Managing Intellectual Property in the Defense Establishment: Opportunities and Risks

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In Israel, there is a consensus on the value of all knowledge generated in the defense establishment and its contribution to the economy. But in the State Comptroller's report of March 2014, the management of intellectual property (IP) at the Ministry of Defense was described as an ongoing fiasco, with the blame ascribed to both the Ministry of Defense and the Ministry of Finance. This essay seeks to contribute to the discourse on remedying the flaws and suggest some organizing principles in the management of IP, while considering both the needs of the defense establishment and those of the Israeli economy. The essay proposes that the IDF manage the IP under its purview as part of the organization's knowledge management, but not engage in financial IP transactions; a specially designated company should be established in the Ministry of Defense that would be responsible for this. At present, the chances of such a move succeeding seem low, but even if it results only in an improvement of the management of technological knowledge in the defense establishment, it would constitute an achievement. Knowing that the idea of commercializing knowledge has been seriously and thoroughly examined is important in and of itself.

Key words: knowledge management, commercialization of knowledge, defense establishment, Ministry of Defense (MoD), Israel Defense Forces (IDF), State Comptroller, defense budget, Israeli economy, high-tech, cyberspace

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The essay was written as part of the INSS Economics and National Security Research Program, supported by the Joseph and Jeanette Neubauer Foundation.

Introduction

Many technologies serving humankind started out as developments for the military, including the microwave, radio, digital camera, internet, GPS, and more.¹ All of these have vast economic value. The Israeli defense establishment (Ministry of Defense, IDF, etc.) develops and improves technologies that subsequently enter the civilian sector, but the knowledge travels from the defense establishment to the economy in an unsupervised, unmanaged way, without any compensation.

The fundamental question at stake is this: should a state deal with the management and commercialization of knowledge developed in its institutions in general and its defense establishment in particular? The analysis in this essay can help formulate an opinion on the matter. The essay's starting point is the State Comptroller's March 2014 report, according to which the Minsitry of Defense (MoD) should manage its intellectual proprety (IP) in order to capitalize on it, or at least make a serious attempt to do so. The results would then either lead to a codification of the issue or to its being removed from the national agenda. Therefore, the essay will attempt to outline how best to meet this challenge while minimizing risks and maximizing opportunities.

The discussion on the management of IP in the defense establishment requires an understanding of several concepts:

- a. *Knowledge management* refers to the entire system of development, follow up, control and oversight in the context of the creation of internal knowledge (within the defense establishment), receipt of external knowledge (from outside the establishment), and transfer of the knowledge, including the distinction between existing knowledge and knowledge that has yet to be developed.
- a. *Intellectual property* is the general term for the rights to intangible goods and resources resulting from thought processes. IP includes inventions, technologies, work processes, patents, and any sort of information or knowledge having commercial potential (henceforth "information"). The rights of IP are protected by means of patents, copyrights, confidentiality clauses, and so on.
- a. *IP management* is the systematic management of knowledge defined as IP or likely to become such, including its production, registration, classification and commercialization. Management touches on knowledge created within the system and on the ways its commercialization affects

the organization (in our case, the defense establishment), the people in it, and even global and Israeli companies.

a. *Commercialization of IP* is the range of actions involved in generating an economic return on IP. This may include the process of turning IP into something with commercial potential and then trading with it. Trade in IP can involve selling the rights to the IP or the products developed on its basis, or receiving royalties.

The Current State of Affairs

The Problem According to the State Comptroller's Report

In March 2014, the Israeli State Comptroller issued a report on the management of IP at the Ministry of Defense. The report states that the MoD's lack of management of IP is an ongoing fiasco and that "the MoD has, for many years, neglected the handling of Israel's defense IP assets under its purview and owned by the IDF."² According to the report, the MoD has no policy, suitable directives³ or central body handling the issue. As a result, the MoD does a poor job of managing, following up on, and supervising the assets of the IP developed on its watch or with its financing, including the military industries, and even following up on its subsequent uses. For example, the IDF has no current data on the quantity, type, and value of IP assets in its possession.

