Chapter VII: Traditional Industries and Services Sectors

Chapter Summary

Industry and services sectors that are classified as traditional or mixed-traditional technologies account for the large part of the business sector's product and employment. These sectors suffer from low productivity per employee, as well as a slow rate of improvement in productivity. Due to their considerable share in the product and in employment, the gains specified in the vision cannot be attained without focusing on improving these sectors' productivity. The key to achieving this objective is to provide incentives to employers to implement innovation, including assimilation of advanced technologies (primarily information and communications technologies, or ICT); openness to organizational changes; considering business model modifications; and aiming to increase export's share in output. The findings put forward in this chapter indicate that company management in traditional sectors lacks awareness, information, and analytical tools regarding the importance of such changes. A detailed situation report for these sectors (including appendices with detailed tables and international comparisons) is also presented. In the absence of one universal remedy for all the required changes, the chapter proposes numerous policy measures for traditional industries. Each measure is quite limited in scope, and aims to raise awareness of innovation's importance in both the technological and the business realms, and to create incentives, in the form of grants and tax benefits, for companies that take concrete measures in innovation and assimilation of advanced technology.

The chapter also proposes to establish university-based "virtual" research institutes per sector, to be funded jointly by the relevant sectors and the government. These institutes' activity will be directed toward clarifying generic problems faced by the relevant industrial and services sectors, in both the technological and the business realms, and transferring and facilitating the assimilation of advanced technologies. **Existing** academic faculty members with appropriate skills will be employed in these centers, as part of their academic duties, along with students studying towards various degrees, who will learn how to implement their acquired academic knowledge and gain close familiarity with market sectors.

The chapter includes a special section on the services sectors, which hold the greatest economic potential. As opposed to industrial sectors, services sectors do not enjoy a designated supportive policy that recognizes their uniqueness. In addition, there is a lack of appropriate infrastructure for gathering statistical data on services sectors' outputs and improvements.

Introduction

Despite the leading status of Israel's advanced technology industry, including information and communications technologies (ICT), and its crucial contribution to improving the balance of payments over the past two decades, the high-tech sector cannot single-handedly maintain the targets for GDP growth and increased employment set by this plan. This is due to the relatively small dimensions of the high-tech sector, and its minor share in employment[13]. This sector's contribution to Israel's economy has been primarily in the production of new technologies and the manufacturing of products shaped by these technologies; it has done less in the way of assimilating new technologies and products within other economic sectors. Therefore, most of the national effort regarding industrial policy for the coming years must be directed toward increasing labor productivity in economic sectors outside of advanced technology, especially in industrial sectors that are classified as traditional or mixed-traditional technology, and in the services sectors (hereinafter: traditional sectors). Classification of economic sectors by technological intensity is based on internationally-accepted measures of the scope of R&D activity and use of advanced technologies; these measures have also been adopted by Israel's Central Bureau of Statistics. Increased productivity in traditional sectors will be facilitated by broadly assimilating and increasing the use of new technologies in these sectors, and promoting innovative business models and management approaches, while strengthening competitive abilities domestically and in foreign markets. This course of action is very crucial, as it will increase income per employee in traditional sectors and reduce income gaps that stem in large part from the dualism existing between the sophisticated high-tech sector and the traditional sectors.

Traditional industries and the services sector, make the largest contribution to the economy in terms of product and employment. They must, then, play an important role in dispersing the advantages of economic growth. In developed countries, including Israel, the services sector accounts for more than half of the GDP and employment. Services sectors and traditional industries are heterogeneous, and include very diverse industries. They employ a great variety of employees, including the economy's largest share of unskilled employees. Tables App-VII-2 and App-VII-3 expand on various economic sectors' product, employment and export in 2006. The internationally-accepted classification of industry sectors by technological intensity can be found in Table App-VII-1. An international comparison of product by different industries is found in Table App-VII-4, and Table App-VII-5 groups the data from the previous table by the various sectors' technological intensity.

In many of Israel's traditional industries, output per employee is up to 50% lower than that found

13 Advanced and mixed-advanced technology industries (including services) produced about 23% of the business sector's output for 2006, employed about 12% of the sector's manpower, and were responsible for about 44% of Israel's overall export that year. See appendices for sectors' technological classification (Table App-VII-1), and output and export data (Tables App-VII-2 and App-VII-App-3).

in Europe and North America. These sectors' product (added value) per employee and capital per employee are also low as compared with their counterparts in the US and Western Europe. Improvement in employee product (labor productivity) in Israel occurs at a very slow rate as compared with other developed countries. Israel's labor productivity grew by only 8% during 1995-2004, as compared with an increase of about 60% in Ireland, 33% in Finland, and about 25% in the US and Sweden, during the same period. The concern is that in the absence of government policy to increase productivity, gaps in labor productivity will only increase. Another important measure is the increase in the economy's total factor productivity (TFP): the share of product growth that is not explained by the increase in labor and capital input, and which is thus attributed to technological and other improvements in productive activity. While developed countries demonstrated about a 1% increase per year in TFP during 1995-2004, Israel's TFP estimates for this period are negative, at -0.75%.

A major factor in Israel's lag in TFP and labor productivity is, apparently, insufficient investment in ICT technologies in traditional and mixed-traditional technology sectors. Most of the investments in ICT in Israel focus on ICT manufacturing companies. Developed Western countries have been wise enough to understand that the more significant economic advantages of ICT come from sectors that utilize, rather than produce, ICT. International experience indicates that investment in ICT in traditional industries and in the services sector may lead to improving efficiency of these industries, which are responsible for two-thirds of the GDP. In the US, for example, the services sector was the primary contributor to GDP growth in the last decade, in large part due to its adoption of advanced ICT[14]. Investment in ICT has two primary impacts on growth. The first has to do with the investment's size, and thus is similar to the contribution of regular capital investments. But more importantly, investment in ICT increases labor productivity (product per employee). Various estimates from recent years show that during 1995-2003, investments in ICT contributed about 0.9% to the annual GDP growth rate in the US. In Israel, the contribution of ICT investments has been much lower - between 0.3% to 0.5% a year during this period. Investments in ICT per employee in Israel are also significantly lower than in the US: some 40-50% of the US investment rate. This notwithstanding, investments per employee in Israel during this period totaled 60%-95% of the US rate. The conclusion is that investment per employee in traditional sectors is excessively capital-oriented, and insufficiently directed towards R&D and innovation, resulting in these sectors' low productivity.

