel-Hamas conflict on the biotechnology sector:**

The Hamas attack on Israel on October 7, 2023, and the latter's response triggered a national prioritisation of internal defence and humanitarian aid. As the Israel-Hamas war continues, the fortunes of the biotechnology sector will become intertwined with the outcomes of the war. A swift negotiation to end the war will likely leave the biotechnology sector relatively unscathed. However, a continued conflict, with potential spillovers to neighbouring regions, will negatively impact the sector.

The section will first analyse the immediate impact caused by the initiation of the war, and then anticipate its impact under two scenarios — one where the war ends quickly in Israel's favour and one where the conflict continues over several years<sup>1</sup>.

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<sup>1</sup> This study makes the following assumption: if the conflict continues, with spillover to neighbouring countries including Iran and Arab countries, the US and mostly other NATO countries would side with Israel. The resulting conflict would play out over several years. Hence, the long-term imaginary scenario with conflict resolution assumes a negotiation has happened with Israel's approval and continued existence.

## 2.1 Immediate impact:

Many biotechnology companies focused on providing aid to victims of the Hamas attack and offered bereavement time to those who needed recovery time. The security conditions immediately following the attack led companies to [operate](#) with only minimal essential staff.

Additionally, Israel called up to 300,000 citizens to the reservist army, leading to some facilities having to [operate](#) with reduced working staff. The immediate impact thus was been to reduce the focus and effort on both R&D and manufacturing, as the country recovered from the attack. According to a report in Israeli magazine Global, an [estimated](#) 10% to 15% of Israel's technology workers had been drafted into the IDF reserves. That means up to 60,000 of the approximately 400,000 Israelis employed in high-tech companies or international companies' R&D centers were recruited for active service.

Along with this, many students and scientists of foreign origin returned to their home countries, further reducing the availability of trained staff to [work](#) at R&D or manufacturing facilities.

As a direct consequence, R&D came to a standstill in laboratories, and manufacturing was reduced, though some companies reported that operations were continuing as normal and remained largely [unaffected](#) by the war.

However, a major consequence of the war on science did not occur within Israel. Instead, it played out in the virtual world, as the scientific community debated the legitimacy and justification of both Hamas' attack and Israel's response. Some Israeli universities have said they will show [“zero tolerance”](#) for anyone who expresses “support for terrorism,” and there are reports of Arab Israeli students [being disciplined for posts](#) on social media platforms. Various student groups vocally protested about the ongoing conflict, bringing on the ire of university administrations. This vocalisation of political preferences has caused a divide in the scientific community, an endeavour that thrives with people working together across the board. Healing this division will require time.

Perhaps the biggest casualty of the conflict came from scientific publishing. eLife, a prominent publication, which leads the experiments on open-access publishing, fired its editor-in-chief Michael Eisen in the wake of a dispute over his social media posts. Mr Eisen had [retweeted](#) an Onion (a satire

publication) post that brought attention to the plight of Gazan civilians being killed in the Israeli response to the Hamas attack. Both his tweet and subsequent removal instigated the resignation of board members and the vocal disowning of eLife by reviewers, authors, and readers.

This incident is a demonstration of the tensions present in the scientific community and the division it has caused.

R&D	Manufacturing	Trade	Scientific Community
Reduced R&D efforts as scientists and personnel focus on rehabilitation, bereavement, and conscription.	Operations were reduced, particularly in border areas.	Too early to say	Reduced staff as scientists called for a reservist army and movement of foreign students.

Thus, the immediate impact of the war on biotechnology has been reduced access to resources, but a determination to carry on operations under the prevailing conditions.

## **2.2 Scenario 1: The Conflict Ceases**

If the conflict ceases in a short time, we should see all R&D and manufacturing activities resume to pre-war levels. However, we might see foreign firms and scientists exercise some caution before returning or investing more in Israel, depending on how the cessation of war proceeds. If Israel's response leads to a humanitarian crisis in Gaza, the divisions within the scientific community will continue, resulting in reduced interest in investing in Israel. However, if Israel and Hamas can reach an amicable solution that prevents unnecessary loss of life in Gaza and surrounding areas, there might be renewed interest in working in Israel.

