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Developing an SPPI for Computer Programming, Consultancy and Related Activities in Israel

(Division 62 - ISIC Rev.4)

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1. Foreword

In recent years, there has been a significant increase in Israel's GDP from various services in the domestic market and in particular from exports. Until 2020, the volume of receipts in Israel from the export of goods was greater than the volume of receipts from the export of services. In 2021, the balance changed, and for the first time, the volume of receipts in Israel from the export of services exceeded the volume of receipts from exporting goods[1]. This trend continued in 2022 as well.

The trade and services industries[2] in Israel according to the ISIC Rev.4. classification contain many divisions, for which the ICBS measures revenue and other data. For the purpose of deflation of nominal series of these divisions and for additional uses and uses similar to PPI in the domestic and export markets, there is a need to use SPPIs of the relevant service industries.

The PPI sector in ICBS is responsible for measuring prices in the manufacturing, mining and quarrying industries, as well as prices in the service industries. However, currently there are only 8 indices for the service industries, which measure the quarterly price changes of the services provided in them. Representatives of the ICBS's National Accounting Sector in the Division of Macro-Economic Statistics contacted the PPI team during the Coronavirus (COVID-19) pandemic, claiming that the existing indices represent rates of gross value added of only 11.9% of the total gross value added of all trade and services according to the ICBS Surveys of Industries in 2018 and 2020, and only 11.8% in 2019. That is, indices for many divisions are missing, comprising about 88% of the total gross value added of trade and services for calculating the gross value added (GVA) in real terms. There is a need to develop additional indices that would cover a greater share of the total gross value added of all trade and services divisions in Israel. Therefore, updating the existing price indices and developing new indices will make it possible to improve the statistical series of the National Accounting Sector.

Toward this end, it was decided at the ICBS at the end of 2022 that the PPI team would update the 8 existing divisions, and, in addition, would develop additional indices for the various service divisions. One of the three criteria according to which we chose to establish additional indices for the service industries was the percentage of gross value added of a division of the total gross value added of all trade and services for 2018. The larger the percentage, the greater the level of importance and priority for that industry's development. A second criterion according to which we chose the divisions was the level of complexity of the industry and hence the difficulty in developing a price index. The greater the previous international experience in developing SPPIs and the richer the professional literature on the subject, the

[1] Table 2.- Current account, Israel's balance of payments – 2022

[2] Trade and services industries in Israel: Divisions 45-96 (Divisions 97-98 do not exist in Israel)

less complex developing the index is. The third criterion involves the weight of sales to other businesses (BTB) and exports versus sales to the final consumer (BTC). The higher the sales to businesses, the more relevant it is to develop the index. For this purpose, data from Supply Use and Input-Output tables were used.

Based on these criteria, the first division we chose to develop was Computer programming, consultancy and related activities - Division 62. This division meets the first and third criteria and to a lesser extent the second criterion as well. The weight of the gross value added of this division out of the total gross value added of the trade and services industries for 2018 was 13.0%, which makes it the largest among the trade and service divisions in revenue and gross value added. Although the industry is considered complex for measurement, nevertheless, it is very important due to the growing size of the industry in recent years.

We started to develop the index at the end of 2022. The initial sample was determined based on the total output of the various companies according to the Survey of Industries 2019[3]. The survey sample included first the largest companies in the industry in order to reach maximum coverage in terms of revenues. At the beginning of 2023, we began to schedule meetings with representatives of the companies. During the meetings, that are still being held currently, we tried to understand the companies' activities, the various products and services they provide to their customers in Israel and around the world, and how we can measure their prices. At the moment we are in the midst of development; we have visited 20 different companies, and as of now we have received the data of most of the companies we met with. For some companies, it was difficult to define the products and services or to measure their prices, for many reasons that will be detailed later in this paper. In this paper we will refer mainly to the data of Classes 6201 and 6202, and only slightly to the other classes. The reasons for this are that (a) it is not possible in practice to develop an index for Class 6203, and (b) we have not yet met with representatives of companies in Class 6209, which is negligible in terms of its output rate in the division.

Our expectation for the completion of the establishment of the division and the use of the final data and their publication is in the first quarter of 2024. At that time, we will have all the necessary data to determine the weights and the structure of the index pyramid and the sample of companies and services that will be finally included in it. The index will be published based on: average 2023=100.

[3] 2019 Economic Industries Survey

2. Classifications

In order to establish Division 62, we used two classifications. The first was the UN's ISIC REV.4 classification,[4] which has been adapted to Israel. Second, we used the UN Ver 2.1 CPC classification[5] as well as the data we received from the various companies we met with in order to build a pyramid for the product groups in each of the classes in the industry.

In Israel, there are many companies that are software research and development (R&D) centers. According to ISIC REV.4 of the UN, these companies should be classified in class 6201. Typically, these companies are subsidiaries of parent companies located outside of Israel, and are not involved in the sale of goods or services to the clients of the parent companies. Rather, their main activity is R&D for the benefit of the parent company; some of them cooperate with other sister companies located outside of Israel. Due to the large number of companies that have high revenues and a large number of employees in R&D activity, it was decided by the Public Advisory Committee in the latest version of the classification that these companies would be classified in a new and separate class – 6203 class, Software R&D Centers – instead of in 6201. However, due to the fact that the companies do not bring in money from the sale of services, rather, their income derives from payments transferred to them by the parent companies located outside of Israel, we do not have the ability to develop an index for this class that measures market price changes of the services or products that the companies produce and sell.

The division and its classes, according to ISIC Rev.4 and its adaptation to the industrial classification in Israel

Division 62: Computer programming, consultancy and related activities

This division includes the following activities of providing expertise in the field of information technologies: writing, modifying, testing and supporting software; planning and designing computer systems that integrate computer hardware, software and communication technologies; on-site management and operation of clients' computer systems and/or data processing facilities; and other professional and technical computer-related activities.