Indeed, examining the components of Israel's economic growth vs. those of developed countries in 1989-2004 indicates that, while developed countries have improved their TFP by utilizing investments in ICT and increasing the quality of the labor force, Israel has been able to achieve positive (and, in the past three years, even impressive) growth rates by increasing the level of input: investment per employee outside ICT, and increasing labor inputs by increasing the rate of

14 Most prominent were those trade sectors that successfully utilized ICT technologies for enhancing logistics efficiency and supplying client demand for products (as done, for example, by Walmart or by electronic trade in financial products).

participation in the labor force and labor hours per employee. The problem with basing growth on increased inputs rather than on technological improvements (that create TFP increases) is that it is very difficult to maintain. There are natural barriers to capital and labor inputs, and when they are reached, growth stops.

In recent years, the OECD countries have demonstrated a high level of policy-making and research activity in services sectors. One reason for this is ICT's increasing potential impact on services sector productivity, and the potential for economic growth by basing services sectors on advanced technologies[15]. In March 2007, a number of American and EU companies and research institutes collaborated on a research and innovation initiative in the services sectors.

Interviews, studies and surveys conducted in the framework of this paper indicate that the lack of awareness of advanced technologies and the inability to absorb them sometimes constitute an obstacle to their adoption, with the exception of pockets of excellence. Israel's services sector (as well as its traditional industry) lags behind other Western countries in adopting new technologies, in innovation and in conducting R&D, and as a result, it lags in productivity as well. Beyond adopting advanced technologies, organizational changes and awareness of innovation are additional keys to resuscitating the traditional industries. Support programs must not only focus on increasing awareness of new technologies' value and the profitability of investing in their assimilation, but must also encourage employing new marketing and management approaches and adopting new business models. Recent attempts made by the Office of the Chief Scientist to encourage traditional industries in these directions are commendable, but only a small part of the designated budgets are in fact utilized by traditional sector firms, apparently due to a lack of awareness of the importance of investment in advanced technologies and innovation. Possibly, the office lacks expertise in organizational innovation and familiarity with low- and mid-tech industries. Supplementing resources may help increase awareness to the issue.

Vision and Strategy

Our vision for traditional and services sectors seeks to achieve their stable, sustainable growth and development and to enable their employees to maintain a high standard of living. The majority of the population is employed in these sectors, for the most part earning low wages. Making changes in these sectors' development, then, will be very significant for the entire economy. Their increased productivity will produce a parallel increase in income and wages, facilitating an increase in employees' standard of living. This is also a significant key to resolving social gaps, as a close relationship exists between economic duality and social duality. In the mid- to long-term, there is no other way to achieve a sustainable reduction in the large income disparities among employees in Israel.

The services sectors account for the economy's largest share in employment and output –

15 See OECD Council 2005 report «Growth in Services Sectors: Promoting Employment, Productivity and Innovation".

about 50% of the employees in Israel's business sector work in services sectors, as opposed to less than 20% in industry. Increasing services sectors' productivity is, therefore, very important. It is especially important to focus on services sectors that have export potential. Tourism sectors, health-related services, education-related services, and business/financial services, are examples of sectors with high potential for future development.

Israel must utilize the existing strength of ICT and other advanced technology sectors, and disperse them into traditional industries and services sectors. It must also encourage traditional and services sector businesses to adopt innovative approaches as regards product and services development, supply chain improvements, and enhancement of manufacturing systems. This should be facilitated by Israel's varied, multilingual and multicultural labor force.

Dilemmas and Problems

There are a number of central dilemmas related to increasing productivity, growth and income per employee in traditional industries and services sectors. This discussion will facilitate the formulation of appropriate policy to address them. The primary dilemmas are presented as follows:

1. One of the negative factors contributing the lag of some of the services sectors and traditional sectors is the availability of unskilled **foreign workers** in the labor force, who receive low wages and no workers' rights. Their availability reduces the incentive to adopt efficiency-improving technologies in industries such as construction, agriculture, tourism, and other traditional sectors. There is no doubt that the construction sector, which has long relied (since the early 1970s) on low-cost foreign workers, has been lagging significantly in adopting existing technologies that are well-known world-wide, thereby reducing the industry's productivity per employee. A similar development occurred in the agricultural sector, which has employed an increasing proportion of low-wage foreign workers. This has occurred in other traditional sectors as well. In a workplace abundant in foreign workers, the quality of Israeli manpower declines. Employment of foreign workers has brought down the wages of low-skilled Israeli workers, and has left many outside of the labor market.

2. In traditional industries and some (non-financial) services sectors, the level of academic and technological manpower is relatively low. Human capital is the key to increased productivity, growth and competitiveness.

3. Traditional and services sectors have a small share in export. Studies indicate that the larger an economic sector's share in export, the greater its expected productivity and innovation.

4. **Managers of industrial industries are less interested in innovation**, due to their concern

that the advantages will not cover the costs, in addition to the shortage of professional manpower.

5. Innovation is perceived as important, but **adopting advanced technologies is perceived as unprofitable**. According the results of the special survey conducted by the study's authors, company managers believe that innovation is a key factor in improving their competitive standing and the quality of their products. Nonetheless, they do not assign importance to using advanced technologies.

6. **Existing innovation is not managed correctly**, and therefore is not effective, because it is not client-directed or market-directed.

7. Investments in capital that embody new technologies are lower than what is acceptable in similar sectors in developed countries.

Primary Developments and Data

1. Productivity, Employment and Output in Economic Sectors

Table 1 presents an international perspective on the Israeli economy's structure and performance. The table demonstrates the relative labor productivity – the product per employee in each major sector relative to the average product in each business sector in the same country. As compared with Israel, labor productivity itself is significantly higher in all countries in the comparison (for example, 50% higher in the US, and 40% higher in Belgium). Israel shows particularly low labor productivity in the agricultural and construction sectors, and in commercial accommodations services – about half the product per employee relative to business sector overall. Although these sectors' productivity is **relatively** low in the comparison countries as well, it is noteworthy that their rate of capital per employee is very low. Sectors showing relatively high labor productivity in Israel (for example, the electricity, gas and water sectors, in which labor productivity is 2.57 higher than that of the business sector overall), demonstrate even higher relative productivity in other countries.

As compared with other sectors, product per employee in Israel's electric and electronic equipment sector (where most ICT is located) is especially high; it is even 33% higher than this sector's relative productivity per employee in the US. This point illustrates the Israeli economy's degree of specialization in ICT and its dependency on it. However, Israel's output per employee in this sector is lower than in the US or Finland[16].

16 See complete comparison of the economy's major sectors regarding output, employment, productivity, and capital per employee in Table VII-App-2 in the appendix to this chapter.