R&D	Manufacturing	Trade	Scientific Community
Restoration of R&D operations	Restoration of domestic manufacturing	Trade will continue and might increase	Israel will continue to attract more thought leaders in science

### 2.3 Scenario 2: The Conflict Continues

If the conflict continues, it will likely spillover into neighbouring areas. In this scenario, it is likely that international companies will move their R&D centres away from Israel. Additionally, as demonstrated earlier, the Israeli biotechnology sector is heavily dependent on foreign investment.

Insecure conditions within the region will reduce investor confidence and, therefore, a reduction in corporate and institutional funding. Also, it is likely that foreign scientists and students will not return to Israel, and Israeli scientists might be willing to move away to escape conscription and focus on research. All of these consequences will lead to a reduction in R&D activity. Further, at a national

level, continued conflict might require funding, infrastructure, and supply chain to be redirected to defence, exacerbating the impact on R&D.

A similar impact will be felt in manufacturing, where foreign orders for Israeli Contract Manufacturing Organisations might be hit. Further, there might be repurposing of defunct manufacturing facilities for defence purposes. Both reduced trade and manufacturing coupled with insecure supply chains in conflict areas will considerably impact the trade of biotechnology products in Israel.

R&D	Manufacturing	Trade	Scientific Community
Reduced foreign investment in R&D, Moving away of international R&D centres to safer	Re-purposing of manufacturing facilities for defence purposes,	As R&D and manufacturing reduces, the proportion of biotech to R&D will reduce	Israeli science activity will reduce, and the scientific community might move out of Israel to focus on R&D



locations. Re-prioritisation of R&D areas and funding from biotech to defence	Re-cessation of foreign manufacturing activity		
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### 3. Opportunity for India

Israel and India cooperate in areas of science, technology, and education. For example, in 2012, the Centre for Israel Studies was established at the Jindal School of International Affairs. Israel’s Tel Aviv University oversees a Centre for Israel Studies in Mumbai since 2017. In 2020, the Ben Gurion University of the Negev [established](#) a Research Centre on Desert Agriculture in Chennai. The India-Israel Industrial Research and Development co-operation framework (i4RD) was signed in 2005. In 2023, India’s Ministry of Science and Technology, GoI and the Directorate of Defence Research and Development of the Government of Israel, [signed](#) a Memorandum of Understanding (MoU) to enhance science & Technology cooperation.

There will likely not have a short term significant impact on the Indian biotechnology sector because of the Israel-Hamas war. There are about 40 India-Israel ongoing life science related projects, but these can be organised using remote meetings or substitution of Israeli experts with others. Overall, there are around 900 Indian students enrolled in academia in Israel, a miniscule number. Accommodating these students within India or other countries should be relatively easy.

Country of origin	Legal	Illegal	Total
Italy	170	10	180
USA	427	34	461
Germany	147	39	186
India	182	44	226
China	1,170	402	1,572
Spain	269	8	277
Rumania	395	25	420
Thailand	290	79	369
Turkey	123	23	146
Other countries	1,454	187	1,641
<b>Total</b>	<b>4,627</b>	<b>851</b>	<b>5,478</b>

[Figure 5](#): Number of experts of foreign origin in Israel by nationality

The Indian domestic pharmaceutical industry is particularly concerned as the war is threatening to disrupt its exports to several countries in the Middle East and North Africa. The UAE, Qatar, Saudi Arabia, Egypt, and Bahrain are among the countries in the region that are major destinations for Indian pharma products.

Indian exports to Israel may [incur](#) higher insurance premiums and shipping costs due to the ongoing war. In 2022-23, pharma exports to Israel from India stood at \$92 million, a [rise](#) from \$60 million the previous year. The region is central to the economic corridor [proposed](#) by PM Modi and a long-term conflict may impact movement through this supply route.

On the other hand, if Israel's pharmaceutical supply to the US and Europe is disrupted, this could create a window of opportunity for competitors. Israel-based manufacturing facilities produce 43 innovator or biosimilar drugs approved in the US, UK, and/or EU, mostly these drugs' active pharmaceutical ingredients (APIs).

Long-term conflict in the Israeli region will push R&D and manufacturing out of Israel. This will be enabled by the fact that most funding and patents are owned by foreign sources. This creates an opportunity for India to attract both R&D and manufacturing to its shores.

