Amiram PORATH
Private Consultant, Amiram Porath Consulting, Israel

TECHNOLOGY TRANSFER COMPANIES
– THE ISRAELI MODEL

Key words
Innovation, technology transfer, university, academy, patents, knowledge, intellectual property, research, applied research, licensing, spin-offs.

Abstract
The Israeli Research Universities have developed a model for cooperation with the industry, transferring knowledge, and commercialising activities that question traditional academic scope of activities. While at universities around the world one may find two functions, an Industry Liaison Unit, and Technology Transfer Unit, the Israeli model, adopted throughout the country is that of a unified entity, filling both roles and sometimes additional functions.

It is these organisations and their tenacious struggle to show revenues that are largely responsible for the success Israeli universities have shown in commercialising their research results. This article presents the structure of the Technology Transfer Companies and how it fits the role they play. It also presents the delicate balance the firms have to maintain between their identity as profit seeking organisations, and their mission as part of a university. This discussion shows why the Israeli model fits well within its environment.
1. Theoretical background

The theoretical background of the paper is based on the Organisational Theory dealing with the fit of the structure and internal routines. An additional aspect is the HR fit with the tasks allocated to the iTTCs.

1.1. Organisational theory

We are interested in the section of Organisational Theory dealing with how organisations fit to their environment. The environment creates the opportunities and the firm's ability to deal with them will determine the potential of the firm to perform and to achieve its goals.

The literature and research work done in the field are significant and only a small segment will be mentioned here. As early as the work done by Penrose [8] the fit of the firm with its environment and goals was considered a crucial element. Others (just one example from ample literature – Williamson and Winter [17] have expanded on that.

The organisational fit of the structure and routines, needs to be complemented by the Human Resources (HR) element. This element, has to fit the structure as well, in order to achieve the required fit. There is considerable work, mostly empirical regarding the impact of HR including the selection, training and continual management of the human resources on the results of the operation of the firm. One main claim was that HRM are strategic assets by themselves. Gomez-Meija [3] has shown that managing HR by encouraging and developing superior capabilities could influence the improvement in export results. It was Pfeffer [9] who showed that competitive advantage could be driven among other sources from HR, and the way it was done. Patterson et al, [7] have shown that good HR would lead to increased productivity and profitability. Huselid and Becker [5] showed that HR and their management constitute a core capability for the firm. The Strategic and organisational fit when favourable will even influence the perception of organisational performance, helping to distinguish between high and low performing companies [6].

In order for it to exist and function, the organisation has to show significant fit [12; 13], the fit should include the structure, as well as the internal routines, and the HR that jointly create the functions the organisation needs to perform in order to survive and even flourish in its specific environment.

2. Environmental influences

The Israeli Technology Transfer Company (iTTC) model described below has been very successful. Not only have these organisations accrue revenues for
their owners that have ranked among the top in the world, but these organisations have spread beyond the research universities in Israel to academic colleges (perhaps to be expected) but also to Hospitals and other organisations.

The selection of the firm, a business organisation aiming for profit, owned 100% by the university may seem odd at first. But once the environmental influences are analysed it would become perfectly logical.

The universities as well as the other organisations mentioned above in Israel are not for profit organisations, some are associations and some have other legal entities but all share the non-for profit characteristic. That allows them to accept donations – which are tax recognizable for the donors. These organisations are also exempt from different taxes which other organisations offering services have to pay. But the tax exemptions are reserved only as long as the organisation does not deal in business activities. Two additional points need to be recognised at this stage: first- the organisations are allowed by law to own another legal entity that is profit oriented (e.g. a business firm); second – university personnel are ill trained for business activities.

A similar organisational logic can be found in the firms that are held by municipalities or regional governing bodies which are called economic companies, and perform a similar function – performing business activities for entities that are barred or discouraged from doing so by taxation or law. Such economic organisations own on behalf of the municipalities the industrial parks, and manage other properties the municipalities own.

So, following the points above it makes sense for a university to own an entity that would take care of all the business-like activities it may need to be involved in. There are however some problems with that structure. In the sections below I will describe the structure and how control of some of the main activities the iTTC deals with, is maintained in such a way as to keep the iTTC compatible with the university. The next parts will detail some of the activities that the iTTCs have indulged with, and their results.