The State Comptroller's report indicates that from 2004 until 2012 nine different teams tackled the issue. All of them pointed to the many flaws in the management of IP at the MoD and formulated recommendations to deal with the issue and improve the situation. However, the ministry's conduct was characterized by "foot-dragging and a lack of resolve." The major flaws were lack of policy on managing the wealth of IP assets in the ministry and how to realize them economically, while not receiving any compensation for transferring ministry knowledge to third parties. "These failings cause real damage both to the ministry's ability to manage its IP and its ability to realize the economic potential inherent in its IP. The MoD must address these failings without delay."⁴

The report also noted that the Israeli Accountant General, as the executor of the Ministry of Finance responsible for handling the nation's assets including intangible ones, failed to fulfill his obligation. The report indicated his neglect when it comes to regulating IP in the Ministry of Defense, supervising the IP assets at the ministry's disposal and the use

that is made of them. Interestingly, the Accountant General stated that the ministry's IP assets have great inherent economic potential, and therefore recommended to institutionalize the field of IP in the Ministry of Defense.⁵

The Israeli State Comptroller's Office noted in the 2013 Annual Report (March 2014) that MoD Director General Maj. Gen. (res.) Dan Harel instructed that steps be taken to remedy the significant failings that emerged during the review.

Completing the assessment of what is happening in the government sector is the seminal study issued in April 2014 by the Haifa Center for Law and Technology at the University of Haifa, which examined the current state of affairs of the policy on the commercialization of government sponsored R&D in general. The study's findings also indicated the lack of a consistent policy on patent registration of products of research funded by the government and their commercialization. "This state of affairs does not serve the goals of government sponsored R&D and is at odds with the principles of good governance." The study's conclusions reveal that although it would be unwise to dictate a single policy for all forms of IP sharing, development and commercialization of government knowledge, it is necessary to create a unifying framework for defining the decision makers' and policy framers' considerations on these issues. The study therefore suggests a framework for defining and identifying the relevant concerns regarding the commercialization of products resulting from government sponsored R&D by means of patents.6

The Knowledge Created in the Defense Establishment and its Importance to the Economy

Managing knowledge in Israel's defense establishment represents a unique instance of knowledge management in public institutions. The knowledge created in the defense establishment is the result of the formulation of new ideas, development, manufacturing, generation of lab data, experiments, operational use, lesson learning, training and instruction, and more. The many challenges and the access to creative manpower render Israel's defense establishment unique. These advantages greatly affect the development of the Israeli economy, especially in the high-tech sector. The derived added value will increase as the need for new and innovative technologies surges. Israel's prominent position in the global cyber market is an excellent example of untapped IP assets.

The act of creating knowledge with commercial potential in the defense establishment occurs in several bodies: those in charge of planning and managing R&D in the MoD, the IDF, and the security industries, both government owned (Israel Aircraft Industries, Rafael, and Israel Military Industries) and private or semi-private ones acting on the government's behalf (Elbit Systems, mPrest Systems and others), research institutions and in academic settings where R&D is conducted for the Ministry of Defense. In addition, the Administration for the Development of Weapons and Technological Infrastructures is a joint body belonging to the MoD and the IDF. Quite a few projects were initiated by the army's branches and corps, following which they were executed by the defense industries. The engineers in the defense establishment characterize, provide advice and ensure that the weapons developed and manufactured meet the demands with a profound understanding of operational needs.⁷

Furthermore, IDF units create IP assets in fields such as technological developments for the sake of intelligence gathering and cyberspace; weapons, securing and fortification development; warfare doctrines; experimental data; and more. The State Comptroller's report also stated that an officer in Unit 8200 reported that the unit is brimming with IP assets that could be traded to the defense industries, but that there is no suitable mechanism for making it happen: "there is no strategic mechanism defining what may be released and what must be released."⁸

The knowledge created in the defense establishment feeds the economy by contributing to the GNP, investments, and employment. The high-tech sector directly employs close to 9.5 percent of the country's workforce and is a critical source for the GNP, income from taxes and exports. One must remember that increasing exports of Israeli goods and services is a prerequisite of growth, because Israel's own market is small and its economy is export oriented. This dependence forces Israel to maintain a high level of competitiveness and adapt itself to structural changes in the global market. Because Israel has no competitive advantage in terms of a cheap workforce, this is possible only if Israel remains a leader in the high-tech sector.