Table 1: Relative Labor Productivity in Various Economic Sectors, Israel vs. Select OECD Countries 1995-2003

(average product per employee in all business sectors in each country = 1.00)

Sectors	USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
Avg. product per employee for all business sectors ($2000 PPP, 1995-2003. Basis for calculating relative productivity in various sectors)	71,800	63,098	**47,439**	58,133	55,807	53,376	53,192	67,324
Quarry mining, wood & wood products, non-metal mineral products, other industries	0.85	0.73	**1.10**	0.93	0.76	0.82	1.30	0.86
Food, beverages & tobacco products	1.23	0.91	**0.91**	0.94	0.85	0.84	1.35	0.95
Textile & clothing products, footwear, leather & leather goods, paper & paper products, publishing & printing	0.87	0.69	**0.68**	0.87	1.28	0.79	1.09	0.83
Oil refinery & products, chemical industry & products	2.48	1.63	**2.01**	1.61	1.56	1.61	2.40	1.96
Plastic & rubber products	0.86	0.90	**1.03**	0.90	0.94	0.92	1.16	1.07
Basic metals & metal products	1.00	0.79	**0.86**	0.95	0.94	0.78	1.32	0.97
Machinery & equipment, transport vehicles	1.17	0.91	**1.11**	1.09	0.86	0.81	1.71	1.01
Agriculture, hunting & fishing	0.53	0.51	**0.53**	0.62	0.53	0.68	0.75	0.50
Electricity, gas & water (production & distribution)	3.84	3.12	**2.57**	2.50	2.33	3.48	4.05	3.58
Construction	0.72	0.68	**0.61**	0.76	0.73	0.77	0.84	0.77
Transportation, storage & communications services	1.19	1.40	**1.21**	1.00	1.20	1.07	1.19	0.93
Electric & electronic equipment, communications equipment	1.24	0.85	**1.65**	1.11	1.63	0.97	1.42	1.04
Wholesale & retail trade, accommodations & food services, social, personal & otherservices	0.61	0.76	**0.61**	0.64	0.67	0.72	0.51	0.64
Banking, insurance & other financial institutions, real estate, business services	1.59	1.89	**1.61**	1.81	1.68	1.76	1.52	1.51

The services sector receives special attention in this chapter for several reasons. It already employs more than half of the labor force in developed economies, and is responsible for more than half of the GDP. About 50% of business sectors' employees and product come from services sectors. In the US, the services sector accounts for about 63% of the business sectors' product and employment. Services sectors present higher growth rates than do most other sectors in developed economies. The rate of increase in the scope of R&D is also particularly high in services sectors, as are rates of women's employment in these sectors. Therefore, these sectors offer an appropriate solution for the problem of the low participation rate in Israel's labor force (especially in the women's, ultra-Orthodox and Arab sectors). Any improvement in these sectors' labor productivity will have a significant impact on the economy's productivity. The services sector includes a wide variety of very diverse industries. Table-1 shows that the accommodations and commercial sectors are among the sectors with the lowest labor productivity rates in developed economies, while labor productivity in business, insurance and banking services is at least 50% higher than the average productivity for the business sector.

Historically, the services sector has not received the attention it deserves from policy makers, given its size and its potential for growth and employment. While an impressive awakening has occurred throughout the world on this issue in recent years, Israel's development policy is still "industry-oriented", as manifested in the absence of support for services, and the very partial, irregular collection of statistical data on this important segment of economic activity.

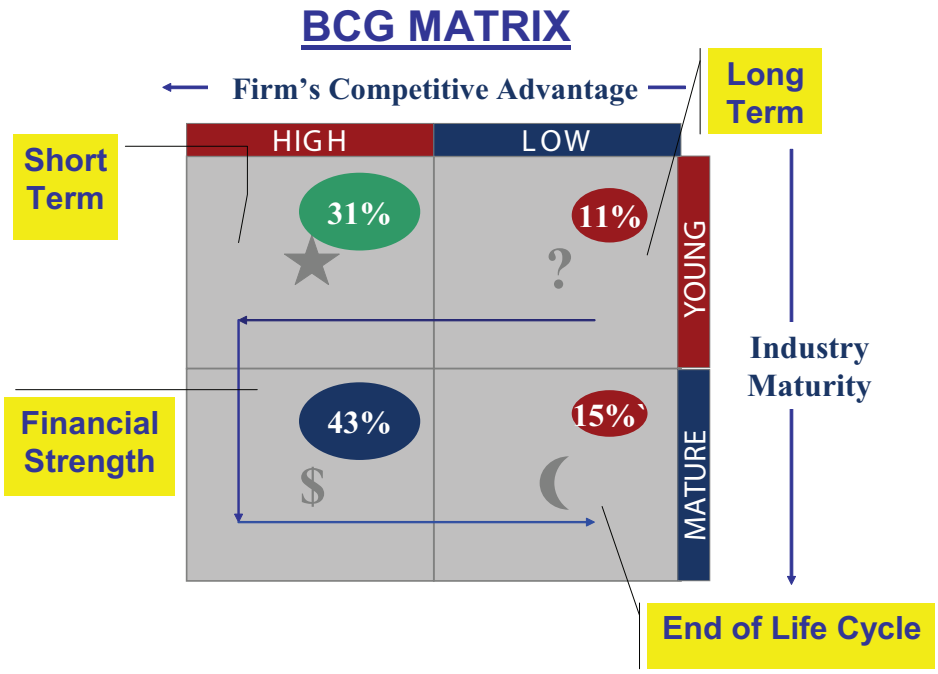
2. Innovation and R&D in Traditional Sectors

In early 2007, a special survey was conducted in the framework of this project in order to better understand the scope of innovation, as well as the obstacles and challenges to its implementation among traditional industry and services companies (medium-low tech and low-tech). One hundred twenty companies responded anonymously to the survey that was sent to them. Following are number of noteworthy points that were revealed:

