6. Women in the land of milk, honey and high technology: the Israeli case

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In the 1990s, Israel emerged as a leading center for technology start-ups and innovation. In the year 2000, near the peak of the high-tech boom, Israel had about 4000 high-tech firms and new ones were forming at the rate of about 500 start-ups per year (de Fontenay and Carmel, 2004). At this stage Israel had the highest number of engineers per capita in the world and the high-tech sector comprised 15 percent of Israel's overall economy (Adams et al., 2003). The centrality of high technology to the Israeli economy can be seen in the fact that its exports in 2000 accounted for approximately one-third of the country's total industrial exports (Israel Central Bureau of Statistics, 2002). Israel has the third (after the USA and Canada) highest number of companies listed in NASDAQ (Breznitz, 2005; Eidelman and Hazzan, 2005). As early as the 1960s and 1970s, large American companies, such as IBM and Motorola, first made Israel into one of their leading development centers, while from the mid-1980s the number of international companies operating in the country has been growing. Alongside these, thousands of local start-ups were founded, some of which went on to become independent multinational firms that are traded on the NASDAQ and compete successfully with the global giants from the Silicon Valley (de Fontenay and Carmel, 2004; Teubal and Avnimelech, 2003).

Since the early 1990s, high-tech industry has played a central role in the Israeli economy, while turning the whole country into what the industry calls 'Silicon Wadi' (the term 'wadi' means a canyon or gorge, and is commonly used in Hebrew and Arabic; de Fontenay and Carmel, 2004). At the end of the 1990s the growth rate of export of high-tech industry was 12 percent, whereas other sectors of export grew at the rate of only of 4 percent (Ha-Poalim Bank, 2000). Furthermore, it employed around 6 percent of all workers in the country, the highest rate for any industrialized nation in that year (Central Bureau of Statistics, 2002). In the first three quarters of 2000, foreign investors made acquisitions of Israeli high-tech firms totaling $12 billion, and since then many more large-scale acquisitions have taken place (de Fontenay and Carmel, 2004). Currently, 43 out of the 50 leading technology giants in the world have a research and development center in Israel.

One way to evaluate the achievements of Israeli high-tech industry is by the number of patents per person in the country. At the start of the 1970s the number of patents in Israel compared to other countries in the Western world was quite low. From the mid-1980s there was tremendous growth in the number of original registered patents and, from 1997 on, only Japan and the USA surpassed Israel (Ha-Poalim Bank, 2000). Some of Israel's achievements in the fields of invention and innovation can be partially attributed to the high ranking of Israeli scientists. *Scientific American*'s list of '50 leading' research leaders for the year 2004 includes three Israeli scientists. Four Israelis have recently been awarded the Nobel Prize. Two were awarded in the field of chemistry in 2004 to Professor Aaron Ciechanover and Professor Avram Hersko from the Israel Institute of Technology. The other two prizes were awarded in the field of economics: Professor Robert J. Aumann received the prize in 2005 and Professor Daniel Kahneman, who was born in Israel and received his BA from the Hebrew University of Jerusalem, was named laureate in 2002.

In terms of numbers (the population is currently 6.5 million), Israel's success in the fields of technology and science is striking. However, although it a leading country in technology and science and is perceived as an equal opportunity country, there are disproportionately few women in the fields of science, technology, engineering and mathematics (STEM). Thus, although Israel can be dubbed 'the land of milk, honey and high technology', in the words of Izraeli (1994), women remain to a large extent 'outsiders in the promised land' with regard to their representation in STEM. One notable (and somewhat distorted) indication of this can be seen in the September 2006 edition of *The IT Magazine: The Yearly Israeli Magazine of Business Computation*. A quick glance through the pages of this colorful magazine reveals a conspicuously gendered image of the IT sector in Israel. The cover page of the magazine features a large color photo of a man and three smaller pictures, also all of men. An additional 35 color photos of men grace the inside pages. All these men are CEOs, managers, experts, consultants and academics in the field. By contrast, only two photos of women can be found and these are in advertisements, not content-based material.

This chapter discusses recent data regarding women's representation in these fields in Israel, and then suggests four key explanations for their limited showing in the fields of STEM that take the unique features of the Israeli context into account. I examine the different stages of the life cycle of Israeli women that aid and abet their integration in the fields of STEM. I start with girls' typical experiences in high school, and then turn to young women's experiences in their mandatory military service. I then discuss the ways in which specific features of the culture of familialism and motherhood in Israel affect their representation in STEM. Last I analyze the possible role of the Hebrew language in hindering women's advancement in fields of science and technology. I conclude by presenting a few programs currently being implemented in Israel to address these issues and to further women's integration in the fields of STEM.

WOMEN IN STEM IN ISRAEL: SOME DATA/NUMBERS

A 2003 survey conducted by the Ministry of Science explored the basic attitudes and assumptions of the Israeli population regarding women's equal opportunity education and employment in the sciences. The survey showed that most people had positive attitudes toward women in the sciences and responded positively to the statement that 'women's potential abilities to study and be involved in research in the field of science and technology are equal to that of men' (Messner-Yaron and Kahanovitch, 2003). Furthermore, respondents were in favor of women having careers in these sectors. However, although the public showed a positive and equitable attitude toward women in science and technology, the actual status of women in Israel in these fields is far from equitable.

Women's Representation in Science and Academia

In the last decade there has been a rise in the number of women enrolled in Israeli universities. In 2005 women made up 56 percent of the undergraduate student body, 57.4 percent of those at the master's degree level and 52.8 percent at the PhD level. Thus, although women account for more than 50 percent of the graduate students as a whole, the picture for the exact sciences, technology and engineering paints a different picture. For example, a recent survey (Berlinski, 2005) shows that in mathematics, statistics and computer sciences, the number of women awarded different degrees ranges between 26 percent and 37 percent, with the lowest percentage for PhDs. In the various branches of engineering, the percentage of women is even lower, and is around 26 percent for all the engineering degrees combined.

Recent data show that women and engineering still form an odd couple in Israel. At the 2006 graduation ceremony at Tel-Aviv University's School of Engineering, 27 women completed their studies as compared to 296 men (Grimland, 2006).

Table 6.1 University students by gender and field of studies, 2005 (percentage of women)

Field of studies	BA	MA	PhD
Humanities	66.8	64.5	57.2
Education	85.5	87.5	78.5
Social sciences	66.4	67.4	61.4
Business management	54.9	47.0	50.7
Law	55.4	51.0	39.0
Medicine	50.8	51.2	66.2
Engineering and architecture	26.7	25.7	27.2
Agriculture	59.4	57.5	56.0
Biological science	66.0	63.9	56.8
Physical science	36.7	37.8	37.5
Mathematics, statistics and computer science	34.5	29.5	26.4
Total	55.9	57.3	52.8

Note: The information is taken from a report of the Council for Higher Education.

Despite the fact that the percentage of women graduating from doctoral programs exceeds 50 percent, only 24 percent of the faculty at all levels and research fields (including in the arts, humanities and social sciences) are women. Furthermore, the higher one climbs on the academic ladder, the lower the number of women, and at the highest echelon (i.e. full professors) it is somewhat less than 10 percent (Messner-Yaron and Kahanovitch, 2003). In engineering, mathematics and physics, women make up between 7 percent and 12 percent of the faculty at all ranks; only 4–5 percent of all full professors are women (see Tables 6.1 and 6.2).