Many technological companies have been established in Israel by or via former members of technological units in the defense establishment, in part because of the knowledge base and experience they gained during their army service. The financial press has pointed to former members of military intelligence's Unit 8200 as being involved in the founding of some internationally leading tech companies: Check Point Software Technologies Ltd., which deals with information security, valued at \$13.8 billion on the NASDAQ (November 2014); Verint Systems Inc., which deals with information gathering, retention and analysis for business intelligence, valued at \$3.5 billion on the NASDAQ; NICE Systems Ltd., which specializes in telephone voice recording, data security and surveillance, valued at \$2.8 billion on the NASDAQ; and more. The technological and operational knowledge emanating from the IDF also represents a critical resource for Israeli security companies. In 2013, Israel signed contracts for selling weapons and security equipment estimated at \$6.5 billion.⁹

The defense establishment is proud of its contribution to the economy. In December 2013, Maj. Gen. Orna Barbivai, then-head of the IDF's Manpower Directorate, said that, "if one takes a broad, national, systemic view, it is easy to see how the IDF and other security services are the engine pulling the country's economic growth and that its manpower is a competitive edge by any standard...One can see the correlation between the advanced startups, in Israel and abroad, and their roots in the army."¹⁰ In January 2011, then-Maj. Gen. Ami Shafran, head of the IDF's Teleprocessing Branch, said that "the IDF represents a key technological hothouse for the high-tech sector...One of the products of this technological hothouse is the human capital that assimilates into Israeli R&D, higher education and industry." According to Shafran, "from a market point of view, spending on developing technological human capital in the IDF in the field of teleprocessing, whose designation is primarily security, also represents an investment yielding significant economic returns for the economy and a central part of Israeli exports."11

One could say that the defense establishment–because of investments, authority given to young people, and operational demands–has, in recent decades, served as a significant catalyst for the founding of new Israeli companies and has created a competitive edge for Israel on the global market. However, global trends in R&D and the founding of new companies are generating new challenges.¹² Global competition and the need to be the first to hit the global market mean an accelerated rate of development and the need for rapid availability of international contacts and capital. Entrepreneurs are therefore eager to reach investors and strategic contacts to finance the developments that can take them into new markets and issue

the companies on global stock markets as soon as possible. This gives rise to a question: will inventions whose origins lie in centers of knowledge in Israel, including the defense establishment, continue to create the same value for the Israeli economy in the future, or will they quickly find their way to international companies?

IP Movement from the Defense Establishment to the Business World

The IP generated by the defense establishment currently makes its way to the outside world via personal and institutional routes.

The Personal Route-Via Alumni

IP developed in the defense establishment technological units moves into the free market via the people who served in them. Officially, the Ministry of Defense's policy does not allow the transfer of information this way, but in practice this is not supervised by the ministry, as many companies employ former members of the MoD departments. However, as far as anyone knows, no concrete information has been published on the transfer of specific IP from the defense establishment, and no one has made any kind of assessment of the value of the IP that has moved into the free market via the personal route. It should also be noted that given the current state of affairs, it is difficult to isolate the contribution of protectable IP from the professional knowledge and experience accrued by graduates of the defense establishment and from the added value the IP accrues in the civilian business setting. The defense establishment is losing potential income from this IP, as noted by the State Comptroller, but as long as it is used in Israeli companies the local economy and the state are at least benefiting greatly, albeit indirectly. This is not the case when IP is realized in its early stages within foreign companies abroad.

The Institutional Route-the Military Industries

These are cases in which an idea, definition, performance testing and sometimes even development funding and manufacturing all happen within the defense establishment, whereupon the industries may use the information and products also on behalf of other clients. Sometimes, the MoD receives royalties for this use, should its rights be specifically noted in the work orders for projects that the military industries carry out as contractors. It should be noted that the transfer of knowledge from the companies used (through sub-contractors or previous employees) is supposed to be handled in the setting of the commercial company interested in protecting the IP even if the information is affiliated with the defense establishment. When this happens in companies fully owned by the government, the state receives full compensation for the IP because the defense establishment and these companies have one single stockholder—the government. But when it happens in defense industries not owned by the government, the defense establishment is liable to lose potential income. The growing use made by the defense establishment of external companies is another reason for following up on what happens to the IP developed in the defense establishment or with its funding.