Class 6201: Computer programming activities

This class includes the writing, modifying, testing and supporting of software.

This class includes:

- Designing the structure and content of, and/or writing the computer code necessary to create and implement:

[4] https://unstats.un.org/unsd/publication/seriesm/seriesm_4rev4e.pdf

[5] https://unstats.un.org/unsd/classifications/Econ/Download/In%20Text/CPCv2.1_complete(PDF)_English.pdf

- systems software (including updates and patches)
- software applications (including updates and patches)
- databases
- web pages
- establishment of websites, content services on the Internet

- Customizing of software, i.e. modifying and configuring an existing application so that it is functional within the clients' information system environment

Class 6202: Computer consultancy and computer facilities management activities

This class includes:

- Planning and designing of computer systems that integrate computer hardware, software and communication technologies

The units classified in this class may provide the hardware and software components of the system as part of their integrated services or these components may be provided by third parties or vendors. The units classified in this class often install the system and train and support the users of the system.

This class also includes:

- Provision of on-site management and operation of clients' computer systems and/or data processing facilities, as well as related support services

Class 6203: Software research and development centers

This class includes:

Companies engaged in research and development of software in designated centers (foreign-owned intellectual property)

Class 6209: Other information technology and computer service activities

This class includes other information technology and computer related activities not elsewhere classified, such as:

- Computer disaster recovery

- Installation (setting up) of personal computers

- Software installation

Table 1 - Detailed Structure and Correspondences of CPC Version 2.1 to ISIC Rev.4 Adjusted to Israel

	CPC 2.1			Corresponding	
Group	**Class**	**Subclass**	**Description**	**CPC 2.1**	**ISIC 4**
831	8314	83141	IT design and development services for applications	83141	6201, 6203
831	8313	83131	IT consulting services	83131	6202
831	8313	83132	IT support services	83132	6202
831	8314	83142	IT design and development services for networks and systems	83142	6202
831	8316	83161	Network management services	83161	6202
831	8316	83162	Computer systems management services	83162	6202
873	8733	87332	Installation services of personal computers and peripheral equipment	87332	6209

3. Market Characteristics

The rates of the gross value added of the division of computer programming (62) out of the total gross value added of all trade and services in Israel were 13.0%, 12.9% and 13.9% in 2018, 2019 and 2020, respectively. The rate increased from 2018 to 2020 (with a small decrease in 2019). Also, according to ICBS business and economic surveys in the years 2018-2020, it represents the largest gross value added in the trade and services industries that are measured in Israel.

The general characteristics of the industry are the concentration rate and the commissions that the international corporations – Alphabet (Google), Meta (Facebook), Amazon, and Microsoft – derive from all the goods and services that the companies in this industry sell to their customers. The international corporations above receive a considerable amount in commissions from the companies that use their cloud for thousands of different purposes, pay using their digital wallet platforms, and clearing, for the purchase of the goods and services that the companies in the industry provide to their various customers around the world and in Israel.

In this section we describe the characteristics of the division by distinguishing between these three classes: 6202, 6201, and 6203.

Characteristics of the 6201 class - This class is characterized by a very large number of companies and employees. Over 90% of the revenues of the companies are from exports. Most of the companies in this class are parent companies of international corporations. They have dozens of subsidiaries in Israel and throughout the world that are considered as research and development centers, but their total income is ultimately included in the tax needs of the Israeli parent groups. The Israeli parent groups pay their

subsidiaries according to Cost-Plus contracts and/or according to other contracts that weigh various other parameters. The companies in this class themselves produce all the products and services they provide to their customers.

Characteristics of the 6202 class - This class is characterized by the second largest number of companies and employees after the 6201 class. Over 90% of the revenues of the companies come from the local market. This class is considered relatively concentrated, because there are a few large companies that bring in most of the revenue, and all the rest are negligible in terms of revenue. As in Class 6201, these companies are the parent companies of dozens of subsidiary companies in Israel and throughout the world. These are considered their research and development centers, but their total income is ultimately included in the tax needs of the Israeli parent companies. These companies pay their subsidiaries according to Cost-Plus contracts or according to other contracts that weigh various other parameters. These large companies provide their customers with hardware and software from third parties only and physical support from professionals who belong to the companies, in the clients' offices or in the companies' offices themselves; most of the employees are in Israel. The income of these companies is determined by Cost-Plus contracts, in which the costs of the projects are priced, which combine the 3 elements mentioned above. The companies in this class don’t produce all the products and services they provide to their customers by themselves, with the exception of provision of various types of professionals who manage and operate computer systems and/or data processing facilities for the customers as well as providing related support services.

Characteristics of the 6203 class - Although we are not developing an index for this class, we find certain characteristics that are unique. The customers of the companies in this class are the sister companies or parent companies, (international corporations) located outside of Israel, to whom the Israeli companies provide research and development services for the products and services they sell to their customers around the world and in Israel. The revenues are received from the sister or parent companies that are outside of Israel through Cost-Plus contracts or according to other contracts that weigh various other parameters. This class is characterized by small rates of the number of companies and the number of workers relative to the total number of companies and workers in Division 62. Nevertheless, the revenue rates of this class out of the total revenues in Division 62 have been increasing every year in recent years and are second compared to class 6201.