Naturally the numbers vary according to the field of research. Whereas the number of women researchers on the whole is higher in the humanities (35 percent of the faculty), social sciences (25 percent), medicine (33 percent) and life sciences (21 percent), their number in the faculty of exact sciences – engineering, mathematics, physics and technology studies – is small (e.g., engineering 12 percent, physics 8 percent). For example, at the Technion (Israel Institute of Technology), Israel's leading school of engineering, the percentage of women faculty members in the Department of Electrical Engineering is only four (8 percent) out of 50 faculty members (Hazzan et al., 2005). The number of full professors is even lower: in 2002 only 4 percent of the full professors in mathematics, computer sciences and statistics in all universities were women (Messner-Yaron and Kahanovitch, 2003) and in the Technion, which for many years produced the country's

Table 6.2 *University faculty by gender and field of studies, 2002 (percentage of women)*

Field of studies	Lecturer	Senior lecturer	Professor	Full professor	Total
Humanities	49.8	42.9	32.4	19.9	35.6
Education	60.7	52.1	43.4	39.4	50.7
Social sciences	42.8	37.6	18.2	11.6	27.7
Business management	42.1	9.4	14.5	0.00	16.5
Law	17.7	36.5	12.4	17.7	21.1
Medicine	51.5	48.0	33.2	15.8	33.0
Engineering and architecture	19.7	21.1	10.6	4.8	12.1
Agriculture	32.4	21.7	13.3	0.0	13.6
Biological science	33.0	20.8	26.4	14.3	21.1
Physical science	49.9	14.8	7.9	4.2	8.2
Mathematics statistics and computer science	33.0	10.1	8.2	4.0	7.7
Total for 2002 (the data above)	44.7	33.6	21.6	10.6	24.6
Total for 2005*	43.4	36.0	21.4	11.9	24.5

Notes: The information is taken from a report of the National Council for the Promotion of Women in Science and Technology.
* The information is taken from a report of the Council for Higher Education.

scientific and engineering elite, the number of women full professors in 2006 was merely 5 percent in all fields (Churchman, 2006).

Women's Representation in Industry

High-tech industry in Israel has been growing intensively and both men and women are employed in the field. According to data published by the Chief Scientist in the Ministry of Science and Head Researcher of Israel, the percentage of women working in science and technology in Israel is about 25 percent, whereas women constitute 45 percent of the labor force (Messner-Yaron and Kahanovitz, 2005). These numbers reflect women at different levels; however, in management positions in the fields of technology their numbers are even smaller.

According to data concentrating solely on the high-tech field, the proportion of women working in high technology, in the broadest sense of the term (including non-technology jobs) in the year 2001 constituted about 34 percent of all employees (Central Bureau of Statistics, 2002). More recent data, from the year of 2005, indicate similar numbers (Central Bureau of

Statistics, 2005). According to the Central Bureau of Statistics (2002), high-tech industry is still defined as a 'masculine' field as regards the percentage of women in its ranks. The report, which covers data from 1995 to 1999, further shows that although the number of women employed in the labor force in Israel in general increased in this time period and that the gaps between the percentage of women and men decreased in many fields, their numbers in the high-tech field remained stable, fluctuating between 30 percent and 35 percent, as did the gender gap. Inside high-tech firms themselves more women joined the communication sector, whereas their representation in the sectors of computing and research and development remained small, and did make a meaningful increase in these four years. This proportion of women is similar to many EU countries (European Commission, 2001), but is significantly higher than in countries such as the UK and the Netherlands (Frenkel, 2006).

With regard to managerial positions in high-tech firms, there has been a notable change. For example, a 1999 survey showed that in that year 68 percent firms from high-tech industry employed at least one woman manager, in comparison with 49 percent in 1996. However, more factories employ at least one female manager in the electronics and electricity sector (76 percent) in comparison with firms in the software sector (60 percent). Furthermore, the number of female managers in the high-tech sector increased from 14 percent in 1996 to 20 percent in 1999. One unexpected and somewhat worrying piece of data shows that as the firms expand from small start-ups to larger companies, the number of women managers decreases in comparison with the number of men managers. In firms that employ over 100 employees, women comprise 18 percent of the managers, whereas in firms that employ up to 29 employees, women comprise 25 percent of the managers (Israel Industrial Union, 2000). Furthermore, according to the data reported by the Chief Scientist in the Ministry of Science and Head Researcher in Israel, in 2005 only 7 percent of the entrepreneurs in Israel were women. Thus although there are hundreds of start-ups in Israel and every year there are dozens more, the number of women launching start-ups is small.

Furthermore, it is interesting to note that although Israel has one of the highest number of patents per person in the world (surpassed only by two big countries; Ha-Poalim Bank, 2000), the percentage of women inventors is low. Between 2000 and 2005, among the patents submitted to the Registrar of Patents less than 6 percent were submitted by women inventors (Yaniski-Ravid, 2007).

This on the whole indicates that although women are represented in various ways among the people involved and working in science and technology in Israel, they are still a minority. Furthermore, although there are some indications in the data provided above that call for some optimism in terms of women's representation, there are also indications that in many of the sectors the rate of change of women's entry into prestigious and influential positions has been much slower than expected. In the following section I present some of the unique characteristics of Israeli society and culture which may account for women's limited representation in the sciences and technology.

BARRIERS TO WOMEN'S INTEGRATION IN STEM IN ISRAEL

There is a long list of barriers and hurdles associated with the somewhat limited representation of women in fields of STEM in Israel. Some have worldwide relevance and apply to many countries, whereas others are unique to the Israeli context. Here I examine the impact of the Israeli school system, compulsory military service, and the effects of familialism and motherhood on women's advancement. I then turn to other overarching factors, such as the possible effects of the Hebrew language as contributing to the creation and preservation of the gender gap.

The School System as Affecting Women in STEM

One of the obstacles to women's advancement in the fields of STEM may be rooted in early education. A career in science and technology requires a background in mathematics. In Israel, to be awarded a high school matriculation certificate, which is a prerequisite for higher education, one needs to pass the mathematics examination at the average (3 points), advanced (4 points) or highly advanced (5 points) tracks. As can be seen from Table 6.3, most girls in Israel decide to take low (3 points) or average track math, which is an inherent disadvantage to starting a career in science and technology. However, it is interesting to note that at all levels, the percentage of girls passing and excelling is higher than that of boys. In fact, in 2003, the difference in percentages between boys and girls increased in favor of girls, both in the percentages of students passing the exams and those excelling in them (Churchman, 2006; Messner-Yron and Kahanovitz, 2003, 2005). Girls' higher grades in the lower math tracks indicate that they could probably have succeeded in the advanced or the highly advanced levels, although possibly with somewhat lower grades. This would be to their advantage since many of the fields of science and technology in the higher education system either require higher levels of mathematics even to apply, or give greater weight when calculating the average matriculation test score,

Table 6.3 Achievements in mathematics high school matriculation exams by gender (%), 2003

Gender	Taking the exam				Passing				Excelling			
	3 units	4 units	5 units	Total	3 units	4 units	5 units	Total	3 units	4 units	5 units	Total
Boys	52.8	26.2	21.0	100	86.5	96.5	98.3	91.6	33.0	51.1	64.8	44.4
Girls	57.1	27.8	15.1	100	90.9	97.8	98.6	94.0	44.8	59.9	66.9	52.4

Note: The information is taken from the Ministry of Education website.

to higher math and physics tracks. Thus a high grade in a lower track of mathematics is less advantageous than a somewhat lower grade at a highly advanced level.