Institutionalizing the Management Of IP in the Defense Establishment–Opportunities and Risks

In changing the current situation by institutionalizing the management of IP of the defense establishment and commercializing it, as required by the State Comptroller's report, there are both opportunities and risks for the defense establishment and for the economy, as is demonstrated below.

Opportunities for the Defense Establishment in Managing IP

a. Contribution to the improvement of knowledge and organizational memory management. Documenting and managing IP is a necessary component in improving the defense establishment's ability to attain its goals long before touching upon the issue of commercializing knowledge. Insufficient retention of technological knowledge in the defense establishment arouses some troubling questions: are time and resources being wasted in certain units as they redevelop technological products already developed in the past? Do certain units promote technological abilities already developed or being developed in other units due to a lack of central control of technological information? These questions are particularly pertinent for units in the IDF and the intelligence community. Compared to the IDF, the defense industries have an advantage in knowledge preservation because they make institutionalized efforts to retain accumulated knowledge over a long period of time by a cadre of permanent employees who do not end their service after three years or are transferred from one position to another, as is customary in the

army. Nonetheless, even with regard to these companies, the question arises: is there sufficient documentation of knowledge and is there a sharing of knowledge among government owned companies?

- b. Economic compensation for the defense establishment. According to the State Comptroller, "maximizing the economic potential in IP assets may provide the MoD with many added financial resources that could significantly increase the state's budget sources in general and that of the MoD in particular."¹³ At stake is the compensation expected from the system's income resulting from the commercialization of IP through products such as various types of communications devices, command and control systems, information security products, optics, drones, satellites, voice processing, picture processing, and so on.¹⁴ Additional income would be generated by means of equipment sale, rendering services, real estate, etc.
- c. Contribution to retaining personnel in technological units. Currently, given the lack of management of IP, the possibility of extracting IP without compensation is liable to tempt the most outstanding personnel in the system to leave as soon as they can. In addition, if the IDF gives up on copyrights, its employees or those serving in it are discriminated against, compared to their cohorts who leave the system and use the knowledge for their own gain. By contrast, if there is informed management, the possibility that personnel serving in the technological units become partners in the creation of IP on the forefront of global technology could maintain a high level of motivation to enlist in these units and perhaps also reduce the numbers leaving the army during high-tech booms around the world. Furthermore, the possibility of recruiting new workers not subject to long service in the defense establishment-for example, 3-6 year stints-to be part of the system of knowledge development and experimentation as part of their own professional development should be examined. This would encourage knowledge to flow in the opposite direction: from outside the system inwards.
- d. Contribution to the defense establishment's operational capabilities. It is only reasonable to assume that in various units there are ideas that remain unrealized because of limited resources or lack of economic feasibility, especially if the unit would be the product's only customer. By means of an orderly transfer of IP to businesses, it would be possible to develop more ideas at lower cost, thereby increasing the number

of products that IDF units could purchase from the industries. For example, it may be that somewhere in the IDF there is an idea for a new explosives detection device or one for conducting underground surveys. Orderly work with a business for joint development could allow the development of products for marketing to meet both the needs of the defense establishment and the global market.

- e. *Preventing operational harm.* Increasing command and control would reduce the rate of unsupervised leakage of classified IP leaving the system liable to fall into hostile hands.
- f. *Protecting the IDF's ability to use technology.* Situations are liable to arise in which IP originating in the defense establishment is patented by a civilian entity, which could limit the defense establishment and defense industries' ability to use it.
- g. *Improving the governance of national resources*. Meeting directives and procedures as noted in the State Comptroller's report.