2.1. History

The first iTTC was established in 1959 [15] in the Weizmann Institute and was named Yeda (Knowledge in Hebrew). It was followed by Yissum (application in Hebrew) university and later in 1973 by Ramot (Heights) in Tel-Aviv University [11]. The last iTTC to be formed was Carmel of the Haifa University [2]. In the meantime Hadasit of the Hadasa hospital in Jerusalem as well as firms from colleges, and other similar bodies have been formed according to similar, if not always identical, guidelines (Table 1).

During their existence, the iTTC's have shown versatility in activity. Ramot Ltd. of Tel Aviv University used to own during the 1990's a Technology Incubator jointly with Rad Group, which was operating under the Technology

One of the special examples was that of Hadasit Bio Holding (HDST) which was established by Hadasit, the iTTC of the Hadasa hospital in Jerusalem, in 2005 and which raised funds for the commercialisation of the Hadasa developed technologies from the public. HDST holds 9 biotechnology firms and is using the proceeds from the public to further the clinical trials and development of the companies in its portfolio. In 2009 HDST [14] which is traded in the Tel Aviv Stock exchange, raised over 18 million NIS for that purpose.

The iTTCs have been successful. In the article [16] published on 25/03/2009 it was stated that Yissum Ltd. [18], the iTTC of the Hebrew University in Jerusalem (HUJI) had increased revenues from commercialisation to 60 million US$ in 2008. The article further stated that products developed on the basis of HUJI knowledge were selling around the world for about 1.3 billion US$, and that in 2008 Yissum got approval of additional 60 patents. The article [16] goes to further state that Yissum is in the 15th place in the world regarding that achievement and is topped in Israel by the iTTC of the Weizmann Institute – Yeda Ltd.

Table 1. Organisations and their iTTC in Israel (partial list)

<table>
<thead>
<tr>
<th>Organisation</th>
<th>iTTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weizmann institute</td>
<td>Yeda Ltd.</td>
</tr>
<tr>
<td>Hebrew University</td>
<td>Yissum Ltd.</td>
</tr>
<tr>
<td>Tel Aviv University</td>
<td>Ramot Ltd.</td>
</tr>
<tr>
<td>Bar Ilan University</td>
<td>BIRD Ltd.</td>
</tr>
<tr>
<td>Ben-Gurion University</td>
<td>BGN Technologies Ltd.</td>
</tr>
<tr>
<td>Haifa University</td>
<td>Carmel Ltd.</td>
</tr>
<tr>
<td>Hadasa Hospital</td>
<td>Hadasit Ltd.</td>
</tr>
</tbody>
</table>

Source: Author.

In order to understand the performance and results of the operation, and the apparent flexibility in operation which plays a role in the results of the actions of the iTTC, we will next consider the environment in which the iTTC's operate in and their structure.

3. Place in the university structure

The iTTCs operate within a special environment. They differ from most profit oriented companies by being fully owned by non-profit oriented bodies,
which also have an organisational culture which differs from that of normal
industry.

University culture, which emphasises the search for knowledge for the
benefit of society; that research is financed by public funds for the public's
benefit. The culture which reveres academic freedom to research for
knowledge's sake, and to publish the results, differs much from that of profit
oriented industry or commerce. The type of research done in universities is
basic research, aiming to better understand natural, social, or human
phenomena, not to develop products or services. There is no adherence to
industrial standards or compliance with them [10].

In such an environment, a body that seeks to transfer knowledge
(commercialise) in return for economic proceeds while keeping in line with the
university culture has to adapt and exist in two conflicting environments at the
same time. How is that done?

The iTTCs are independent legal entities registered as companies under the
Israeli Law. There is an inherent structural problem from a managerial point of
view, when a non-for-profit organisation with no business intentions owns a for
profit business unit. There are the problems of ownership, management and
coordination of values. For the university to control the iTTC it has to control
the board and do it in a way that would allow for the iTTC remaining business
oriented and successful at that, while at the same time compatible with the
university values. This section will deal with the structural aspects of the
university-iTTc combination.

There are two questions that this section will address, the structural control
the university maintains over the iTTC and the contribution of this control to the
work and function of the iTTC in the university environment.