The fact that at all levels girls' scores are better than those of boys suggests that girls' innate ability cannot account for for the small proportion of girls choosing to be tested at the higher levels of math. Rather, social and psychological reasons are more likely to lie behind this phenomenon (Messner-Yaron and Kahanovitch, 2005) According to a recent report from the Technion (Churchman, 2006), girls' decisions to study lower levels of mathematics are partially explained by direct and subtle messages conveyed to them by parents and teachers suggesting that 'certain subjects (such as mathematics, physics and computer science) are meant for boys and not for girls'. Although this stereotype is contradicted by the fact that girls score higher on the mathematics high school matriculation exams than boys, unfortunately, most teachers, parents and pupils are not aware of these statistics, and thus it is the stereotype that continues to influence their behavior and girls continue to choose lower levels of studies.

Apart from mathematics, in the field of computer studies the picture is similar. Worldwide surveys indicate that the number of women studying undergraduate-level computer science is constantly decreasing (Galpin, 2002). High school is thought to be a critical point in the computer science pipeline where many female students are lost. Formal and informal data indicate that the percentages of high school girls who study computer science in Israel at the highest level of the matriculation exam remain relatively low. For example, in the years 1998, 1999 and 2000 the percentages of girls who took the highest level of the computer science matriculation exam were 26 percent, 27 percent and 29 percent respectively (Adams et al., 2003).

According to a study by Eidelman and Hazzan (2005), there is a significant difference between the Arab and Jewish sectors in the percentages of female high school students studying advanced level computer science. Specifically, in the sector of the Jewish majority in Israel only 25 percent of those studying high school computer science are female, whereas in the Arab minority sector 50 percent of those studying at the higher level are female.

Two different explanations have been given for these unexpected findings. First, noticeable differences exist in the amount of encouragement Arab female students reported that they receive from various close agents, especially teachers, in comparison to Jewish female students. Arab female high school students reported that they were encouraged more by their mothers (56 percent versus 40 percent), fathers (44 percent versus 40 percent), siblings (44 percent versus 16 percent), friends (44 percent versus 20 percent), and acquaintances who had studied computer science (50 percent versus

20 percent) and – with the greatest difference – by their teachers (56 percent versus 8 percent). One possible explanation for the difference in encouragement is based on findings of other studies that explored cultural and familial differences between Arab and Jewish adolescents. According to these studies, since Arab students are a minority group, as well as a part of an Eastern, collective culture, it is likely that their parents and teachers support higher scholastic achievement in order to help them improve their social status (Peleg-Popko et al., 2003).

Second, the Jewish and Arab sectors in Israel study in separate educational systems. The Arab educational system offers a more limited range of subjects to choose from, including the more conventional and basic subjects (e.g. mathematics, computer science, physics and literature), whereas the Israeli students can choose less conventional subjects (e.g. drama, arts, music, sociology, psychology), as well as the more conventional ones. The limited choice offered to pupils in the Arab sector leads to higher rates of female pupils choosing to study computer science (Eidelman and Hazzan, 2005). Unfortunately, despite the fact that Arab female students make up about half of the computer science classrooms in high schools, according to their self-reports about their future career orientations, this will probably not help to expand the 'shrinking pipeline' in the Arab sector. According to the results of a survey administered to students, most Arab female students have already decided on their future professions and only a small percentage of them consider majoring in computer science, while the majority choose stereotypic female professions (Eidelman and Hazzan, 2005). Thus the better starting point of the female Arab students apparently does not carry over to higher education and industry.

From the above it can be concluded that when female high school students in Israel graduate, in many cases they have already accumulated some disadvantages in terms of their future ability to become integrated into the fields of science and technology. Support and encouragement of teachers and parents are likely to help in promoting girls to aim higher in the fields of mathematics, physics and computer science; however, at this stage such encouragement by authority and educational figures remains weak.

The Israeli Military and its Impact on Women in STEM

In Israel, service in the armed forces is mandatory. Following high school graduation men and women are drafted when they reach the age of 18. This stage in their life cycle has enormous impact on their future careers.

In a recent international competition for 120 novel inventions in the field of technology held by *The Wall Street Journal* in 2004, two Israeli inventions were awarded second and third place. The first firm developed a video capsule that films the intestines and the second developed an ultrasound device (using magnetic resonance imaging – MRI) for the removal of cancerous growths through a non-intrusive procedure. The success of these inventions was attributed by the inventors to their work in the past in the Israeli military in units that develop technological inventions aimed to improve combat (e.g. special missiles, devices for night sight) (Brazilai, 2004). The head of one of these firms stated:

> The medical device we developed is similar in principle to a 'command and control' military device. Now we are trying to develop the future operating room, which will be one that does not involve blood. Thus, the day after the surgery, the patient will be able to go to work.

As can be seen from the news item above, the Israeli military is most influential in affecting the field of high technology and engineering in Israel. A unique characteristic of Israel is the influence of the military in almost every area of private and public life, and the widespread overlap of the military and civilian spheres (Izraeli, 1994; Kimmerling, 1993). As such it can play a central role in determining women's ability to become involved and to progress in the labor force in the fields of high technology, engineering and, to a lesser extent, in science and research. In this section I will first provide a general background about women in the Israeli military, and then discuss the impact of the Israeli military on the high technology field. This section ends with an analysis of the specific impact army service can have on women in the fields of high technology and engineering in Israel.

Women's status in the Israeli military

In Israel, service in the armed forces is mandatory. Men and women are drafted after high school, when they reach the age of 18. The Zionist vision of a 'people's army', the pre-state socialistic ideology (Berkovitch, 1999), and the prolonged Arab–Israeli conflict, leading to the country's pervasive security needs, have all turned Israel into the only Western state with compulsory conscription for both men and women. Mandatory military service for both men and women could signify the construction of a gendered egalitarian citizenship. However, the Israeli military is still a male-dominated territory which values masculinity (Sasson Levi, 2003). Unlike men, women are easily exempt from the army, on the grounds of pregnancy, marriage or religious belief. Thus the law grants priority to a cultural ideology that values women's family responsibilities over their obligations to army service (Berkovitch, 1997; Izraeli, 1997).