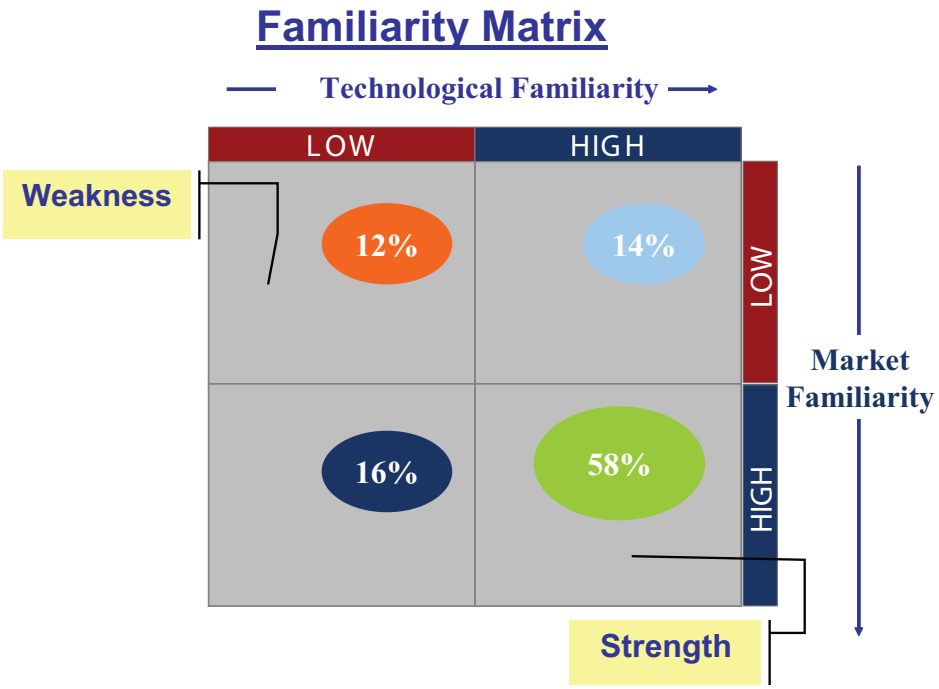
- Traditional industry companies did well over the past three years in the following areas: competitive standing, familiarity with relevant markets, and growth.
- About 25% of companies in traditional sectors are not innovative and do not invest in R&D. It is interesting to note that lack of funding was not the significant obstacle to promoting innovation in these companies, but rather uncertainty regarding future profitability has prevented companies from investing in innovation.
- While generally speaking, the levels of investment in innovation and R&D activity are reasonable, these activities are not effective. Investment and innovation efforts have

not affected the measures of companies' success, because the developments have not been client- or market-directed. Furthermore, most of the efforts in innovation have been product-oriented, with only minor innovation in process development.

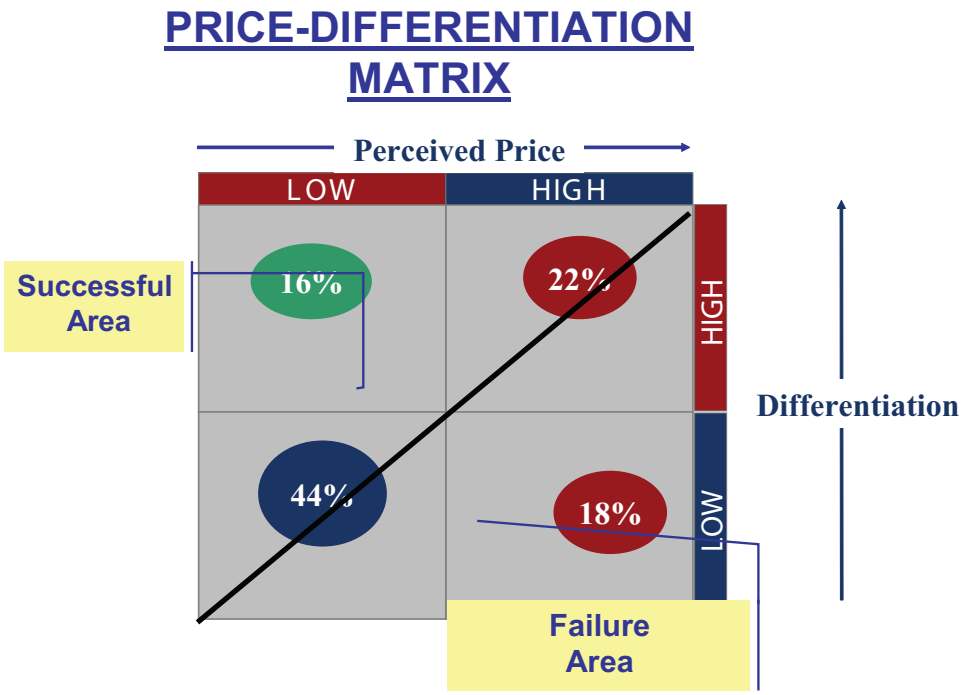
- Information on relevant innovation comes primarily from marketing and private sources, while public and academic institutions provide less useful information.
- Companies in traditional sectors tend to prefer internal R&D rather than off-the-shelf technologies or R&D done outside of the organization. According to the survey, internal R&D is more appropriate for products developed for these companies' target markets.
- Innovation in management and marketing, directed to client or market, make a significant contribution to the success of companies and facilitates companies' improved performance.
- It was found that an innovative organizational culture greatly contributes to the investment in innovation and its success. Companies that encourage their employees to propose new ideas for change and improvement, tend to invest more in R&D and innovation, develop more innovative products and processes, and adopt more advanced management and marketing approaches.
- **The Boston Consulting Group's matrix enables assessing traditional companies' business units on two axes: the maturity of the industry in which firms operate and firms' competitive standing within the industry.** According to this analysis, the formula of traditional companies' units is satisfactory: there are a sufficient number of new and mature companies as well as financially-stable companies. The largest group of companies (43%) falls under the category of "cash cows", but 42% of companies require investment of additional resources in innovative technologies and marketing. The two uppermost cells of the matrix - the question mark and the star - represent companies at the stage of penetration and growth that require investments in marketing, particularly in marketing, distribution, sales and campaigns. Conditions of high competitiveness also require investments in technology (continuous improvements in product and accompanying services).



- **The matrix of familiarity with technology and the market -** About 58% of companies have good familiarity with the market and technology, while only 12% are in the problematic zone of low familiarity with both the market and technology. 30% of additional companies require better familiarity with the market or with technology.



- **According to the cost vs. differentiation matrix** - 16% of companies have a differentiated product (from their competitors), and a price perceived as attractive by clients. A similar percentage (18%) of companies is in the problematic zone of an undifferentiated product and a price perceived as high. In the age of high competitiveness and low profit margins, companies must improve products and services and adopt advanced management processes in order to improve differentiation.



Recommendations

1. Recommendations for Traditional Industries

- Create support mechanisms for employee training in the Ministry of Industry, Trade and Labor, aimed at traditional industries and based on skilled teams with deep knowledge of these sectors, including marketing and strategic planning experts, and on designated budgets.
- Continue expanding efforts for increasing awareness among manufacturers regarding the importance of innovation, and the support available for this purpose. Traditional industries should be offered adapted versions of the Chief Scientist's programs that were originally created for high-tech sectors, such as "Magnet" and "Tnufa".
- Expand post-secondary education in technology, in order to create human capital that is appropriate for assimilation and use of advanced technologies in industry and services, and broaden possibilities for continuing education in innovative approaches to organization, business management and international marketing.