Distribution of revenues, number of companies & number of employees in local and export markets

Diagram 1 - The Revenue Rate of Division 62 Out of the Total Services and Trade Divisions (45-96) Revenue in Israel, 2018-2022

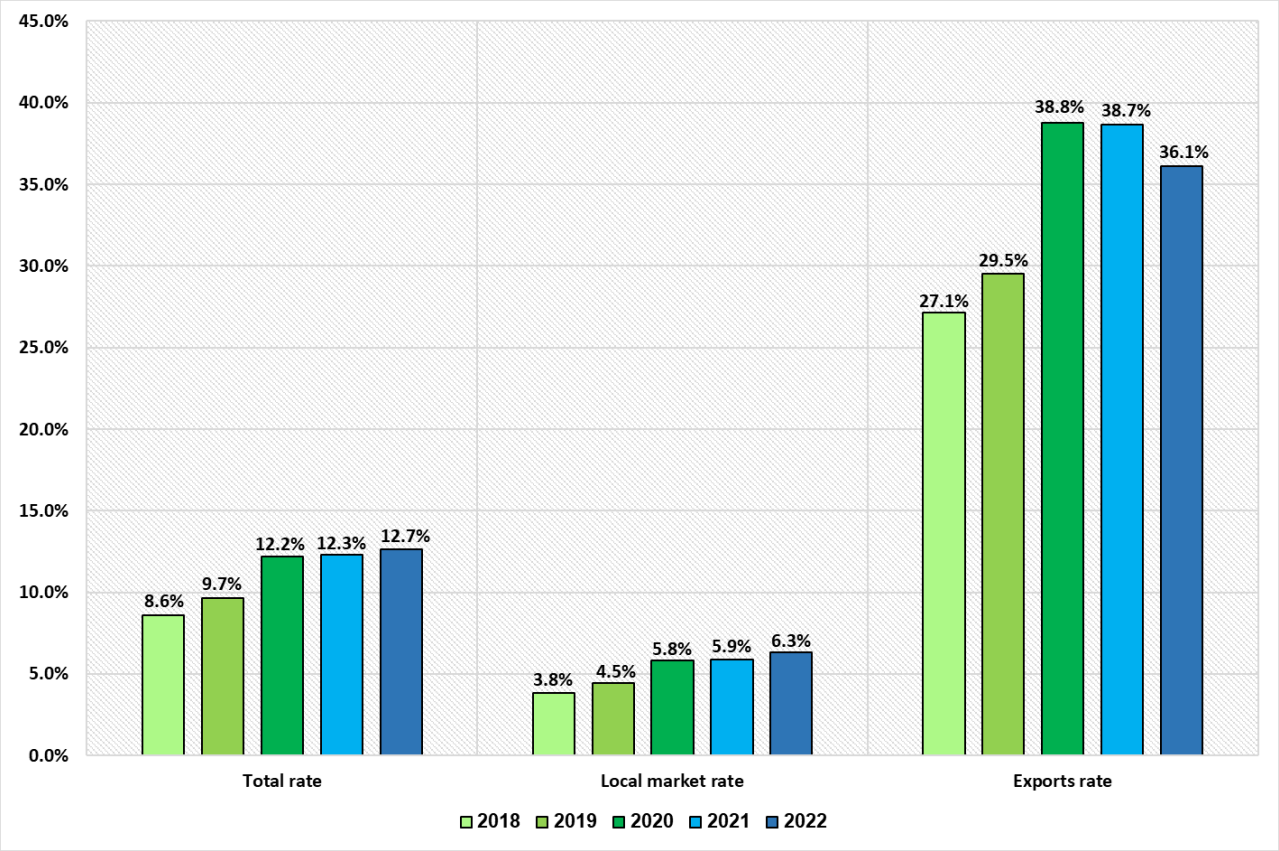


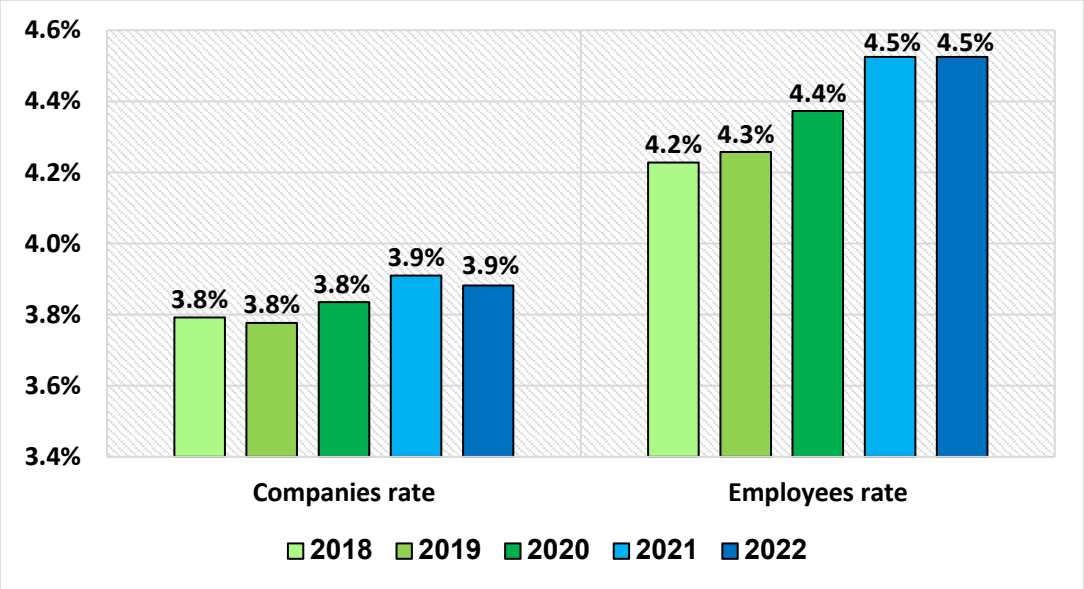
Diagram 1 shows the revenue rates of Division 62 out of the total revenue of trade and services in Israel between the years 2018-2022, divided according to the total, the local market, and the export revenues rates. The total and local market revenues rates increased every year. However, the export revenue rates increased until 2020, followed by a slight decrease of 0.1% in 2021 and a slightly larger decrease in 2022. In my opinion, this decrease represents the global economic crisis that began that year, and in particular in the high-tech industry. In most countries of the world, interest rates were raised by the central banks, which directly caused decreases in global demand for most products and services, and resulted in decreases in the various investments and in high-tech industry in particular, and in widespread layoffs in the industry. Despite this, it can be observed that the export revenues rates of Division 62 out of the total export revenues of trade and services are growing exponentially and constituted a large share of the total revenues in the exports of the Israel during these years.