Women comprise only 32 percent of the regular army; they serve a shorter term than do men (women are recruited for two years and men for three) and are usually excluded from combat roles. Furthermore, most men who have served in the military are required to serve for 30–40 days per year on reserve duty, at least until the age of 40–45. Women are usually exempt, except for those who have specific skills and training who may be called up to the age of 26 or until they become mothers. (Men do reserve duty and spend around one month per year in the army until the age of 45, whereas women at most times are excluded from reserve duty once they finish their compulsory service.) These structural and organizational differences between men and women limit the range of roles to which women may be posted and constitute explicit barriers to women's advancement to higher ranks in the military (Izraeli, 1997; Cohen, 1997).

Furthermore, the strong link between military service and citizenship in Israel extends the effect of the military on women's status not only to the period of their army service, but in Israeli civilian society more generally. Thus the differential treatment of men and women in the military and women's marginalization generate differential opportunities for mobility, both within the military and in civilian life, that privilege men. The advantages men obtain and derive from military service are converted into advantages in civilian life. Military elites shift easily into roles in civilian elites (e.g. political, managerial, educational, etc.), thus contributing to the sustainability and reproduction of gender inequality (Izraeli, 2001).

The effect of the military on hi-tech industry in Israel

Israel's military is perceived as a hotbed for high-tech entrepreneurs and an important base for the continuing success of the software industry in Israel (Breznitz, 2005; Teubal and Avnimelech, 2003). From 1960 to the present, the military has played a crucial role in the spread of computerization and information technology skills in Israel, thus helping to create an independent industrial sector. According to Breznitz (2005), the military performs various important functions that contribute to the development of the Israeli IT industry. These functions are explained below.

Training and human capital Young soldiers stay a limited time (up to six years) in the military and do short reserve duty stints. This results in intensive investment in training, and extreme responsibility for R&D is given to very young individuals. This produces highly trained and experienced professionals who form a large pool of trained young people who can join industry thanks to the army.

Collective learning and dissemination of knowledge The military constitutes a major means of collective learning. Because of the unique structure of reserve duty in Israel, military working teams are composed of former graduates who are civilian experts from a variety of firms and academic institutions, who do their reserve duty alongside active duty soldiers. Since these teams work together in the national interest and with a sense of patriotic camaraderie and mutual trust, they are able to collaborate and share their knowledge in a way that would not be possible outside the military. Furthermore, apart from contributing to the military, the reserve personnel are themselves constantly exposed to the knowledge gathered and created in the military, as well as to the knowledge of their comrades, knowledge they take back to their firms.

Foreign knowledge transfer The Israeli military plays an important role in the process of exposing the Israeli IT industry to knowledge acquired from foreign software tools and IT companies. The military is often a leader in the acquisition of new tools and state-of-the-art knowledge from abroad, and organizes training courses, hence enabling faster dissemination of the latest software development techniques in Israel.

Social networks and community building Graduates and reserve personnel of military technological units create dense networks of knowledge, recruitment and venture capital. Professional networks are known to facilitate information spillovers between firms, thereby promoting the spread of the most successful techniques and technologies, organizational structures, and contributing to the rapid movement of talented labor (Saxenian, 1994; Teubal and Avnimelech, 2003). The uniqueness of Israel is that the military serves as the foundation for these dense and large professional high-tech networks. Since Israelis go through several years of military service at a formative stage in their lives, connections with army friends function much as do university connections in the USA, with the added benefit that they are more closely-knit, and that the individuals have observed each other during high-impact work with the military, and can better evaluate each others' capabilities. Therefore, it is common for high-tech start-up founders to recruit a core team from old army friends and acquaintances. Army background also helps employers and investors make selection decisions: data on a person's unit and performance in the army are easily available, and these provide a great deal of information as to a person's ability, work habits and leadership qualities. For example, someone from an elite intelligence unit may be offered a job, or a leadership position in a civilian firm, merely on that basis (Breznitz, 2005).

The effect of the military on women in STEM in Israel

In light of the crucial role played by the Israeli military in the development of the software industry in Israel, it is of great significance to explore how the military affects women's integration into these fields. The military's role with respect to women's advancement can be seen as a double-edged sword, limiting some opportunities and fostering others. Since the early 1970s, women have been assigned to computer training in the military's computer center (Izraeli, 1994). The army recognized the importance of being able to use young women in technological fields, and has worked towards increasing their numbers (Churchman, 2006). Since young men who can be accepted on software and IT courses often have to be recruited out of a limited pool of candidates who have a low combat profile, the military prefers to recruit a larger number of women for these courses, because they can be drawn from the entire pool of women on active duty. Thus there are a number of programs that enable young women, whether before they enter the army or at the beginning of their service, to acquire an education in these areas.

The percentage of women in many of these courses is often high, and in some courses they are the majority. However, in the more prestigious computing and programming courses, although there have always been women participants, their numbers are more limited (about 20 percent of the participants). There are several reasons for the limited number of women in these courses. First, these courses require higher levels of mathematics and computer science, and, as noted above, Jewish women do not tend to specialize or study the highest levels of these topics in the school system. Thus they are not likely to be accepted on some of these courses. Second, these specialized, 'elite' courses require the participants to sign up for a few extra years of army service. Some young women who have the potential to participate in these courses may be reluctant to sign on for the extra years. Furthermore, although women may be represented in large numbers in the lower ranks of the units specializing in computing and software, there are few women in the higher ranks of these units. For example, data regarding a related field show that women officers in engineering roles are represented mostly at the lower ranks, both professionally and formally (women make up 30 percent of academic professional officers, but only 0.4 percent of the senior academic officers; 29 percent lieutenants, 0 percent colonels) (Messner-Yaron and Kahanovitch, 2003). Moreover, many of the men who serve in these units stay in contact with the units during their reserve duty and work in these units many days each year (up to 40 days per year). The women, on the other hand, as explained above, are not expected to do reserve duty in most cases.

This forms a complex dynamic overall, in which, on the one hand, women's participation in these units enables them to have some access to many of the benefits acquired by service in such units (e.g. training, experience, state-of-the-art knowledge, access to foreign knowledge, and an opportunity for networking). For example, a number of women 'army graduates' today head software and computer service companies (Izraeli, 1994). However, since there are fewer young women in the prestigious computing courses and the higher-ranking echelons, and almost no women do reserve duty, their access to training, experience and knowledge is more limited than that of men. Furthermore, the ability of women in such circumstances to develop social networks – which are so important for access to information and support, as well as to people, places and jobs in civilian society – are more limited (Izraeli, 1997). Moreover, since women barely take part in reserve duty, all the processes of ongoing knowledge accumulation and updates, and their ability to form ties with soldiers during reserve duty (including academics and other graduates working in competing companies) is denied to women. Reserve duty also brings together people from many different walks of life who might otherwise not meet. Serving together creates social bonds of mutual obligation that bypass status differences in civilian life and often extend beyond the service. Etzioni-Halevy (1996), in her study of civilian–military relations in Israel, found that senior officers meet civilian elites and prepare their second careers while still in the military (Izraeli, 2001).

Thus, although the military provides young women with a jumping board to the high-tech and other related fields, the young men in these units gain more tangible and long-term benefits for their future civilian career in related fields.