- Initiate a new grants program for companies in traditional industries that adopt new technologies able to bring about significant change in company performance. Companies should be offered grants to cover costs of training manpower for implementing new technologies, industrial R&D and professional knowledge (similar to the Singaporean grant program for new technology initiatives).
- Initiate a specific program in the Office of the Chief Scientist that offers industrial teams or students, as well as academic mentors, for projects undertaken by traditional industry companies. Many university and college projects can be planned and directed toward traditional industry. This will offer the added value of exposing students to traditional industry, while exposing traditional industry to advanced management methods and new technologies.
- Grant special tax benefits in the form of tax **credits** for R&D expenditures and investments in ICT. The existing tax benefits for R&D (section 20A of the Income Tax Ordinance) allow deducting R&D expenditures, subject to approval of the R&D plan. In addition to tax benefits in the form of deductions, many of the world's countries grant a tax **credit** of 10%-50% of R&D expenditures beyond a certain level, in order to encourage R&D activity. Israel's corporate tax rate is gradually being reduced, and is planned to reach a rate of 10%-15% within a number of years. Thus, the rate of R&D subsidies hidden in R&D expenditure deductions by section 20A will be dramatically reduced. In addition, Israel will be unable to attract international corporations that employ expansive R&D activity unless it provides benefits comparable to what these corporations are offered elsewhere. See also "Appendix B - Encouraging the Establishment of R&D Centers: Taxation Aspects, International Survey and Recommendations for Discussion", sub-committee for evaluating appropriate frameworks for attracting multi-national corporations to open R&D centers in Israel for strengthening the periphery, the Makov Committee report, "Strengthening the Periphery and Traditional Industry " (2007).
- **Temporary provision: granting tax credits for employers in traditional industries and services in the periphery, for expanding employment in their businesses.** In order to halt and reverse the trend of abandoning businesses in the periphery, we propose instituting a program to encourage employment in these areas for a number of years. (Distant periphery must be clearly defined; eligibility for the program may be restricted to certain types of industries or a certain company size.) Tax credits will be awarded to companies that expand their workforce as compared with their average number of employees during the previous three years. The annual tax credit will be significant: for example, the cost of each additional employee's monthly salary. Thus a connection will be made between the salary paid to additional employees and the credit given to the employee for taking them on, providing a stronger incentive for hiring skilled employees. The tax credit will be calculated along with the company's annual taxes, based on the

employer's periodic reporting on deduction of tax at source for employees.

- The tax credit for employers will be attractive only for those employers that expect additional income as a result of expanding their workforce. Cost to the state will be quite low, as the additional employees will pay taxes on their income, while the total of transfer payments and support for these otherwise unemployed workers will also be reduced.
- The Makov Committee report indicates that granting tax credits for residence in the periphery misses the target of maintaining quality manpower in these areas: the data show that quality manpower often prefers to live in central Israel, even when its workplace is in the periphery. We believe, however, that the Makov Committee's recommendation to improve roads and transportation networks between the periphery and central Israel will only intensify this trend. The above recommendation to provide tax benefits to employers who expand the scope of employment in businesses located in the periphery should, at least partly, curb businesses' tendency to move to central Israel and leave the periphery's population without sources of income.
- We endorse the Makov Committee's recommendations[17] to increase support grants for business R&D conducted in the periphery, and to set criteria for evaluating applications for support by businesses in geographical areas defined as deserving of encouragement. Such applications for assistance will be evaluated in view of exclusive criteria that promote innovation, assimilation of advanced technologies and employment in businesses located in the periphery.
- Encourage marketing for export in small, young companies as well. Becoming familiar with the international market will drive the required processes for increased growth, productivity and income per employee, and for incorporating innovation.
- Facilitate mergers and acquisitions that enable the penetration of innovation and R&D activity, in order to support organizations that have a critical mass and that can think in higher-level strategic terms (many companies from traditional sectors are too small to develop their own R&D or innovation strategies).
- Initiate specific programs for creating connections between university laboratories (Engineering Research Centers) and traditional industries, such as the Dutch voucher system that gives companies government-funded vouchers for acquiring services from an approved research lab in order to solve a specific problem.
- Encourage the creation of cooperative consortia of technology users.
- Initiate professional industrialist forums for specific industries involved in innovation.

17 Report of the Committee to Evaluate Means to Strengthen the Periphery and Traditional Industry, October 2007.

2. Recommendations for the Services Sector

- Support investment, manpower training and ICT use in order to increase productivity in the services sector.
- Create a services-supportive environment in regulation and business terms, by signing international trade agreements, especially with the EU, and make support, incentives, and subsidies for services sectors equal to those offered in the manufacturing field.
- Develop productivity and innovation measures in services from OECD services, and adapt them to Israel's services sector.
- Encourage the demand for innovative services by public bodies (such as education and tourism services, etc.) through changes in government standards and in government requisitioning and acquisition policy.
- Examine how Chief Scientist support programs such as "Magnet", incubators, bi-national agreements and so on, can be implemented in the services sector.
- Implement the international benchmarking survey in order to increase awareness of the services sector's growth and export potential, and of Israel's reputation in the services realm, as well as identify constraints and "bottle-necks".
- Support the creation of services clusters, research programs and centers in the services realm in universities, and cooperate with foreign companies and nations.
- Establish a services forum that includes representatives of the services sector, the Ministry of Industry, Trade and Labor, and academia. The forum's task will be to create awareness and provide expertise in the field of innovation and productivity enhancement, based on the study of accepted practices in policy, support programs and companies in Israel and abroad, as well as on academic research. The services forum will provide position papers, conferences and brochures for interested parties (leveraging and distributing acquired knowledge); mentored academic activities and contribution to applied research in the services sciences; redefining R&D to include innovative activity in the services realm; and developing new measures and indicators to measure the sector's output and productivity.

3. Recommendations Arising from Analysis of the Findings of the Special Survey

- Collect and analyze information on markets, technologies, opportunities and threats regarding economic and legal aspects, and transfer information to companies.
- Improve management training and provide professional support in strategic planning and marketing, with a special emphasis on client- and market-directed innovation.
- Encourage companies that lack innovative activity to develop this kind of activity in a cautious, gradual manner.

- Encourage adoption of management and technological methodologies in the following areas: strategic planning, new business models, assimilation of new management information technologies (for example, in ERP - enterprise resource planning, and CRM - customer relationship management).