Table 2 - Total Revenues (NIS million)

Divisions	Year	Total	Local market	Exports
45-96	2018	1,289,047	1,026,721	262,327
	2019	1,357,455	1,075,035	282,420
	2020	1,301,877	1,049,287	252,590
	2021	1,572,018	1,262,976	309,042
	2022	1,820,027	1,434,020	386,008
62	2018	110,528	39,356	71,172
	2019	131,234	47,890	83,344
	2020	159,045	61,165	97,880
	2021	193,483	74,009	119,474
	2022	230,441	91,028	139,413

It can be seen from Table 1 that the total revenues in the trade and services divisions increased every year between 2018-2022 and for all destinations. Correspondingly, the revenues of 62 division increased every year between 2018-2022 to all destinations.

Diagram 2 - The Companies' Rate of Division 62 Out of the Total Services and Trade Divisions (45-96) Companies in Israel During 2018-2022



It can be seen from Diagram 2 that the proportion of companies that employ workers in Division 62 out of the total number of companies that employ workers remains fairly stable between the years 2018-2022. However, the rate of workers employed in the Division 62 out of the total number of employed workers increased between the years 2018-2021, and is relatively the same in 2022 compared to 2021. It can be concluded from graphs 1 and 2, that the proportions of companies and workers employed are relatively small compared to the revenue rates of the division in total revenues rates in the trade and service divisions. This indicates very high worker productivity.

Table 3 - Total Companies and Employees (absolute numbers) of Division 62 and Total Divisions in Israel Between 2018-2022

Divisions	Year	Companies that employ workers	Employees
45-96	2018	226,046	2,998,838
	2019	229,009	3,059,347
	2020	225,728	2,736,183
	2021	230,816	2,948,169
	2022	243,314	3,234,836
62	2018	9,731	145,135
	2019	9,913	156,292
	2020	10,021	158,400
	2021	10,602	179,621
	2022	11,246	211,443

Table 2 shows that the number of companies that employ workers and the number of workers employed in Division 62 increased every year between 2018-2022. Even in 2022, despite the precarious economic situation in the world and widespread layoffs of many workers in the high-tech industry in many countries around the world, the number of companies and kept are growing in Israel.

Diagram 3 - The Revenue Rate of Division 62's Classes Out of Division 62's Total Revenue in Israel Between 2018-2022