Ideals of Familialism and Motherhood as Affecting Women in STEM

After going through the military, the next stage for most Israeli women is that of creating their own family, while continuing their studies and starting a career. Despite its post-industrial economy and westernized lifestyle, Israeli society is known for its familialism (Fogiel-Bijaoui, 2002; Remennick, 2006). The family and motherhood continue to play a crucial role, at both the individual and collective levels, and are among the key social values of Israeli society. This is evident in the high marriage rates, the relatively low (albeit growing) divorce rates, and total fertility rates, which are among the highest in the developed industrialized world. Jewish-Israeli women's fertility rates are nationally 2.8 children per woman, ranging from 2.4 in secular families to 7.5 among the Ultra-Orthodox (Remennick, 2006). A recent survey found that Israelis see the ideal family as even larger, with an average of 3.5 children (Bareket, 2005). The Israeli-Jewish pronatalism approach is expressed at both institutional and popular levels and is thought to be driven by various different factors, including religious tradition, the memory of the Holocaust, the loss of life in military conflict and terrorist attacks, and the ongoing demographic competition with surrounding Arab nations (Portugese, 1998; Sered, 2000).

While Orthodox Jews are known for their commitment to fertility, reflecting the biblical commandment to 'be fruitful and multiply', in the secular Israeli community raising a large family is also often represented as a patriotic deed and a contribution to the struggling and developing nation (Berkowitch, 1997). Motherhood is seen as a major ideological icon and a primary identity indicator for most Israeli women regardless of their background and identity (e.g. ethnicity, religiosity, education, employment and career aspirations) (Remennick, 2006). The norm for secular couples is around three children, whereas one child, which is quite popular in other Western countries, is thought of in Israel as unsatisfactory. Childless women carry a lifetime stigma. This pronatalist norm is further institutionalized at the state level through assisted reproductive technologies (ART), which are accessible to all Israeli women since IVF and other expensive treatments are subsidized from public funds (Izraeli, 1994; Kahn, 2000; Remennick, 2000, 2006).

One interesting expression of this cultural ideal can be seen in the way in which motherhood and work are integrated. For example, in Israel there is an extremely limited presence of childless women in the political, economic and academic elites (Herzog, 1999; Frenkel, 2006). A recent list of the 50 most influential women in the Israeli economy drawn up by the prominent newspaper *Ha'aretz* in 2003 included only two childless women. In comparison, according to Hewlett (2002), about 40 percent of the women in the top percentile of wage earners in the USA do not have children (Frenkel, 2006).

As a cultural code, familialism takes for granted an unequal gender division of labor. The woman is constructed as a wife and mother, whose primary responsibility is to bear children, and take care of her home and family. Her paid work is widely accepted as a secondary contribution to the family's livelihood (Fogiel-Bijaoui, 2002). Thus, in the past the widespread gender contract in Israel was one that expected women to do paid labor, but not to have a career. Since the 1970s, however, Israeli public discourse has changed, and the issue of equal opportunities and the opening up of professions and industrial sectors to women has become increasingly important. Nonetheless, overall the cultural ideal that calls for the integration of motherhood and paid labor has not changed (Frenkel, 2006).

This cultural ideal of familialism has an extensive influence on women's aspirations and possibilities for integration in the fields of STEM. Women's expectations of becoming wives and mothers hinder their ability to become full-time employees as engineers, high-tech workers or scientists. For example, a recent survey shows that women in the high-tech industry in Israel in full-time as well as part-time jobs work longer hours than women in all other types of jobs in the labor force (Central Bureau of Statistics, 2002).

Since most women employed in high-tech industry are likely to also have a role as wives and mothers, working long hours can become a difficult demand. This is one of the reasons why women in these fields are poorly represented, and even less so towards the top of the organizational ladder. However, in the unique Israeli context, in which there is also an aspiration to establish an independent national economy and to further the project of nation building through economic development and prosperity, women are also expected to become integrated in the workforce in order to contribute to state productivity (Berkovitch, 2001; Shafir and Peled, 2002).

To enable the successful integration of work and mothering, the state has developed various family-friendly policies (e.g. mostly in the public service sector and unionized workplaces) that allow women to work full time while still caring for their children in the afternoon. Furthermore, a system of subsidized daycare centers for working mothers has developed (Frenkel, 2006). This has led to a widespread gender contract in Israel in which women are expected to do paid labor, and are able to participate in the labor force, but to a more limited extent than men. These cultural norm and structures enable women to take part in the technology and engineering workplace. But on the other hand, their involvement in these fields is generally limited and their ability to climb the corporate ranks is restricted.

Familialism: the case of Israeli high-tech industry

Frenkel (2004, 2006) recently examined the gender performance of Israeli high-tech women as they move between the masculine global culture of the high-tech world and their local Israeli culture, which expects them to combine full-time work (though with limited hours) with their active participation in caring for their children during after-school hours. Her findings show that although women's struggle in the high-tech world seems similar to that of their overseas equivalents, a deeper analysis reveals a distinct Israeli pattern. According to Frenkel (2006), the space created between the two cultural repertoires that shape gender performance in Israel (the masculine high-tech culture and the culture of familialism) is seen as allowing Israeli high-tech women to redefine the meaning of femininity in the workplace. This new femininity posits the image of the woman struggling to juggle active family caring with a career as worthy of imitation and as the cultural heroine of the new economy in Israel. Her examination of the day-to-day practices of women in high-tech industry shows that by openly and demonstratively making use of family-friendly organizational practices (e.g. leaving work early to care for their children), in keeping with the traditional Israeli perception of motherhood and femininity, and by publicly rejecting the claim that by doing so they are less worthy workers, 'hi-tech women at least partially succeed in extracting themselves from the social role of surrogate men that is imposed on women in other masculine environments, and manage to create a limited space in which to maneuver their doing of gender and their self-classification' (Frenkel, 2006, p. 48). Using this discourse, they manage to challenge the accepted characteristics of both good motherhood and the ideal worker and are able to redefine and manage well both life spheres – work and home – as well as gain social approval and appreciation. This dynamic possibly enables the construction of a new Israeli femininity that neither forgoes family caring nor accepts the marginalization of care givers in the organizational context.

Nonetheless, it is important to note that both Israeli society and the Israeli high-tech sector are not free from gender discrimination and a gendered perception of the image of the ideal worker. However, previous studies have suggested that the tension felt by Israeli career women is slightly less acute in comparison to their counterparts from the American middle class (Lieblich, 1987).

Familialism: the case of science and academia

Among academic scientists and researchers in Israeli academia the ideology of familialism is prevalent as well, and can have serious consequences for women at different critical points in their academic career. One specific unique Israeli aspect I will focus on is the prerequisite that individuals in academic positions spend some time (between one year to a few years) as students or in research position abroad. All Israeli universities require faculty that apply for a tenure track position to have done some of their studies aboard. Because Israel is a small country, it is seen as a necessity for academics to gain some knowledge and experience abroad during or after their PhD studies. This implies that students are expected to get their PhD degrees from universities outside Israel, or if they graduated in Israel, they are expected to do their postdoctoral studies abroad. Leaving for a PhD would mean leaving the country for four to five years at least (most students go to the USA). The requirement for postdoctoral studies is a year or two in the humanities and social sciences and two to four years in the field of natural and exact sciences. This postdoctoral requirement remains a major stumbling block for women.