4. Required Plan of Action and Government Budgets

The entirety of measures detailed above does not constitute an operative plan of action. In order to propose such a plan, each recommendation must be examined separately, in cooperation with the relevant responsible agency (for example, the Office of the Chief Scientist, Ministry of Finance, State Revenue Administration, Investment Center, Committee for Planning and Budgeting, Prime Minister's office, etc). **Formulating the entirety of measures required for dispersing innovation and advanced technologies in traditional and mixed-traditional industry sectors and services sectors, is an appropriate task for the National Council on Economy and Society**. It need not be an especially lengthy process, but as it involves diverse aspects, such as taxation, trade restrictions, encouragement of R&D, post-secondary education, applied research in cooperation with higher education institutions, population-distribution policy, etc., its formulation requires an integrative perspective that examines the overall picture, relegates specified tasks to designated ministries and agencies, and sets priorities for allocating resources for the various programs.

It is therefore, difficult to present at this stage itemized budget costs for the entirety of measures brought forth in this chapter. A preliminary assessment, which includes an assessment of budget costs of the Makov Committee report's recommendations, arrives at budget supplements of approximately NIS 500 million a year, as itemized below:

- Direct incentives for innovation, R&D, and assimilation of technologies – NIS 250 million a year
- Establishing cooperation between higher education institutions and traditional economic sectors – NIS 50 million a year
- Training and consulting programs in the realms of innovation, organizational management, and assimilation of advanced technologies – NIS 100 million a year
- Direct support for businesses in the periphery – NIS 100 million a year

Budget supplements of approximately NIS 500 million a year are expected to activate internal economic processes with returns that are much higher than the additional government expenditure. Some of the government expenditure will go back into the budget, from royalties and taxes paid by successful companies and employees.

Appendices to Chapter VII

Classifying Economic Sectors by Technological Intensity

Table App-VII-1 below presents the Central Bureau of Statistics' classification of manufacturing sectors and some services sectors, by technological intensity. This classification corresponds with that of the OECD and is based primarily on rates of direct R&D investment and investment in R&D-related equipment, as compared with these sectors' output and investment. Note that the classification includes mostly manufacturing sectors; it does not cover most services sectors and important sectors such as construction, electricity production and transmission, water supply and so on.

Table App-VII-1: Productive Industry Sectors in Israel by Technological Intensity

Traditional technology	Mixed-traditional technology	Mixed-advanced technology	Advanced technology
			Manufacturing:
Food products	Quarrying of sand & stone, mining of metals, other quarrying and mining	Oil distillery & products and nuclear fuel	Pharmaceuticals
Beverages & tobacco products	Production of crude oil & natural gas	Chemicals & chemical products (exc. pharmaceuticals)	Machinery for office, accounting & computers
Textiles	Plastic & rubber products	Machinery & equipment	Electronic components, isolated cables and wires
Clothing products	Non-metal mineral products	Electric engines and electricity-distribution apparatus	Electronic communications equipment
Footwear, leather & leather products	Non-ferrous & precious metals, including casting	Transport vehicles (exc. sea vessels, aviation vehicles and other transport equipment for airports)	Industrial control & supervisory equipment, medical & scientific equipment, measuring and testing equipment
Paper & paper products	Basic iron and steel industry, foundries, pipes and metal products		Aircraft
Printing & publishing	Boat & ship building		Services sectors defined as high-tech: Communications services, computer services, R&D
Wood and wood products, furniture	Jewelry, ornaments & silversmithing		

From Israel Central Bureau of Statistics, Technical publication #63, Standard Industrial Classification of all Economic Activities, 1993-Second edition; and the CBS' 2004 report by the sub-committee for official classification of high-tech sectors, on defining the high-tech field in Israel.

Table App-VII-2:
Added Value and Employees in the Business Sector, 2006

by CBS classification of economic sectors at two-digit level

Sector code	Sector name	Added value	Employees (2)	Added value per employee
		Millions current NIS, base price	thousands	Current NIS, base price
	Total business sector	**402,236**	**2,058**	**195,461**
A	**Agriculture, forestation and fishing**	**11,038**	**72**	**152,833**
B	**Industry (mining and manufacturing) - total**	**86,889**	**332**	**262,108**
13	Quarrying Sand & stone quarrying, stone mining	2,056	3	623,103
14,15	Food products	7,286	47	155,357
16	Beverages and tobacco products	1,417	7	218,038
17	Textiles	1,883	11	165,185
18	Clothing products (except knitted)	812	7	124,931
19	Shoes, leather & leather products	192	2	119,860
20	Wood & wood products (except furniture)	581	4	141,628
21	Paper & paper products	1,448	10	147,737
22	Publishing & printing	3,334	21	155,812
11,23,24	Oil distillation & its products, chemicals & chemical products	16,039	26	619,250
25	Plastic & rubber products	4,328	21	210,085
26	Non-metal mineral products	2,551	10	262,965
27	Basic metals	1,163	5	223,683
28	Metal products (except machines & equipment)	8,983	35	257,392
29,30	Machines & equipment: Office machines, computers	2,982	16	181,837
31	Electric engines & electricity-transport apparatus	1,784	8	234,784
32	Electronic components	3,949	16	245,303
33	Electronic communications equipment	5,536	16	357,161
34	Industrial equipment for supervision & monitoring, medical & scientific equipment	11,100	31	355,760
35	Transport equipment	5,087	17	306,468
36	Furniture	2,231	10	232,422
37	Diamonds	1,035	3	356,926
38,39	Jewelry, ornaments & silversmithing for airport products	1,111	8	142,381
C	**Electricity and water**	**11,175**	**17**	**640,067**
D	**Construction**	**28,123**	**188**	**149,780**
	Services	**265,012**	**1,449**	**182,900**
E	**Trade, vehicle repair & other repairs**	**54,761**	**349**	**156,741**
501	Motorized vehicles & fuel sales	3,668	36	103,311
500,502-530	Trade	51,094	314	162,784

F	**Accommodation & food services**	11,260	130	86,413
55	Hotels & accommodations services	3,862	25	155,742
56	Restaurants & food services	7,397	106	70,116
G	**Transportation, storage & communications**	44,340	173	256,895
60	Land transport	13,789	70	196,430
61-62	Sea and air transport	5,510	10	568,069
63	Transportation services	7,383	29	259,042
64	Storage & car parking	865	8	102,985
65	Mail & courier services	1,344	18	76,366
66	Communications	15,449	38	404,416
I,H	**Finances & business services**	115,124	475	242,163
67	Banking & other business institutions	20,342	59	344,204
68	Insurance & provident funds	9,306	28	327,668
70	Real estate	12,163	18	668,322
71	Leasing of machines & equipment	5,998	7	908,765
72,73	Computing & R&D services (inc. estimate for start-up firms)	31,305	96	326,434
74	Employee recruiting & manpower services	2,060	8	260,786
75,76	Business services	33,949	259	130,927
L	**Business educational, health & welfare services**	26,156	132	198,200
M	**Social, personal and other services**	13,370	189	70,628
94	Leisure, culture & sports activities	6,915	41	168,667
95,96	Personal and other services	6,455	148	43,524

1) Except for industry sectors:

a) The data include foreign workers;

b) Due to the depth of detail, the Central Bureau of Statistics based some sectors on a number of assumptions.