3.1. Structural Control

The universities in Israel are all headed by presidents. The president of the
university is in charge of the wellbeing and the organisation of functions at the
university. It is at the organisational level below the president that the different
activities are split. The description below is a generalisation based on the most
common structures and positions. The academic management is split from the
organisational management. In turn the academic management is normally split
into the research management and teaching. So a typical university in Israel
would have a president, then a general manager who may be appointed as a vice
president, but not always; a vice president in charge of fund raising (a more
attractive term may be resources), who will be in charge of the publicity, the
friends and sometimes alumnae associations and similar activities. The
academic management may be managed by a rector or another title and this will
deal with the faculties members, curriculum and also with research. There is one
special function which in most universities is titled Vice President and Dean for research and development. That is to show that this specific function is both academic and business-like. The Vice President and Dean for Research and Development (VPDRD) is a vice president under the president and a dean under the rector or academic head of the university at the same time. The VPDRD manages both the pure academic research in the university, as well as the cooperation with the industry and commercialisation of the knowledge via the iTTC. VPDRD uses two management tools, an internal department in the university of university personnel managing academic funded research - the Research Authority; and the iTTC (keep in mind that there are variations some of which are detailed below). The VPDRD (in most cases) is ex-officio an active chairman of the board of the iTTC, which among external people also includes university representatives. The active chairman is in daily contact with the general manager of the iTTC and handles all policy issues. He also is the head of the university research committee and other related bodies (patent committee) and the ombudsman for research related issues in the university. The above structure is the most common one, but in the relatively small number of research universities in Israel (less than 10) there are several variations. In the Hebrew University the Vice President is called Chairman of the Research
Authority and is the director of Yissum, and the general manager and vice president of the university, and several leading researchers. He is not the Chairman of the Board of Yissum and therefore has less control over it. In the Weizmann Institute, in addition to the VPDRD there is a VP for technology transfer who is in charge of Yeda. However, while each university finds its own balance, there is always involvement at the board (responsibility) level of the VPDRD for the operation of the iTTC.

The by-laws and routines of the iTTC limit its freedom of action regarding conflicts of commerce with university culture. The iTTC has to adhere to the university laws for example in joint research projects with the industry regarding involved research students and their theses publications. There is a delicate balance that is maintained by daily involvement of the VPDRD in issues concerning the iTTC as much as there is in issues concerning the academic research via the Research Authority. Both the iTTC general manager and the Research Authority manager, answer directly to the VPDRD (see Figure 1 – iTTC place in university structure).

By maintaining the daily contact, and involvement in actions, (second signature on specific contracts etc.) the VPDRD keeps the iTTC in-line regarding university control, and serves as a knowledge and approval conduit to the university management bodies.

4. Internal structure of the iTTC

As presented in Fig. 1, the iTTC is successful, if out of the few companies in Israel there are two ranked high in the list of the successful commercialisation firms. While the previous section of the article has dealt with the issue of iTTC incorporation in the university structure and the university’s control over it, in this section the internal structure of the iTTC and it sinfluence on the success of the firms will be examined.

When examining the iTTCs one must bear in mind that they are being owned by research universities, chronically suffering from budgetary problems. Therefore, the search for efficacy and efficiency drive the structure.

4.1. iTTC – HR

Since iTTCs use the commercialisation department, as the main tool for commercialisation, and, the focus of this section will refer to that department. The iTTCs in the research universities employ people with industrial experience seeking for expertise in the area of technology commercialisation. The employees are not part of the university HR and do not follow the salary structure or the tenure of the university staff. While that characteristic makes the iTTC employees to be external to university life and culture, it does improve
the link to the industry and assures that the employees of the iTTC meet the industry on equal terms.

4.2. iTTC – Routines

The professional expertise is also expressed in the internal routines that the iTTC employs, the support measures that it develops and the internal structure. In the most prevalent case the commercialisation department focuses on different industrial sectors – technologies, such as: high-tech, bio-tech, pharma etc. allowing people in charge to develop both the internal expertise and familiarity with the relevant researchers in the university, as well as the contacts and familiarity with firms, associations, and tools relevant for the segment [12]. Another possibility, mostly in the smaller iTTCs is the tool specialisation such as licensing, or Spin-offs [1].

The segmented structure of the department, from time to time, requires colleges to assist each other but allows the iTTC to remain relatively small and keep the redundancy to a minimum. In fact the small size assists the efficiency of internal communication and cooperation, as people know each other and have direct daily contact. Most iTTCs do not use internal patent attorneys but do use internal legal departments, occupied mostly with different legal aspects of commercialisation. This structure may seem strange at first, but the iTTCs would rather employ external patent attorneys, each and expert in its own specific field, enjoying for each patent the best expert in the field without the overhead of internal HR.