Risks to the Defense Establishment in Managing IP

- a. *Risk of becoming overly preoccupied with IP for civilian needs.* At times, this could skew the priorities of the units away from dealing with the most important security needs.
- b. *Risk of financial loss.* The way to turn an idea into protected IP can be long and costly. Furthermore, conflicts about ownership of the IP that could lead to costly legal battles are liable to erupt. This could also damage the defense establishment's image. In any case, maximizing the income of information developed in the defense establishment is complex, and it is best not to develop higher than realistic expectations of the financial gains this route can represent. For example, if compensation takes the form of stocks the state receives from the sale of IP, it could deplete the funds raised by the company.¹⁵
- c. *Risk to human resources.* Strengthening the interface between civilian industries and the defense establishment is liable to increase the temptations for many talented personnel to leave the defense establishment, especially during high-tech booms. In addition, oversupervision of knowledge is liable to deter experts from working in the defense establishment.
- d. *Risk of establishing a mechanism that will only perpetuate itself.* One of the dangers is the establishment of a body that will fulfill its bureaucratic

objective but lack sufficient motivation to maximize the value of the knowledge because it will be part of the defense establishment structure whose performance is not tested on the basis of the results of knowledge commercialization.

e. *Growing risk of exposing sensitive information.* The management of IP, the sharing of knowledge, and the establishment of knowledge bases are inherently liable to increase this risk, especially when more information is exposed to more people who will want to make use of it on global markets.

Opportunities for the Economy in Managing IP in the Defense Establishment

- a. *Improving the flow of information to the market*. It is reasonable to assume that the defense establishment currently suffers from loss of information because it never makes it to the market. For example, in March 2014, Brig. Gen. (res.) Prof. Chaim Eshed, chair of the military space committee in the National Council for R&D, said: "in cyber, we are breaking new ground...This is the field in which we've dealt for more than 20 years, even if we didn't always call it cyber. Still, the defense establishment has greatly invested in turning military technologies into dual-purpose technologies that can be marketed in the civilian world, but we're not there yet."¹⁶
- b. *Giving priority to the use of IP to benefit Israel.* Globalization encourages routes in which IP moves directly abroad (also with the help of defense establishment alumni) without contributing to the Israeli economy. This route offers Israeli entrepreneurs the opportunity to work in places where there is access to capital, large markets and higher standards of living and working. In some cases, tempting offers come to Israeli entrepreneurs directly from abroad. In addition, many global companies, by means of their development centers in Israel, keep a watchful eye on new ideas emerging from Israel. This makes it possible for foreign companies and nations to enjoy the profits of IP developed with resources belonging to the State of Israel. Control of IP developed by the nation would allow it to give priority to using this IP for the good of the country and its economy (more on this below).
- c. *Institutionalizing the flow of information.* This would protect companies and other knowledge users from claims and lawsuits, and increase market equality in receiving information. The more uses there are for

the information, the more knowledge will expand, thereby multiplying the number of new opportunities in the encounter among entrepreneurs, consumers, financing and science.

d. *Greater social equality.* The issue of economic inequality in Israeli society is at the heart of public discourse. Generally speaking, no one disputes the right of personnel exiting the public sector to maximize the knowledge and skills they acquired for creating economic wealth once they enter the private sector. However, in the future it will become more difficult to ignore the question of whether or not the public is entitled to this wealth, with so much IP originating with the defense establishment.

Risks to the economy in managing IP in the defense establishment

Damage to the Flow of Information

The State Comptroller's report does not relate to the question of how to ensure that the great economic potential inherent in IP assets of the MoD and the IDF will in fact be maximized on behalf of the Israeli economy. If the defense establishment keeps its IP to itself (a risk liable to arise from an extreme interpretation of the State Comptroller's report) as the result of rigid procedures and directives and without establishing a mechanism for the transfer and application of information, the damage to both the economy and the defense establishment is liable to be significant, because several technological developments with value to the defense industry, the super-technology industries, and the Israeli GNP in general could be prevented. Therefore meticulous registration of intangible assets and their safekeeping must occur in tandem with a solution for the application of the information. It is likely that the current state of affairs, in which information is transferred without compensation to the defense industries and the economy through personnel that served in technological units and are now working on the free market, is preferable to the state compared to a situation in which rigid procedures will prevent its use altogether.