2) Including general hospitals.

Source: Israel Central Bureau of Statistics.

Table App-VII-3:
Business Sector Goods & Services Exports, 2006

by CBS classification of economic sectors at two-digit level

Sector code	Sector (Exporter) name	Millions current NIS
	Total Business Sector (2)	58,766
A	**Agriculture**	**421**
B	**Industry (mining & manufacturing)**	**35,250**
14-15-16	Food & beverage products	1,039
17-18-19	Textile	1,186
24	Chemicals	6,603
32	Electronic components	2,229
33	Electronic communications equipment	3,438
34	Industrial equipment for supervision & monitoring, medical & scientific equipment	4,287
35	Transport vehicles	2,758
37	Diamonds	4,691
38	Jewelry, ornaments & silversmithing	334
39	Manufacturing for airports/n.e.c.	8,684
C	**Water & electricity**	**246**
D	**Construction & civil engineering works**	**461**
	Services	**22,388**
E	**Retail and wholesale trade**	**9,402**
50	Motorized vehicles, motorcycles & bicycles – sales, maintenance & repairs, retail fuel sales	88
51	Wholesale trade (exc. vehicles, motorcycles, & diamonds)	4,584
5135	Wholesale diamond trade	4,595
52	Retail trade	135
F	**Hotels and accommodations services and**	**538**
G	**Transportation, storage and communications**	**3,978**
60-65	Travel fare	588
60-66	Other transportation services	3,178
66	Communications	212
H	**Insurance and public administration**	**58**
I	**Real estate, leasing activity and business services**	**8,234**
70-71	Real estate activity and equipment leasing	290
72	Computing services	4,395
73	R&D (inc. start-up firms' services exports)	2,168
74-75	Security activities and labor recruitment	49
76	Other business activities	1,333
M	**Leisure, entertainment & sports activities**	**178**

Source : Israel CBS.

Table App-VII-4:
Business Sector Industries – International Comparison

Averages for the years 1995-2003 or recent available data. Product per employee (added value) and capital per employee -$2000 PPP. Number of employees – in thousands. Sources: OECD data, Israel CBS, Applied Economics.

Industry		USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
1. Sand and stone quarrying, mining of minerals, wood & wood products, non-metal mineral products, jewelry, other industries	Product per employee	60,892	46,050	**51,685**	56,131	42,226	43,531	68,284	58,142
	% business product	2%	4%	**2%**	2%	3%	3%	4%	3%
	Employees	2689	866	**30**	371	68	70	367	86
	% of business sector employees	2.6%	5.0%	**2.0%**	2.1%	4.3%	3.7%	3.2%	3.0%
	Capital per employee	80,359	172,711	**186,027**	145,894	162,886	133,170	146,114	281,930
2. Food products, beverages & tobacco products	Product per employee	87,851	57,072	**43,040**	55,446	47,047	44,998	70,024	64,065
	% business product	2%	3%	**3%**	3%	2%	4%	3%	3%
	Employees	1765	487	**52**	621	44	81	246	97
	% of business sector employees	1.7%	2.8%	**3.4%**	3.6%	2.7%	4.3%	2.1%	3.4%
	Capital per employee	109,839	204,601	**114,606**	165,147	225,673	156,637	102,643	253,754
3. Textile and apparel, footwear, leather & leather products, paper & paper products, publishing and print	Product per employee	62,999	43,181	**32,485**	52,154	71,377	41,949	56,842	56,162
	% business product	3%	5%	**4%**	3%	7%	3%	5%	3%
	Employees	3692	1288	**85**	607	92	68	480	111
	% of business sector employees	3.5%	7.4%	**5.5%**	3.5%	5.8%	3.7%	4.2%	3.9%
	Capital per employee	84,143	114,487	**67,726**	125,550	324,939	127,805	131,501	218,934

Industry		USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
4. Chemicals & chemical products, oil refinery	Product per employee	177,457	102,614	**95,968**	96,736	87,185	85,938	123,269	131,448
	% business product	3%	2%	**2%**	4%	2%	2%	2%	5%
	Employees	1136	261	**19**	463	22	28	106	77
	% of business sector employees	1.1%	1.5%	**1.2%**	2.7%	1.4%	1.5%	0.9%	2.7%
	Capital per employee	342,444	432,069	**342,715**	244,136	362,608	356,056	404,415	386,221
5. Plastic & rubber products	Product per employee	62,317	56,481	**48,814**	NA	52,241	49,208	62,259	71,941
	% business product	1%	1%	**2%**	NA	1%	1%	1%	1%
	Employees	957	201	**25**	NA	17	22	109	25
	% of business sector employees	0.9%	1.2%	**1.6%**	NA	1.1%	1.2%	0.9%	0.9%
	Capital per employee	97,516	201,195	**147,264**	NA	152,687	135,950	78,720	349,140
6. Basic metal, metal products	Product per employee	71,054	49,436	**40,764**	57,878	52,438	41,716	70,521	65,279
	% business product	2%	3%	**3%**	3%	3%	2%	3%	3%
	Employees	2187	766	**58**	548	56	54	255	100
	% of business sector employees	2.1%	4.4%	**3.8%**	3.2%	3.5%	2.9%	2.2%	3.6%
	Capital per employee	99,570	191,937	**76,225**	158,866	200,486	93,449	168,744	263,332
7. Machinery & equipment, transport vehicles	Product per employee	84,020	57,006	**52,559**	66,032	47,840	42,861	89,634	67,832
	% business product	4%	4%	**2%**	4%	5%	4%	5%	4%
	Employees	3831	865	**28**	688	86	91	365	104
	% of business sector employees	3.7%	5.0%	**1.8%**	4.0%	5.4%	4.9%	3.2%	3.7%
	Capital per employee	115,415	168,535	**81,123**	152,185	100,557	89,951	114,740	203,464
8. Agriculture	Product per employee	37,819	32,311	**25,478**	37,154	29,706	36,254	37,388	33,617
	% business product	2%	3%	**3%**	4%	5%	4%	3%	2%
	Employees	3248	1180	**75**	1052	140	104	494	104
	% of business sector employees	3.1%	6.8%	**4.8%**	6.1%	8.8%	5.6%	4.3%	3.7%
	Capital per employee	140,627	265,201	**84,011**	170,173	206,688	383,236	116,727	180,659