All Israeli universities have this requirement as a prerequisite for an academic position on the faculty. Since Israeli youth serve in the military (men for three years and women for two years) and at times sign on for a longer period, and then many young people tend to travel or take it easy for a year or two, by the time they reach the stage of a PhD or postdoctoral studies they are likely to be over the age of 30. According to Toren (2000), the average age for women who apply for a faculty position at a university is 33.

At this stage of life Israelis are most likely to have at least one child, if not two or three. According to Toren's striking findings (2000) on women applying for a tenure track position, 78 percent are likely to already have one child (70 percent had their first child before earning their PhD), 50 percent are likely to have a second child as well and 22 percent have a third child (most of the women who chose to have a third child had it after receiving their appointment as lecturer). Although the requirement for postdoctoral studies seems gender-neutral, it is likely to affect women's careers in academia more than men's careers.

While it is accepted, and relatively common, for a wife to accompany her husband on studies or a postdoctoral position abroad, it is much less common for a husband to accompany his wife. This has been suggested to be a major obstacle to women's integration in academia. Furthermore, women who are hired for a tenure track position are likely to have similar conflicts. During their critical years between the degrees of lecturer and the tenured position of senior lecturer they are likely to give birth or to have to take care of young children, for whom in most cases they will be the primary caregivers. During these years they are also expected to be highly productive in academic terms, as well as to attetnd conferences that take place abroad. These multiple responsibilities are likely to hinder women's achievements as researchers. Although the Israeli universities acknowledge this and grant women (and men) who have had a baby during their pre-tenured period an extra year for tenure, this is still in many cases not enough.

Interestingly, previous research on the number of publications in relation to the number of children showed that childless academics do not publish more than those with children, and mothers of a low number of children do not out-publish those with more children (Toren, 2000). The most prolific publishers are mothers of two children. However, in comparison to men, their publication rates are lower and their advancement rate is slowed at all stages of their academic career (longer time spent between each rank) regardless of their productivity. This has been termed the 'hurdles race' by Moore and Toren (1998), capturing the idea that women in Israeli academia are confronted with gender obstacles at all stages of their academic careers, and not only in the earlier stages.

The Hebrew Language as a Barrier

Another unique aspect of the Israeli context that may subtly affect women's experience on the whole, but more so in fields where their representation is low, is the Hebrew language. According to the Technion report (Churchman, 2006), the Hebrew language plays an important role in constituting women's status and ability to become integrated in the fields of STEM. One central feature characterizing the Hebrew language is its requirement for gender differentiation in relation to every entity that the speaker or writer refers to (including people, but also objects). Furthermore, the generic term used in the Hebrew language is male.

Thus virtually in every university class, training course or discussion, the general term used to refer to the audience and to the profession is male. Apart from the spoken language, all documents in the universities and industry are phrased in the male form, perpetuating the stereotype of 'the scientist', 'the engineer' or the 'technology worker' as a male. The 'solution' usually used is to include a footnote saying that although the language relates to males, it is intended to include females. However, this is a very minimal improvement. Not only does a language reflect existing social, organizational and professional structures, but it also contributes to the nature of these structures and helps stabilize and reproduce the existing order in a manner that implies that these territories (of engineering, science, technology and mathematics) are masculinized.

A recent study of women engineers in Israel lends weight to the argument that language shapes, as well as constitutes, the obstacles and difficulties women encounter in this field. This qualitative study, based on in-depth interviews with women engineers, examined the manner in which Israeli female engineers construct their social lives and the countermeasures that they have adopted to confront the elements that obstruct their integration into the profession (Mordechai, 2004).

A linguistic analysis of the discourse of the women engineers interviewed revealed the use of different, aberrant linguistic patterns. For example, when the women engineers were talking about themselves in first person they would refer to themselves and their actions using the masculine term and not the feminine term (as expected in correct use of the Hebrew language), or using a mixture of the masculine and the feminine terms. These aberrant linguistic patterns, which helped the female engineers obfuscate their gender identity, were most clear-cut especially when discussing their occupation and professional identity. This was evident in a somewhat 'neutral' situation of an interview with the researcher (who was a female); however, it is even more likely to occur in the context of their daily activities and interactions with men (who are the vast majority) in their workplace. These linguistic variations, which are readily distinguishable in Hebrew in comparison to other languages, have not been mentioned in earlier studies in other countries.

According to Mordechai (2004), these linguistic variations are used by women as a coping strategy that enables them to reduce the discrepancy they experience between the pace of the transformation of occupational practices that enable women to work in the profession of engineering, and the slow rate of change in which the gender narrative in the engineering profession is still rooted and constructed on assumptions and imagery of masculinity. Thus the common use of the generic male term in the Hebrew language further signifies to women in fields in which they are a small minority their prolonged (albeit reduced) exclusion from these fields and signals to them that they are better off using the language in an incorrect manner in order to conceal their gendered identity.

CONCLUSIONS AND FUTURE DIRECTIONS

Currently women are present in the field of STEM in the 'land of milk, honey and technology', and to some extent their situation may be better than that of women in other developed and westernized countries. However, their number is still far from being equal to that of men. Many of the possible explanations for the limited representation of women in science and technology in Israel are common reasons that are apparent in other countries (e.g. lack of role models, stereotypes concerning gander and the STEM fields, gender discrimination, masculine norms of the fields of STEM, etc.). However, in this chapter I chose to focus and elaborate only on the unique and particular characteristics of the Israeli context and culture that are likely to hinder women's integration in this field. By reviewing these unique barriers to women's representation in the field of STEM it can be seen that there are various critical stages in the life course of girls and women in Israel that have important implications regarding their tendency and ability to specialize in the field of STEM.

First, the experience of girls in elementary and high school and their choice to refrain from high-level studies in the fields of mathematics, physics and computer science form an initial and critical barrier to their integration in the field of STEM. This barrier has practical implications, since it limits their ability to be accepted to higher studies in these fields, but it also has social implications, strengthening girls' beliefs that STEM is not a suitable field for them. As they leave high school, equipped with somewhat limited knowledge in mathematics, physics and computer science, they are recruited for service in the Israeli military. The experience of young women during their mandatory service in the military enables some of them to gain access to training and experience in R & D in fields of science, computing and technology, as well as some social capital in terms of networks and connections that can assist in their future integration in the civilian labor force in STEM fields. However, the gendered structure of the Israeli army, in conjunction with women's reduced numbers in more prestigious courses and ranks, limits their access to training, knowledge and social capital in comparison to men in the same units.

As their life cycle further advances, most women in Israeli society conform to the social norms of familialism and become wives and mothers. Their responsibility to care for their husbands, children and elderly family members further limits their ability to become fully integrated in science and in the technology industry, and to climb to high ranks in these fields. Last, through all these different stages of the life cycle, the Hebrew language forms a constant and continuous environment which signals to women they are the 'other'. This is likely to become more evident and salient in fields in which women are a small minority, such as the fields of STEM, and furthers their sense of alienation, non-membership and otherness.