#### 4. Next steps for India

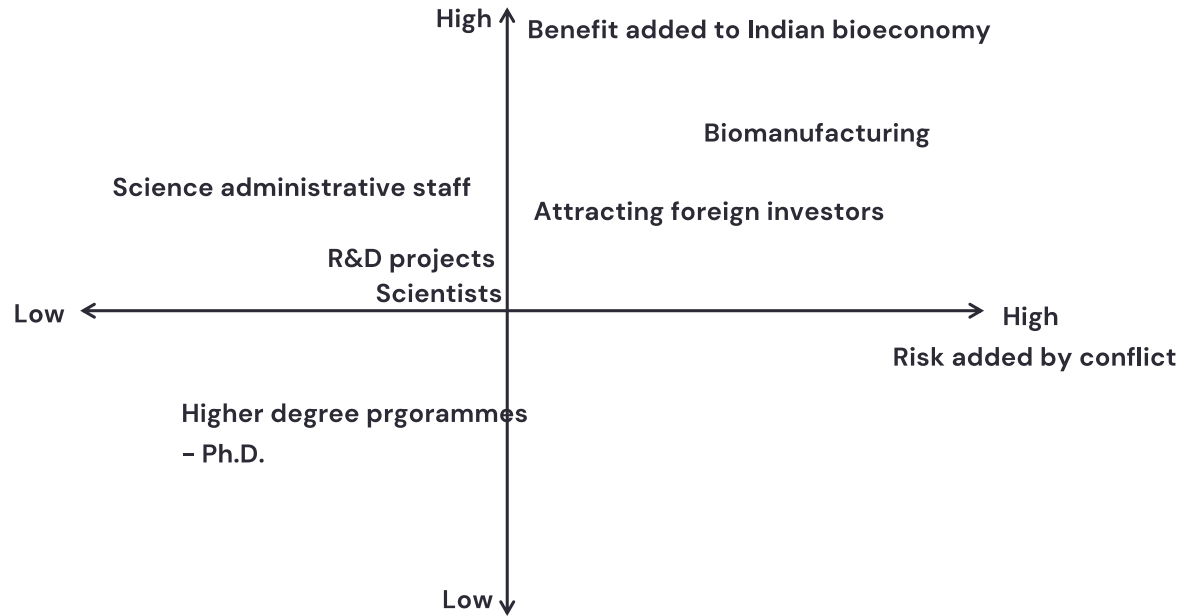


Figure 6: A 2X2 framework to assess the opportunity for India

The Israeli biotechnology sector is made of up multiple sub-segments which may be of interest to India. The 2X2 framework in Figure 6 proposes a method to structure India's approach to attracting these segments. The framework assesses sub-segments based on the risk to their continued existence in presence of a long-term war versus the benefits India can accrue by their relocation. Based on these parameters, attracting biomanufacturing contracts and investors to set up biomanufacturing in India can be prioritised.

In the near term, India should watch and see how the conflict develops, without explicitly getting involved. Having said, India should create incentives for companies willing to move to safer shores to transfer their R&D and manufacturing capabilities. Some incentives could be:

1. Offer fast-track regulatory processes for MNCs to relocate manufacturing from Israel to India
2. Offer patent fee waivers and fast-track registrations for products patented in Israel, if the products are going to be manufactured in India
3. Sign co-operation treaties with EU to set up exchange of standards, funding and scientists
4. Expanding the VAJRA fellowship to scientists of Israeli origin

5. Offer Israeli scientists a portion of the ongoing Indo-Israeli grants/projects to take equivalent positions in their Indian counterpart's institutions on a temporary or permanent basis.
6. Create a programme for science administrators to take equivalent positions in India. Israel has created bureaucratic processes for translation of R&D to products and services and India can gain from understanding and applying this crucial link.

Indian companies and contract manufacturing organisations should also reach out to the impacted MNCs to offer their services.

## **5. Conclusion**

The Israel-Hamas conflict will have negligible impact on biotechnology in India. However, if the war continues, there might be an opportunity for India to attract international players to set up R&D or manufacturing units. India needs to create incentives to facilitate the entry and establishment of these players.