Industry		USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
9. Electricity & water (production & distribution)	Product per employee	281,920	199,488	**122,301**	148,496	129,746	185,602	209,611	240,218
	% business product	3%	3%	**3%**	3%	3%	3%	4%	3%
	Employees	785	149	**18**	190	19	16	109	27
	% of business sector employees	0.8%	0.9%	**1.1%**	1.1%	1.2%	0.9%	1.0%	1.0%
	Capital per employee	1,154,645	2,056,922	**1,197,047**	1,242,347	1,850,433	1,784,394	2,661,894	2,173,601
10. Construction	Product per employee	51,413	42,968	**28,596**	44,157	40,436	40,987	45,040	51,606
	% business product	5%	6%	**9%**	6%	6%	7%	6%	6%
	Employees	8024	1515	**234**	1414	143	158	882	231
	% of business sector employees	7.7%	8.7%	**15.1%**	8.1%	8.9%	8.5%	7.7%	8.2%
	Capital per employee	27,386	71,932	**12,583**	38,662	33,587	54,674	30,586	95,185
11. Transportation, storage & communications	Product per employee	85,448	88,211	**57,194**	59,002	67,015	57,051	62,277	62,503
	% business product	8%	9%	**11%**	8%	13%	10%	9%	9%
	Employees	7135	1091	**136**	1420	167	179	873	264
	% of business sector employees	6.8%	6.3%	**8.7%**	8.1%	10.4%	9.6%	7.6%	9.3%
	Capital per employee	224,563	399,896	**434,086**	253,552	479,686	302,729	288,146	276,230
12. Electric equipment, electronic components, electronic communications equipment	Product per employee	88,319	53,485	**78,252**	67,135	90,570	51,989	73,587	69,528
	% business product	3%	2%	**7%**	3%	6%	2%	2%	2%
	Employees	2274	455	**64**	420	60	43	132	54
	% of business sector employees	2.2%	2.6%	**4.1%**	2.4%	3.8%	2.3%	1.1%	1.9%
	Capital per employee	148,220	160,672	**151,735**	133,563	72,115	95,418	70,307	244,312
13. Trade, accommodations and food services, social, personal and other services	Product per employee	44,084	47,598	**28,809**	37,444	37,110	38,301	27,006	42,771
	% business product	25%	24%	**16%**	21%	19%	24%	21%	20%
	Employees	42478	5569	**403**	5711	449	624	4681	880
	% of business sector employees	40.7%	31.9%	**25.8%**	32.8%	28.0%	33.5%	40.7%	31.2%
	Capital per employee	47,933	82,279	**NA**	82,202	121,994	113,109	26,202	105,772

Industry		USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
14. Banking, insurance & other financial institutions, real estate & business services	Product per employee	114,313	119,340	**76,253**	105,479	93,582	93,958	81,085	101,332
	% business product	37%	30%	**34%**	39%	25%	31%	32%	35%
	Employees	24233	2815	**330**	3707	237	325	2394	661
	% of business sector employees	23.2%	16.1%	**21.1%**	21.2%	14.8%	17.4%	20.8%	23.4%
	Capital per employee	125,918	1,149,216	**NA**	912,196	1,242,753	1,104,715	101,196	768,688
Avg. product per employee in all business sector industries 1995-2003		71,800	63,098	**47,439**	58,133	55,807	53,376	53,192	67,324

Table App-VII-5: Business Sector Industries by Technological Intensity - International Comparison

Averages for 1995-2003 or recent available data. Product per employee (added value) and capital per employee -$2000 PPP.
Number of employees – in thousands.

Technological classification		USA	Italy	Israel	France	Finland	Denmark	Canada	Belgium
Traditional & mixed-traditional Food, apparel, paper & printing, wood, mining, plastic & rubber, metals, non-metal minerals, jewelry, boats and ships.	Product per employee	67,885	47,814	**40,562**	55,254*	55,372	43,654	64,749	61,522
	% business product	10%	16%	**14%**	11%*	16%	13%	16%	13%
	Employees	11,289	3,608	**250**	2,147*	276	294	1,457	418
	% of business sector employees	11%	21%	**16%**	12%*	17%	16%	13%	15%
	Capital per employee	91,380	161,900	**101,711**	149,017*	233,782	131,240	132,876	258,266
1. Mixed-high Pharmaceuticals, oil distillation, chemicals, machinery & equipment, transport equipment exc. boats/ships	Product per employee	105,389	67,576	**70,271**	78,391	55,869	52,941	97,220	94,764
	% business product	7%	6%	**4%**	8%	7%	6%	7%	9%
	Employees	4,967	1,125	**47**	1,151	108	119	471	181
	% of business sector employees	5%	7%	**3%**	7%	7%	6%	4%	6%
	Capital per employee	167,338	229,612	**187,861**	189,197	154,032	152,221	180,069	280,835
2. High Electric equipment, office machines, electronic components, communications equipment, control & supervisory equipment, scientific equipment, aircraft.	Product per employee	88,319	53,485	**78,252**	67,135	90,570	51,989	73,587	69,528
	% business product	3%	2%	**7%**	3%	6%	2%	2%	2%
	Employees	2,274	455	**64**	420	60	43	132	54
	% of business sector employees	2%	3%	**4%**	2%	4%	2%	1%	2%
	Capital per employee	148,220	160,672	**151,735**	133,563	72,115	95,418	70,307	244,312
3. Unclassified Agriculture, electricity & water, construction, transportation, storage & communications, accommodations, trade, vehicle repair, personal services, business & financial services, real estate	Product per employee	69,953	67,400	**46,265**	60,648	54,025	55,416	48,337	66,021
	% business product	80%	75%	**76%**	81%	71%	79%	75%	75%
	Employees	85,904	12,320	**1,196**	13,493	1,154	1,407	9,433	2,166
	% of business sector employees	82%	71%	**77%**	77%	72%	76%	82%	77%
	Capital per employee	96,307	394,429	**193,680****	346,886	430,965	399,386	105,130	357,202

No2tes:
* The numbers do not include the aggregate plastic & rubber industry.
** The numbers do not include the following industries: commerce, accommodations, car repairs, personal services; business, financial and real estate services.
(a) The pharmaceutical industry is classified as high technology but is included here under mixed-high technology.
(b) The electrical equipment industry is classified as mixed-high technology but is included here under high technology.

Sources: OECD, Israel CBS, Applied Economics.