Factors Liable to Turn this Risk into a Reality

a. *The establishment of a rigid bureaucratic mechanism within the Ministry of Defense.* For example, for the defense establishment, which is not oriented by nature towards economic profits, it is very easy to delay and even prevent the release of information to the free market on the

basis of its being classified or restricted. Furthermore, in the fast-paced world of accelerated technological developments, such delays may decrease attractiveness of the IP created in the defense establishment and its competitive edge on the global market.

b. Failed intra-system cooperation. It is clear that the subject under discussion is not likely to head the agenda of any commanding officer and may even be viewed as a nuisance. Former defense establishment personnel can bypass the system's ownership of the IP by making certain alterations. In extreme cases, there is a risk that some personnel within the defense establishment will prefer to keep certain knowledge with commercial potential to themselves rather than register it with the defense establishment in the first place.

Interim Summary

Proper IP management in the defense establishment can maximize opportunities and minimize risks. The following are suggested steps that can be taken to this effect.

First, regulation is needed for the sake of controlling and supervising the information. This stage should begin with an orderly registration of information. Second, it is necessary to institutionalize the sharing of information and knowledge within the system. Third, it is possible to begin to commercialize the knowledge. This stage must involve detailed planning, establishment of a mechanism, a survey and a pilot program before full-scale commercialization begins. These three stages require prior planning and risk management, mainly in order to prevent a situation in which information produced by the defense establishment that can be released, is not. The following section examines possible solutions for the commercialization of knowledge.

Existing Models of Commercialization of Knowledge

Assuming that the defense establishment is interested in the orderly application of the IP generated under its aegis, the following section will review the main models for realizing this goal.

Venture Capital Funds

These are bodies that raise money from investors (limited partners) for risky ventures such as startups. The many companies controlled by the fund reduce the risk involved when an investor invests in a single company. The sources of IP in ventures capital funds vary; some funds invest in ideas at the very beginning, while others come in at a more advanced stage. The capital is usually foreign: 90 percent of the capital currently raised for the Israeli high-tech sector comes from foreign investors.¹⁷ As a result of the dramatic increase in raising venture capital for the Israeli market at the end of the 1990s, the defense establishment had the idea to use the assets to develop dual-purpose (civilian and security) technologies originating in the technological units of the IDF, and thereby help finance R&D in the security sector.¹⁸ This idea was never implemented and became less attractive after the high-tech bubble burst globally at the start of the new millenium. From time to time, funds and private companies specializing in the commercialization of dual-purpose technologies originating in the defense establishment are founded.

Technological Incubators and Accelerators ("Hothouses")

These are settings designed to turn innovative technological ideas into startups and get them to the point where they can raise funds on their own. The hothouse provides new projects that are still in their early stages, with support such as an infrastructure for R&D, technological and business support, connections to investors and strategic partners, help in putting together suitable teams and administrative services for the company, etc. The technological hothouse program run by the chief scientist of the Ministry of the Economy allocates a certain budget to the projects that have been approved for participation; 85 percent of the funds are provided by the state as a grant to be paid back in the form of royalties on sales, and the entrepreneurs hold 15 percent of the stock of the company to be established thanks to the hothouse without having to invest any of their own money in the venture.¹⁹

Investment Companies

This is a general term for companies specializing in acquiring subsidiaries and working to upgrade them. The company's profits come from the subsidiary's dividends and from the income derived from the sale of the upgraded companies. Investors in an investment company are the company's shareholders. RDC Ltd.,²⁰ for example, applies the idea of cooperation between the security and civilian sectors. This company is owned jointly by Rafael Industries and Discount Investments. It is designed to combine technological IP from Rafael and receive capital and business knowhow from Discount Investments for the sake of establishing subsidiaries. The most successful of RDC's projects is Given Imaging Ltd., which manufactures and markets diagnostic products–pills with tiny cameras inside for the visualization and detection of disorders in the gastrointestinal tract. At the end of 2013, Given Imaging Ltd. was sold to the Covidian Group for \$820 million.²¹

Companies for the Commercialization of Knowledge at Universities, Research Institutes and Hospitals

These companies promote commercial applications based on inventions by researchers working in the organization, such as Ramot Ltd. at Tel Aviv University, Hadassit Ltd. at Hadassah Hosptial, Yisum Ltd. at the Hebrew University, and so on.²² Isorad Ltd. is a government company manufacturing and commercializing developments made at the Soreq Nuclear Research Center. This company, for example, is involved in the development of nuclear catheters and other developments in the field of nuclear medicine.²³