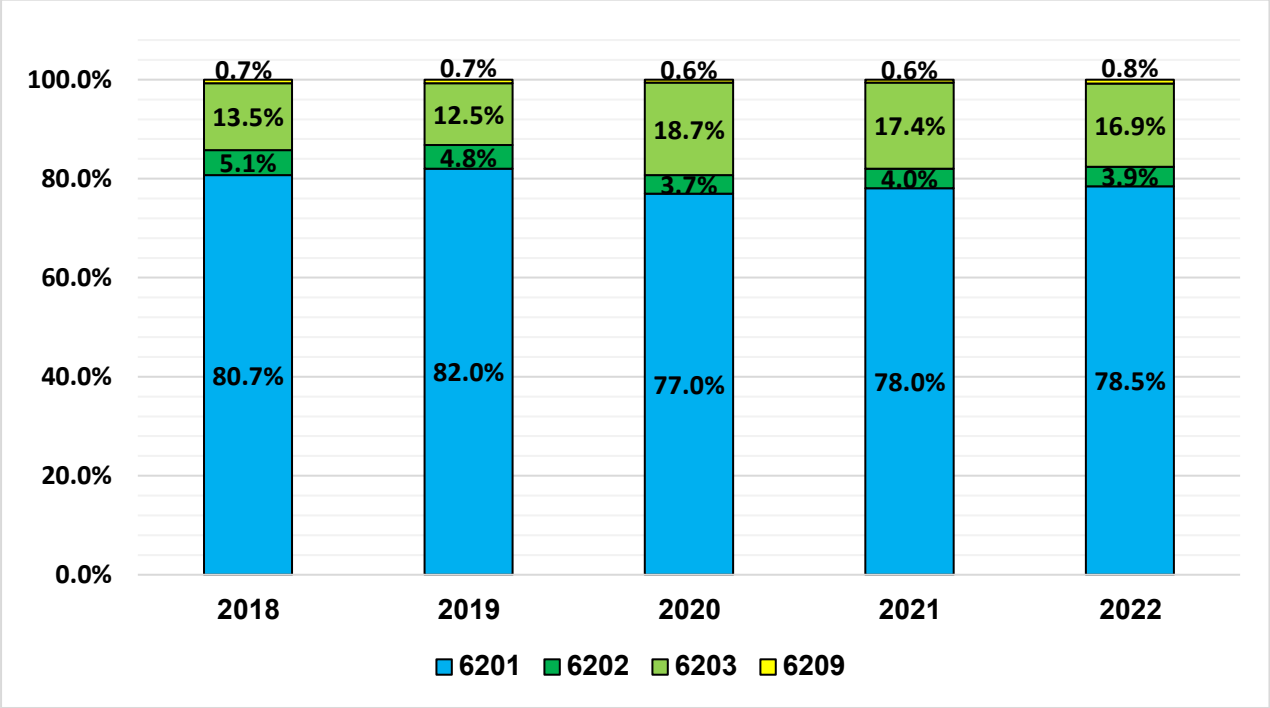


Diagram 3 shows the revenues rates of all classes in Division 62 out of the total revenues in 62 division in the years 2018-2022. It can be seen that the rate of revenue of 6209 class is minimal and has remained fairly stable between these years. It can also be noticed that class 6201 is the biggest and that the revenues rates in classes 6201 and 6202 decrease slightly over the years, while the revenues rates in 6203 class increasing, meaning that there is a lot of investment in this class in Israel and it is reflected in the total revenues themselves which are grown over the years.

Table 4 - Total Revenues of Division 62's Classes in Israel During 2018-2022 (NIS million)

Class	Year	Total	Local market	Exports
6201	2018	89,182	33,569	55,613
	2019	107,647	41,423	66,224
	2020	122,448	52,006	70,442
	2021	150,992	62,667	88,325
	2022	180,853	78,086	102,766
6202	2018	5,644	4,138	1,506
	2019	6,235	4,584	1,651
	2020	5,903	4,750	1,153
	2021	7,717	5,802	1,915
	2022	8,971	7,252	1,719
6203	2018	14,898	1,021	13,877
	2019	16,415	1,162	15,253
	2020	29,705	3,635	26,070
	2021	33,582	4,656	28,926
	2022	38,861	4,457	34,405
6209	2018	804	628	176
	2019	937	721	216
	2020	988	773	216
	2021	1,192	884	308
	2022	1,755	1,232	522

It can be seen in Table 4 that the total revenues of all classes increased between the years 2018-2022 to both the local and export markets, with small decreases in certain years.

Table 5 - Total Companies and Employees (numbers and rates) Out of Division 62's Classes in Israel During 2018-2022

Class	Year	Companies that employ workers	Employees	Companies rate	Employees rate
6201	2018	7,726	111,590	74.7%	80.8%
	2019	7,960	121,337	74.7%	81.6%
	2020	8,000	123,872	73.9%	81.1%
	2021	8,394	134,773	73.3%	80.4%
	2022	8,857	155,782	74.2%	80.4%
6202	2018	1,609	11,840	20.6%	16.8%
	2019	1,583	12,969	20.3%	16.2%

Class	Year	Companies that employ workers	Employees	Companies rate	Employees rate
	2020	1,631	12,547	20.6%	16.5%
	2021	1,741	12,759	20.7%	16.7%
	2022	1,759	14,441	20.8%	16.0%
6203	**2018**	174	19,369	1.2%	1.8%
	2019	163	19,745	1.1%	1.6%
	2020	151	19,859	1.0%	1.5%
	2021	157	29,559	0.8%	1.5%
	2022	236	37,920	1.1%	2.1%
6209	**2018**	222	2,336	4.7%	2.3%
	2019	207	2,241	4.9%	2.1%
	2020	239	2,122	5.5%	2.4%
	2021	310	2,530	6.0%	3.0%
	2022	394	3,300	5.0%	3.6%

Table 5 presents the proportions of companies that employ workers and the proportion of workers in all classes of Division 62 compared to the total of Division 62. Although the revenue rates of Class 6203 are very large (Table 4), the rates of companies that employ workers and the rates of the of workers are very small and the smallest of all the classes. It can be concluded from these data that the companies in Class 6203 are very efficient in terms of productivity.

4. About the Sample

The sample currently includes the large companies with high levels of certainty. These companies cover a large part of the output in each Class, and we are presently in the process of expanding the sample by adding medium and small size companies, using the probability proportional to size (PPS) method.

The sampling frame is the Survey of Industries 2019. The frame file includes the following variables for each company: ISIC classification (4 digit), weighting factor (the number of companies that the company represents in the population), the number of employees, revenue, output, wages and GDP.

The strategy for building the sample is to first and foremost include the largest companies in the industry, due to their influence and because they cover a large part of the output. We then add the medium and small size companies to build a representative sample, and to make sure that it fills the threshold we set for covering the sample in the population.

First, a list of the largest companies was selected from the sampling frame; the ranking of the companies was based on output. Currently we are working in collaboration with the Statistical Methodology Department to determine the ranges for medium and small size companies, the criteria for selecting them, and to determine the final sample of companies for the index. Another reason

we started with the large companies was to schedule meetings with these companies as a preliminary survey, in which we could learn from them about the types of services, customers and technologies, as well as methods for determining and measuring prices.

The word "list" in the tables below refers to the list of companies selected from the total sample in the survey according to the size of their output. This list is being used as a pilot for gaining knowledge about the industry before building the final sample.

The following are tables that show the analysis of the data by classes according to the Survey of Industries 2019.

Table 5: Data Analysis of the Sample in Classes 6201-6209

Computer programming - 6201		
	The number of companies	**Output (NIS Thousands)**
Population	12,488	82,634,293
Sample of the Survey of Trade and Services 2019	407	47,280,930
The list (pilot before building the final sample)	21	26,775,989
The list's representation in the population	21	26,775,989
The list's coverage of the sample	5.2%	56.6%
The list's coverage of the population	0.2%	32.4%

Consulting in the field of computers and management of computer facilities - 6202		
	The number of companies	**Output (NIS Thousands)**
Population	3,198	4,085,597
Sample of the Survey of Trade and Services 2019	73	1,251,933
The list (pilot before building the final sample)	16	1,185,637
The list's representation in the population	57.93	2,222,429
The list's coverage of the sample	21.9%	94.7%
The list's coverage of the population	1.8%	54.4%

Software research and development centers 6203 Does not appear in the international classification

Other services in the field of information technology and computers - 6209		
	The number of companies	**Output (NIS Thousands)**
Population	761	393,699
Sample of the Survey of Trade and Services 2019	15	86,088
The list (pilot before building the final sample)	4	84,332
The list's representation in the population	72.67	281,209
The list's coverage of the sample	26.7%	98.0%
The list's coverage of the population	9.5%	71.4%

In the first stage, we searched for the largest companies in terms of outputs, in order to contact them as soon as possible and schedule meetings with them.