Thus, as Israeli women mature from young girls into women and experience the different life stages reviewed above (i.e. high school, military and motherhood), they accumulate disadvantages along the way with regard to their chances of becoming integrated in fields of STEM. In the process these somewhat small disadvantages accumulate and interact to form a larger disadvantage (see Valian, 1998 on the accumulation of small disadvantages) to women in these fields. These particular Israeli dynamics, in conjunction with other more prevalent dynamics and barriers not reviewed in this chapter, work together to form the picture presented above of the limited representation of women in STEM.

It should be noted that the characteristics of Israeli society reviewed above, although they lead to the accumulation of disadvantages to women's advancement in STEM, also give women some advantages and privileges which are not always evident in other countries and contexts. One of the most salient advantages is the possibility women have to integrate motherhood with a professional career in science and high technology, without being forced to give up one of these worlds.

Over the last ten years many different programs have developed in Israel aimed at changing the existing situation and furthering women's representation and advancement in fields of STEM. Some of these programs and their outcomes are described below.

Programs Focusing on High School Education

Since high school education is the starting point for the gender gap in STEM, there are a variety of projects aimed at encouraging girls to study higher levels of mathematics, physics and computer science. One of these is the 'GES project: Girls to Engineering Studies', which is designed to increase the number of high school girls who study mathematics and physics at the level required to enroll in university degree-level engineering studies, as well as to encourage them to consider enrolment for an engineering degree and future employment in engineering and technology. The project is based on several component activities, among them: (a) training math teachers to head the project in their schools; (b) identification of underachieving pupils, and providing help and support to improve their grades and self-esteem; and (c) acquainting target pupils with professions and the courses of study required to enter them.

In schools which took part in this program the number of girls in math classes tripled over a period of three years, with the average grades for girls higher than those for boys (Messner-Yaron and Kahanovitz, 2003). Another project targeted to outstanding high school female pupils, 'Electricity in the Palms of Her Hands', was aimed at changing the perception of electrical engineering by outstanding female high school pupils, using a one-day conference aimed at exposing them to the profession of electrical engineering. A study investigating this initiative found that, if planned properly and thoughtfully, even a single one-day conference can significantly change the perception of electrical engineering among female pupils (Hazzan et al., 2005).

A third project known as 'The Future Generation of Hi-Tech' is an initiative of the Forum of Female Industrialists of the Manufacturers' Association and is run jointly with the Science and Technology Authority of the Ministry of Education and the Commanding Officer of the Women's Corps of the Israeli Military. It is focused on encouraging students in general, and female students in particular, to aim for a career in science and technology. The project began in September 1997 in seven junior high schools and was expanded to more schools in the following years. One class from each school worked in cooperation with an industry which 'adopted' the pupils. In each partnership a special program was developed linking industrial activities to the basic science and technology curriculum of the junior high schools. The program includes activities designed to change the atmosphere in which choices of study tracks and careers are made. Thus it includes counseling activities for students and teachers to raise awareness of the possibilities open to women in industry, field trips to industrial facilities, information activities directed at parents, and meetings with female industrial executives, who lecture on their work and serve as role models for girls.

However, although there are a number of programs comparable to those described above that are aimed at encouraging girls in high school or young women after high school to expand their studies in scientific and technological areas, they are small-scale and subject to budget cuts (Churchman, 2005).

Programs Focused on Military Service

Regarding the integration of women in STEM in the military, the Israeli military has recognized the importance of being able to use young women in the fields of technology and computer science. In order to increase the number of women in these jobs, the military has initiated a few programs. The Women's Corps is responsible for special programs for women, designed to encourage them to go into technological careers. As a part of these programs a few initiatives have been taken. First, women officers and soldiers filling technological positions visit schools to speak to pupils (boys and girls) and teachers on engineering and technological service in the army. These officers and soldiers are instructed to give special emphasis to the role of women in the military. The appearance of female representatives of the military involved in technological activities is aimed at providing a role model for girls before the draft. Second, the army invites pupils to visit military installations to learn about various service options, including technological duties. Girls are separated from the boys, and meet with an officer from the Women's Corps, who encourages them to enter one of the technological frameworks. Despite these activities, the number of women receiving deferments in order to undertake technological studies before their military service is low and has actually declined over the past few years (Messner-Yaron and Kahanovitz, 2003). Furthermore, the military aims to attract young women to technological studies by postponing the military service of girls studying in the practical engineering track at university level, and then enlisting them in professional jobs in the field of technology during their active service.

Programs Aimed at Helping Women who are Mothers

Last, there are some programs designed to help women who are mothers enter academic tracks. For example, in an attempt to provide a solution to the problem of postdoctoral studies abroad, one suggestion has been for Israeli universities to allow postdoctoral research to take place in a different Israeli university and not just abroad. Furthermore, a leading academic institute for exact and natural sciences (The Weizmann Institute) has taken special steps to aid women with their postdoctoral studies abroad. According to its report, one of the problems in traveling abroad with the whole family is also financial, since going abroad for a postdoctoral position demands a strong financial base, particularly if the women have families. Thus the Institute decided to create a precedent by granting a new kind of scholarship that was awarded for women excelling in science, and is intended to enable them and their family members (husband and children) to go through the postdoctoral period abroad with no financial worries.

Other universities have set up a number of policies that respond to various different aspects of the problems facing women with children. One is the childcare centers that provide relatively full-day service for students and faculty (regardless of the gender of the parent). Another is the policy regarding scholarships for graduate students (master's and PhD) at the Technion: when a woman gives birth she continues to receive her scholarship. If she receives the maximum number of scholarship benefits allotted to her and still needs more time to finish her thesis, she can apply to a special fund and explain why she needs more time and have her advisor confirm this, and ask for additional months of financial aid (Churchman, 2006). Moreover, some universities put extra time on the tenure clock for women and men who have newborn children.

To conclude, there are a variety of projects implemented in Israel aimed at fostering changes in the representation of women in the STEM fields. These programs seem to be helpful; however, they are often limited in terms of the numbers of women participating in them and there are few data on their actual outcomes and success. Nevertheless, with the continuing rapid development of Israel in the fields of technology and sciences it is likely that women will become further integrated in these fields and will be able to enter the promised 'land of milk, honey and high technology' in larger numbers and enjoy the fruits and abundance of these developments.

REFERENCES

Adams, E.S., Loftsson, H., Hazzan, O. and Young, A. (2003), 'International perspective of women and computer science', paper presented at SIGCSE 03, Reno, NV, USA.

Bareket, A. (2005), 'New study: Jews in Israel want at least three children', *Ha-aretz*, 5 July.

Berkovitch, N. (1997), 'Motherhood as a national mission: the construction of womanhood in the legal discourse in Israel', *Women's Studies International Forum*, **20**(5–6), 605–19.

Berkovitch, N. (1999), 'Women and citizenship in Israel', *Israeli Sociology*, **2**, 277–318.

Berkovitch, N. (2001), 'Citizenship and motherhood: women's status in Israel', *Y. Peled and A. Ophir (eds), Israel: From Mobilized to Civil Society*, Jerusalem: The Van Leer Jerusalem Institute and Hakibbutz Hameuchad, pp. 206–43.