The legal departments as they are required to develop the ability to execute Technology Transfer, while keeping to the university philosophy and legal framework may be maintained internally. The intensity of their action and the fact that the expertise required mostly regards the fit with the university and the legal environment, advocates keeping the expertise internal. Another contributing factor is that while there are many attorneys that may be hired and trained, that is not the case for patent attorneys who are more expansive to hire on permanent basis.

So the main efficacy oriented department in the iTTC would be the commercialising department. The patent strategy and execution is managed by either the commercialisation department or the legal department (it can also be a small department by itself) but it is done in full coordination with the other departments. There is also the financial department dealing with financial aspects, joint projects, different kinds of proceed and research finance. This department will prepare the financial reports, take care of the employees of the iTTC, and be an important part of iTTC’s independent function.

In some iTTCs there may be additional departments but these are rather specific than general and normally are the results of historical developments
(e.g. Ramot Ltd., which is the iTTC of the Tel Aviv University, has a publishing department).

Conclusion

When considering success factors, indigenous and exogenous, there is an important aspect to of the national culture and natural entrepreneurship of the people that needs to be considered. That includes support mechanisms for spin-off ventures creation, and the willingness of people to make the move to cooperate or transfer to other sectors. These affect the performance of the iTTCs, especially those more focused on spin-offs than licensing. The "small village" culture of Israel, that allows the transfer of people to academy and the research results from the academy to the industry, also helps iTTCs in their work. Another aspect is the environment. In Israel there are only few national research centres (e.g. Volcani for agriculture), and most of the research for the industry are performed by cooperation programmes with the industry. That differs from the current situation in most European countries, and influences the role of the iTTC and the openness to work with the academy shown by the Israeli industry.

Indigenously - iTTCs enjoy the flexibility given to them by law to achieve their goals, to employ their own personnel according to their needs and to establish independent routines. They function in a complex environment with the commercial world on one hand and the academic structure, on the other. That equilibrium is maintained via a delicate balance and rigid control of both long term goals, and daily operation by the university, combined with execution by non-university personnel.

The iTTCs have shown daring in attempting to create the tools, affiliates, partnership with the industry in i.e. technology incubators, in order to achieve their ends.

When one considers the time since the establishment of the leading iTTCs and relates it to their economic results, it should be understood that the iTTC does not change the university balance sheet quickly. The iTTCs have had a long time to “educate” the researchers and make them realise that reporting on research with potential economic benefits, patent registration help, and assistance in commercialisation is for the benefit of the researchers, and the university. That is a focus shift and it takes time. It takes time to make the researchers trust a non-academic body, employing people from another culture.

What will the next development in the structure be?

So while one cannot change the national culture, a research organisation may consider some of the parameters used by Israeli iTTCs and keep in mind that these changes require time and effort.
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Reviewer:
Edward STAWASZ
Firmy Transferu Technologii – model izraelski

Słowa kluczowe
Innowacja, transfer technologii, uczelnie, patenty, wiedza, własność intelektualna, badania, badania stosowane, licencjonowanie, firmy typu spin-off.

Streszczenie

Opracowany w izraelskich uczelniach badawczych model współpracy z przemysłem, transferu wiedzy i działań prokomercyjnych kwestionuje tradycyjną rolę tego typu instytucji. Podczas gdy na większości światowych uczelni transferem technologii zajmują się specjalnie utworzone organizacje, takie jak Centra Współpracy z Przemysłem czy Biura Transferu Technologii, w zaadaptowanym w Izraelu modelu funkcje te pełni ujednolicona struktura organizacyjna – Firma Transferu Technologii. Dzięki wysokim dochodom generowanym przez tego typu organizacje, uczelnie izraelskie odniosły olbrzymi sukces w komercjalizacji wyników prac badawczych. Artykuł prezentuje strukturę Firm Transferu Technologii. Ponadto w artykule przedstawiono sposób, w jaki Firmy Transferu Technologii radzą sobie z problemem bycia jednocześnie dochodowymi przedsiębiorstwami i jednostkami wydzielonymi ze struktur uczelni. Artykuł traktuje o tym, dlaczego zaprezentowany model tak dobrze sprawdza się w warunkach izraelskiej gospodarki.