Afterwards, we compiled a list of the leading companies according to revenue, but an issue arose – there were companies for which the revenue figure did not exist. Thus, it was decided that output would be used to determine the companies in the sample, while taking into consideration other relevant variables (revenue, income and jobs).

Our deliberations focused on the parameter we would look at for the purpose of determining the final sample: revenue/output/income. In the sample obtained from the Survey, revenue is recorded as reported to the VAT authorities. However, when there are groups of companies that are registered as reporting together to the VAT authorities in Israel (VAT partnership), we receive only the revenue of the company that is reporting for the group and not for the other companies (sometimes they are subsidiaries). The variable of income is often the same as output, but it sometimes includes income from capital gains as well, and this is less relevant to us, therefore, the ranking was according to output and not according to income. The calculation of output in Division 62 is: The company's income less capital gains and less consumption of goods (purchased and sold without further processing).

Another discussion was whether to build the final sample by classes or by division. Additionally, we considered by which criteria we seek to build the sample: Whether to determine according to output, revenue, or according to the company's fields of activity. After examining the subject, and after meetings with companies, we realized that we could not sort the companies according to their field of activity because there are many companies and we

cannot meet with them all, and without meeting we cannot know for sure what their main activity is.

In light of all this, we decided to sample according to classes, to add medium and small size companies, and to build a representative sample according to the output. We determined a certain range of the output in each class, which divides the class into size groups, as follows:

Class 6201:

Medium size companies between NIS 100-450 million, small companies will be under 100 million in output and over 5 million.

Class 6202:

Small companies will be under NIS 29 million, and over NIS 5 million

In addition to output, there is also reference to the number of employees in the company, for example: companies with output over NIS 30 million and at least 20 employees. When there is uncertainty about which company to include, e.g., between two companies that are the same size in terms of output, we then relate to the company's number of employees (number of jobs). In small companies we look at the weighting factor – the amount of companies that the company represents in the population. We try to estimate the number of companies in the sample for each class according to our desired coverage, for example: 50 companies in Class 6201 and up to 20 companies in Class 6202.

5. The Meetings with Companies and Issues We Encountered

After building the initial sample, we visited the largest companies in each class. During these visits, we encountered many issues; we dealt with them and found solutions for them. Despite all the difficulties, we succeeded in defining services and pricing methods for each company in order to collect prices quarterly. We discovered that some companies were classified incorrectly.

So far, we have met with representatives of 14 companies in the industry. We contacted 19 companies; of the five we did not meet, three will not be included in the sample and two are subsidiaries that are related to companies in the sample.

During the meetings, we encountered objections from most of the company representatives, who claimed that they would not be able to give us measurable prices of the products or services they sell. They maintained that the company's services could not be measured, at each meeting we had to ask targeted questions to reach specific services and products.

Another problem we discovered is that some of the companies work with the Cost-Plus method. They are engaged in development and do not sell the

company's products or services. Instead, they work for the parent company and all the sales revenue goes to the parent company, which is not in Israel. These companies are currently classified under Class 6201, incorrectly. We believe that they should be moved to Class 6203 – Software research and development centers.

In addition, the classification in our sample frame was by subsidiaries, that is, we received the data of the output and revenue of each subsidiary in the same parent group separately. However, before we arrived at a meeting at a particular company, we checked the Dun & Bradstreet website for ownership relationships, and found the parent company of this company and other subsidiaries. Some of them were already on our list of large companies, and some were in the sample frame. Therefore, we asked to meet with appropriate company representatives who could give us the data of the entire group in order to streamline the work and not schedule a meeting with each subsidiary separately.

The last problem we encountered was when contacted a company from the sample that has been developing a Chain-Block infrastructure (open source) for the past few years. They raised venture capital for the development of this infrastructure, and all the company's revenues are solely from these funds; they are used to pay the various developers in the company. After the company finishes developing the abovementioned infrastructure, it will be held by the community that paid for it in the issue (various private individuals).

Questions at the meeting

We asked about the following topics during the meetings: The company's field of business, its activities, the services or products it provides to its customers, the number of employees in Israel and abroad, types of employees, where the company's headquarters are located, whether there are related companies (subsidiaries of the parent company), country of tax reporting, competitors in Israel and worldwide, the mechanism for providing services and payment for them, and the company's revenues for 2022. After we had defined the main groups of services, we requested definitions of products/services for the sake of compiling a report on prices, as well as job definitions in order to compile a report on the rate for an hour of work.

Main Issues with price measurement

Virtual game applications - in some games, one can buy upgrades for the game, such as an extra round in the game or accessories for the characters.

In games that offer upgrades in virtual currencies, we considered measuring packages in virtual coins, however, every month the company changes the amount of coins and prices requested according to internal considerations. In order to measure the price of a virtual coin, we attempted to calculate the income in real money and income in virtual coins and calculate the ratio between the two. Using an Excel file, we multiplied the price in the virtual coins by one hundred and then calculated the percentage of change per

package and coin. We were uncertain whether we should measure the price of the packages in real money or by the price paid for packages in virtual coins. Eventually we decided to obtain prices for different packages of game upgrade coins and measure the price of the package in real money, as this reflects the company's revenue.