The 8200 EISP Program

This is a non-profit organization established in 2010 by an NGO formed by Military Intelligence Unit 8200 alumni on behalf of the community. Its objective is to use the knowledge and experience of its members to help young entrepreneurs, not necessarily from Unit 8200, succeed in new ventures. By April 2014, 60 entrepreneurs in three rounds have participated in the program. Among the projects participating in the program were a company in the field of interactive advertising and a company in the field of information security.²⁴

The US Army IP Model

The US Army grants licenses to civilian companies to use patents under its registration. The army views this as a way to expand the use of various inventions that came about under its aegis. The license may be for nonexclusive, partially-exclusive or exclusive use, based on the army's considerations for any given invention. In any case, the US administration retains the nation's rights to use the military's inventions for its own needs. Royalties are determined through negotiations and relate to the size of the potential market, exclusivity, and the need to develop additional technologies. The army's research labs may provide technological assistance for further development.²⁵ Obviously, when exclusivity is not granted, the particular IP becomes less attractive.

The Intellectual Ventures (IV) Model

Intellectual Ventures is a company based on the principle of knowledge sharing. One of the company's approaches is developing ideas while taking advantage of a network of some 4,000 inventors around the world. Inventors respond to a call for proposals, IV chooses the ideas for commercialization and finances the creation of patents. The inventors are eligible for some of the profits should IV sell its assets.²⁶

Principles for Handling the Management and Commercialization of IP in the Defense establishment

Given the situation and the various models presented above and in light of an analysis of the risks and opportunities, we now propose some principles for the management of IP in the purpose of commercialization.

At the opposite ends of the security spectrum are two types of organizations that must be treated very differently:

a. *Security companies.* These commercial companies are supposed to manage their IP as any company doing business these days, including documentation, confidentiality and patent registration, under government guidance and supervision. The MoD and the Ministry of Finance must ensure that government owned companies use up-to-date procedures that protect the state's rights in general and particularly when they sign contracts. The best scenario would be the establishment of a knowledge sharing mechanism that would connect all government owned companies to increase efficiency and maximize the advantage of size. When it comes to non-government companies or providers to government owned companies, it is important to make sure that there is a contractual and follow-up system in place, so that IP developed with defense establishment funds remains under defense establishment companies use it on behalf of other customers.

b. Military units. In general, it is best that they do not focus on the business side of things but rather on the security purpose of their developments and on transferring the information that could be applied to commercial uses. The responsibility of the commanding officers would be to document the information created in the unit, use the information for the unit's needs, share the information with other units in the defense establishment for its security needs, preserve information security (so far, these are all tasks that serve the military's needs), and only then transfer the information regarding business needs to the body in the MoD authorized to deal with its commercialization. It should be noted that the task of preventing the leakage of information out of the unit based on information security considerations also serves the function of supervising the IP developed in the unit.

Most of the dealings with the commercialization of IP originated in IDF units would therefore occur within the MoD itself, but cooperation with the units is a prerequisite.

A Prerequisite is the Internal Management and Control of the IP

The defense establishment must engage in the registration, protection and regularization of ownership before patent registration. To that end, the defense establishment must undertake activities of a legal and organizational nature: procedures, directives, guidance, explanation, enforcement and supervision. The MoD must take steps to ensure that unreleased information does not leak into the market in an unsupervised way and that the flow of information takes place only via an authorized body. In any case, it is essential to ensure that application of this principle is in tandem with the regularization of the release of IP to the market so at to avoid a bottleneck in the defense establishment.

Taking a Broad View

Handling this complex issue requires the integration of representatives from different fields. It is best to put together a steering committee that would include representatives from the Ministry of Defense, the technological units in the IDF, the military industries, the Ministry of Finance, the Chief Scientist in the Ministry of the Economy, and the Patents Authority in the Ministry of Justice. Subordinate to this committee, there would be two groups charged with the essential components of the process: one

dedicated to gathering information from IDF units, sorting it, and releasing it for commercialization, and one dedicated to preparing the information for its commercialization and its actual commercialization.