Berlinski, S. (2005), 'Women in academia. A report presented to the Council for Higher Education', Tel-Aviv, Israel.

Brazilai, A. (2004), 'The missile that landed in the surgery room', *Ha-aretz*, 20 December.

Breznitz, D. (2005), 'Collaborative public space in national innovation system: a case study of the Israeli Military's impact on the software industry', *Industry and Innovation*, **12**(1), 31–64.

Central Bureau of Statistics (2002), *The Development of the Hi-tech in Israel in the years 1995–1999: Labor Force and Wages*, Jerusalem: Israel, Central Bureau of Statistics.

Central Bureau of Statistics (2005), *Data Gathered for International Women's Day*, Jerusalem: Israel Central Bureau of Statistics.

Churchman, A. (2005, 2006), *Women and Men at the Technion: Faculty and Students*, Annual Report, Israel: Technion (Israel Institute of Technology).

Cohen, S. (1997), 'Toward a new portrait of the (new) Israeli Soldier', *Israeli Affairs*, **3**, 77–117.

de Fontenay, C. and Carmel, E. (2004), 'Israel's Silicon Wadi: the forces behind cluster formation', in T.F. Bresnahan and A. Gambardella (eds), *Building High-Tech Clusters: Silicon Valley and Beyond*, Cambridge and New York: Cambridge University Press, pp. 40–77.

Eidelman, L. and Hazzan, O. (2005), 'Factors influencing the shrinking pipeline in high schools: a sector-based analysis of the Israeli high school system', paper presented at SIGCSE '05, 23–27 February, St Louis, MO.

Etzioni-Halevy, Eva (1996), 'Civil–military relations and democracy: the case of the military–political elites' connection in Israel', *Armed Forces and Society*, 22, 401–17.

European Commission Directorate-General for Employment, Social Affairs and Equal Opportunities (2001), *Employment in Europe 2001*, Luxembourg: Office for Official Publications of the European Communities.

Frenkel, M. (2004), *Has the Motherhood Wall Collapsed?*, Tel Aviv: The Women's Network.

Frenkel, M. (2006), 'Reprogramming femininity: gender performance in the Israeli hi-tech industry between global and local gender orders', Working Paper, The Hebrew University, Jerusalem.

Fogiel-Bijaoui, S. (2002), 'Famialism, postmodernity and the state: the case of Israel', *The Journal of Israeli History*, **21**(1–2), 38–62.

Galpin, V. (2002), 'Women in computing around the world', *Inroads–SIGCSE Bulletin*, Special Issue, Women and Computing, 94–100.

Grimland, G. (2006), 'The feminist movement reaches the hi-tech', *Ha-artez*, 25 June.

Ha-Poalim Bank (2000), 'The Israeli hi-tech: the current state of affairs', *Economical Review*, **130**.

Hazzan, O., Levy, D. and Tal, A. (2005), 'Electricity in the palms of her hands: the perception of electrical engineering by outstanding female high school pupils', *IEEE Transactions on Education*, **48**(3), 402–12.

Herzog, H. (1999), *Gendering Politics: Women in Israel*, Ann Arbor, MI: University of Michigan Press.

Hewlett, S.A. (2002), *Creating a Life: Professional Women and the Quest for Children*, New York:Talk Miramax Books.

Israel Industrial Union (2000), *A Report of the Results of a Survey of Women in the Hi-Tech Industry*, Tel-Aviv, Israel.

Izraeli, D.N. (1994), 'Outsiders in the promised land: women managers in Israel', in N.J. Adler and D.N. Izraeli (eds), *Competitive Frontiers: Women Managers in a Global Economy*, Oxford: Blackwell Publishers, pp. 301–24.

Izraeli, D.N. (1997), 'Gendering women's military service in the Israeli Armed Forces', *Israel Social Science Research*, **12**, 29–166.

Izraeli, D.N. (2001), 'Paradoxes of women's service in the Israeli Defence Forces', in D.N. Izraeli, E. Maman, B. Ari and Z. Rosenhek (eds), *Military*, *State*, *and Society in Israel*, London: Transaction.

Kahn, S.M. (2000), *Reproducing Jews: A Cultural Account of Assisted Conception in Israel: Body, Commodity, Text*, Durham, NC: Duke University Press.

Kimmerling, B. (1993), 'Militarism in Israel society', *Theory and Criticism: An Israeli Forum*, **4**, 123–40 (in Hebrew).

Lieblich, A. (1987), 'Preliminary comparison of Israeli and American successful career women at mid-life', *Israel Social Science Research*, **5**(1–2), 164–77.

Messner-Yaron, H. and Kahanovitch, S. (2003, 2005), *Women in Science and Technology in Israel – State of Affairs*, The National Council for the Promotion of Women in Science and Technology.

Moore, D. and Toren, N. (1998), 'Thresholds, hurdles and ceilings: career patterns of women in academia', *Sociological Imagination*, **35**(2–3), 96–118.

Mordechai, A. (2004), *Engineering Lives: Understanding the Ways Israeli Female Engineers Constitute their Social Lives*, MA thesis, Bar-Ilan University, Israel.

Peleg-Popko, O., Klingman, A. and Abu-Hanna Nahhas, I. (2003), 'Cross-cultural and familial differences between Arab and Jewish adolescents in test anxiety', *International Journal of Intercultural Relations*, **27**, 525–41.

Portugese, J. (1998), *Fertility Policy in Israel: The Politics of Religion, Gender and Nation*, Westport, CT: Praeger.

Remennick, L. (2000), 'Childless in the land of imperative motherhood: stigma and coping among infertile Israeli women', *Sex Roles*, **43**(11–12), 821–41.

Remennick, L. (2006), 'The quest for the perfect baby: why do Israeli women seek parental genetic testing?', *Sociology of Health and Illness*, **28**(1), 21–53.

Sasson Levi, O. (2003), 'Feminism and military gender practices: Israeli women soldiers in "masculine" roles', *Sociological Inquiry*, **73**, 440–65.

Saxenian, A. (1994), *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Cambridge, MA: Harvard University Press.

Sered, S. (2000), *What Makes Women Sick? Maternity, Modesty, and Militarism in Israreli Society*, Brandeis Series on Jewish Women, Boston: Brandeis University Press.

Shafir, G. and Peled, Y. (2002), *Being Israeli: The Dynamics of Multiple Citizenship*. Cambridge and New York, Cambridge University Press.

Teubal, M. and Avnimelech, G. (2003), 'Foreign acquisitions and R&D leverage in high tech industries of peripheral economies. Lessons and policy issues from the Israeli experiences', *International Journal of Technology Management*, **26**(2–4), 362.

Toren, N. (2000), *Hurdles in the Halls of Science: The Israeli Case*, New York: Lexington Books.

Valian, Virginia (1998), *Why So Slow? The Advancement of Women*, Cambridge, MA: The MIT Press.

Yaniski-Ravid, S. (2007), 'The exclusion of female inventors in the meeting point between the field of property, patents, work and gender discourse', in D. Erez-Barak, S. Yaniski-Ravid, Y. Biton and D. Fogin (eds), *Study of Law, Gender and Feminism*, Tel Aviv: Nevo – Ono Academic College Press.