In one game development company, the game is offered as a free download from Google or Facebook app stores or digital wallets, or through a dedicated application of the company, or by means of the server on the company's domain. The company earns money by selling different packages of products, services or in-game items on the different platforms. When customers download and play the game through platforms not belonging to the company, such as Google or Facebook, the company pays a fee to these companies for each purchase. However, when the customers play the game through a platform directly belonging to the company, there are no fees. Here a question arose: Should we measure the data by deducting the fees they pay to the clearing platforms or without deducting fees? We wanted to measure the net revenue that the company actually receives, so we asked for the data both with and without fees. After an analysis, we decided to obtain the prices minus the fees to the outside platforms.

CRM Services - we encountered resistance from a certain company when asked to specify the names of customers and the prices of the packages sold to customers. We suggested that we could indicate the customers with an agreed marking – in letters. Furthermore, we would receive the rates of change of the prices instead of the prices themselves, starting with a base of 100 in the 1st quarter of 2022.

Information security and cyber services - there are companies that provide licenses for intrusive cyber software, which is used by intelligence and security agencies of various countries in order to capture terrorists, hostile elements, pedophiles, etc. Most of the customers pay in full for using the company's license for an entire year from the date of first payment. Therefore, the price will not change for that customer during the three quarters following the quarter of the purchase. Accordingly, we made an agreement with the company that they would report the price of the quarter that the product was purchased for each customer, and afterwards they would not need to report on a price change for three consecutive quarters for each specific customer.

Cloud services mediation - we met with a company that mediates between the major cloud providers – Google, Amazon and Microsoft - and the client. The company has developed a tool that manages the customer's cloud environment and offers advice to the customer on how to effectively manage the cloud infrastructure.

The customers pay the company the payment according to the costs advertised by these cloud companies, and gives them the bills, and then these companies pay commissions (percentages) on the prices to the parent company, which is abroad. Its income is received by its parent company

according to Cost-Plus and additional contracts. Therefore, we cannot measure the costs of the various products that are on the cloud for this company.

After all, we realized that we would not have to measure the company's services, because the income goes to the parent company abroad, and therefore it should be classified in Class 6203.

Project management - there are companies that manage projects for other companies and do not provide fixed services. They offer solutions for the client's requests, and when they carry out projects they price the cost according to the scope of the investment. They add a profit margin they consider acceptable, including risk factors, and thus arrive at prices for the different projects. The investment costs include manpower, products, and services of a third party. The projects are all different in pricing; they involve different professional roles and vary greatly in the services provided. It was inherently difficult to measure according to projects; therefore, we asked to receive an hourly rate charged for the project that includes costs for professional role as well as for software and hardware costs. So far, we have met with two companies, and they said they would not be able to give us such data, because they do not have such resolutions. The representatives of these companies claimed that the main component of their expenses in the projects is the salary component for the professionals. They stated that they are able to provide us with the average monthly expenses of the companies for the professionals they provide for their customers in their different roles, and that there is an almost complete correlation between the monthly changes in these expenses and the monthly salary changes of employees in the high-tech sector. Due to all these, it was reasonable to receive the professionals' expenses for the purpose of calculating the industry's index.

However, our goal is still to obtain an hourly rate charged for the project that includes costs for professional role as well as for software and hardware costs from the companies we visit in the future.

6. The Various Types of Services

During the development of the index and the meetings with representatives of companies in the sample, we gained insights about the various types of products and services provided. First, we contacted companies in the two largest classes in the industry in terms of revenue, 6201 and 6202, and at a later time we will contact representatives of companies in Class 6209.

We concluded from these meetings that the companies in each class have very different types of products and services. For example, note the variations in Class 6201 (Computer programming activities):

- **Virtual game applications –** virtual packages or products that provide different features to game users.

- **Advertising services –** Internet advertisements in applications of various contents that match the content articles, in games or on other platforms. These ads advertise products based on algorithms and on the surfers' browsing history on the internet and in various applications. The companies providing these services purchase advertising space from website publishers or applications, and pay these companies a fixed fee for the space, or according to a certain share of each click on their ad.
- **Information security and cyber services –** Information security services of computer systems and networks and even offensive cyber security services.
- **Financial fraud detection services –** Software that identifies suspicious customer transfers that indicate fraud. In addition, there are programs that check whether money laundering is taking place among different customers.
- **Platform services for creating web pages for businesses and a platform for managing online businesses –** These are services that developed substantially during the COVID-19 pandemic due to the clear need of business owners to sell products and services via the internet.
- **CRM services –** Solutions for customer service centers of companies in Israel and worldwide. The services include call routing, digital solutions (WhatsApp, Messenger, chat, email, etc.), call recording and the ability to analyze calls, operator assessment and remote support. The software does all this automatically and presents it live to customer's employees. The entire relationship between the end customer and the service provider is documented, and based on this, the system analyzes the communication between the service provider and the recipient, for the purpose of improvement and regulation. For example, the software of one company is able to detect emotion (in the customer's voice and intonation), and alerts the service provider if the customer is angry, disappointed, or satisfied; they can then adjust their attitude accordingly.
- **Software providing billing services, financial services, payroll services and GIS services**

On the other hand, in Class 6202 (Computer consultancy and computer facilities management activities) the services provided are usually quite similar, for example:

- **Project management services -** various projects that supply third-party hardware, third-party software and physical support from the company's high-tech professionals at the client's offices or at the company's own offices. Most of the employees are in Israel and some are abroad.