Gathering and Sorting of IP and its Release for Commercial Use

This requires a professional body in the Ministry of Defense. It must be intimately familiar with the technologies in the defense establishment and be able to envision their civilian applications. It would be responsible for the active gathering, intake and preservation of information from the technological units. It is important that this body have expertise both in the technological side and in marketing, including an understanding of the needs of the civilian market, on the one hand, and the capabilities of the defense establishment, on the other. To this end the body would have to seek the help of consultants from the business world.

After gathering, sorting, and organizing the information, a committee will authorize the release of technologies from the defense, while undertaking a cost-benefit analysis. The committee would include representatives from the groups involved in the steering committee. The IP released for commercialization would appear in the Ministry of Defense's database.

The Realization of the IP for the Needs of the Civilian Market

Another body, such as a designated government company, would be established to realize the IP designated for the non-government business market. The company would be fully government owned or owned in partnership with the business sector. Initially, full government ownership is preferable given the complexity of founding and running a jointly owned company. In either situation, control would remain in the hands of the MoD and management would be handled by business professionals. The Ministry of Defense's representatives on the steering committee would be members of the company's board of directions, ensuring they were committed to its success. The Chief Scientist of the Ministry of the Economy would be involved in its establishment. It is best that this company be founded only after the professional body in the MoD has gathered 20-30 ideas from the units.

The designated company would handle the following: retrieving information from the database; documenting and researching the applicability of the IP for the business sector; protecting the preparation of the information for commercialization (e.g., protecting the information with patents); and the commercialization of the information.

Commercialization of the Information for the Civilian Sector

This would occur via the designated company at least in the direct sales routes.

Direct Sales Route

The designated company would sell the rights to the knowledge to commercial companies, both military and civilian, under normal business terms, such as a lump sum payment, royalties,²⁷ and stocks with an antidilution mechanism. Conditions for limited use may be set: a prohibition on transferring the technology to another party, and commitment to use the IP within a set period of time. There may also be priorities in the selling of IP, such as giving preference to establishing and developing companies in Israel or foreign companies that are providers of security products to Israel or contribute directly to the development of Israel's economy, etc.

The Hothouse Route

This route's purpose would be to sell the IP at the stage where it is already applied at the small business level. This route, which is infinitely more complex, could make a significant contribution in other fields as well, such as the development of knowledge and management of manpower (more on this below). The designated company would stay in close contact with existing hothouses and/or establish a startup hothouse of its own. One could also consider the founding of startups whose knowledge base is classified, provided the final products are not restricted or would be channeled into use only within the defense establishment. Some of the projects could be developed in hothouses already active while others could be developed close to the technological units.

This interaction is likely to provide the defense establishment two additional advantages: on the technological side, the units would be able to test the applicability of the ideas to existing needs, and on the side of maintaining technological manpower, the project would represent an alternative to technological personnel who, in any case, want to leave the army without completely cutting themselves off from the system. In other words, in certain cases, the IDF would allow people to leave the units and develop their ideas in the hothouse. Because only a fraction of the projects can be expected to succeed, as is the norm in the venture capital sector, the defense establishment would be able to reintegrate hothouse personnel. Alternately, personnel from the technological units would be able to work in the hothouse for a certain period of time as part of an extended service program, similar to personnel granted time to study at the university. The risk in this is that the route could also accelerate the rate at which certain personnel leave or overemphasize hothouse-related efforts at the expense of security goals.

Conclusion

The defense establishment has IP that can be developed for commercial use in both the military and civilian sectors. Some IP leaves the system in a disorganized fashion or remains in the system and is never fully realized. Generally, the prevalent situation in the MoD and the findings of other studies point to the need for a comprehensive policy on the management of IP belonging to the government into which the security sector would be integrated.

Proper management of IP in the defense establishment would take full advantage of the opportunities and minimize the risks inherent in the field. In any case, it is important to avoid overly rigid government involvement, which might damage the economy. It is therefore necessary to ensure that there are routes via which it is possible to transmit the information to the market so that the market could make use of it. Given the risks inherent to the process, it is best to implement the process gradually and to begin by undertaking a pilot program.

Notes

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