- **Provision of various types of professionals who manage and operate computer systems and/or data processing facilities for the customers as well as providing related support services**.

7. Types of Customers

The types of customers in this division are many and varied, ranging from governmental agencies in Israel and around the world and international corporations that employ tens of thousands to the individual consumer. The following is a breakdown of the types of customers according to main products and services.

In the 6201 class:

- **Virtual game applications -** the customers in this group are virtual game players on apps or networks.
- **Advertising services -** the main customers in this group are agencies that represent a large number of companies from the world of content, mainly on the Internet, and game content developers on apps.
- **Information security and cyber services -** the main customers in this group are international companies and corporations, intelligence and security agencies of countries, and banks and hospitals around the world.
- **Financial fraud detection services -** the main customers in this group are banks, companies, and corporations that provide financial services to their customers in Israel and around the world.
- **Platform services for creating web pages for businesses and platforms for managing online businesses -** the main customers in this group are SMB (small medium businesses) around the world. Since the beginning of the global COVID-19 pandemic, these services have been greatly expanded to the level of every business in the world, whether its owner has no basic technological knowledge, basic technological knowledge, or extensive technological knowledge.
- **CRM services -** the main customers in this group are banks and a variety of companies and corporations that provide services to their customers around the world.
- **Software that provide billing services, financial services, payroll services, and GIS services -** the main customers in this group are municipalities and local authorities in Israel.

In the 6202 class:

- **Project management services**.
- **Provision of various types of professionals who manage and operate computer systems and/or data processing facilities for the customers as well as providing related support services**

  The main customers in both groups are software or hi-tech companies, business corporations, government offices, local authorities, security

and intelligence agencies, banks and financial institutions, academic institutions, communication companies, food chains, real estate companies, industrial entities, etc., mainly in the local market.

8. Pricing Methods

In this section we elaborate the types of prices we asked to receive from the reporters of the various companies we visited, in the 6201 and 6202 classes.

As noted above, we noticed that in Class 6201, the price measurement method is the same as in manufacturing PPI, namely, the direct use of prices of the repeated services or the contract pricing method, because the companies in this class produce virtual products or services that are sold to their various customers. The differences are that the products are virtual and not physical products; this means that we can measures prices directly, for repeated services. Below are the types of prices that we requested and began to receive for the various types of products that the companies produce, for the purpose of their measurement in Class 6201:

- **Virtual game applications -** We measure the weighted average quarterly prices of a different customer mix (players) of specific packages with different characteristics in each game (a variable mix of number of coins in the package) or the weighted average quarterly prices of a different customer mix of items with different characteristics in each game, which give customers different options in these games. The prices are obtained after deducting fees for downloading the games and clearing that are paid by the various companies to companies with digital wallets (GOOGLE, APPLE, etc.) and after deducting discounts and returns (net prices, without taxes).
- **Web and application advertising services -** we measure weighted average quarterly prices of the CPI (cost per impression) unit and the CPC (cost per click) unit of specific large customers (agencies) in terms of revenues for 2022. Some of the prices are received after deducting the expenses of the companies for advertising space per CPI or CPC unit, and some will be received without deduction, because companies have no practical ability to provide them without deducting the expenses.
- **Information security and cyber services -** we measure various types of prices:

– weighted average prices of monthly licenses of each type of software in each quarter of all customers according to the unit of measure price per customer's one user;
– prices of annual licenses according to specific customers (security or military forces of various countries); and
– for each quarter, weighted average prices of annual licenses of packages containing various types of information security software; the packages also contain hardware and support from the company's employees for the operation of the packages.

- **Financial fraud detection services –** for each quarter, we measure monthly, quarterly, or annual package prices of the types of software according to specific customers. The prices include remote software support.
- **Platform services for creating web pages for businesses and managing online businesses -** we measure weighted average monthly prices of different packages of platforms with various features for setting up web pages for businesses, or of platforms with various features for setting up web pages for businesses plus a platform with various features for managing a business on the Internet, according to the mix of main countries in continents or parts of continents in each quarter, deducting expenses on different domains and emails of third party companies (net software) and deducting any discounts.
- **CRM services -** for each quarter, we measure monthly, quarterly, or annual package prices of the types of software according to specific customers. The prices include remote software support.
- **Software that provide billing services, financial services, payroll services and GIS services -** weighted average prices of monthly licenses of each type of software in each quarter, for all customers.

On the other hand, in Class 6202, the services that the companies in this class provide to their customers are measured using the Time-Based methods and as follows:

- **Project management services -** We measure the average hourly project cost per quarter by professionals (for example: software project manager, software engineer, systems analyst, data analysts, DEVOPS employees, QA employees, Help Desk employees, UX/U employees, CTO, etc.) at different levels (junior, senior or managerial position) in the weighting of all of the customers. There are companies that cannot provide the above prices, and due to the large weight of the cost of employees in the total costs of the projects that they provide to their clients. These companies provide an average monthly cost per quarter of the employees that they provide to their clients, according to those professionals, in the weighting of all of the clients.
- **Provision of various types of professionals who manage and operate computer systems and/or data processing facilities for the customers as well as providing related support services -** We measure a weighted average of the monthly rate per quarter that they demand from their customers according to type of professionals (for example: software project managers, software engineers, systems analysts, data analysts, DEVOPS employees, QA employees, Help Desk employees, UX/U employees, CTO, etc.) at different levels (junior, senior or managerial position) in the weighting of all of the customers.

In addition, prices are the same for the local market and for export and there is no distinction between the destination as the services are sold all over the world, including in the domestic market (Israel).

Summary

The computer programming services industry in Israel is indeed a complex industry to measure, but it has a great impact on the Israeli economy in terms of its gross value added, GDP and total revenues, especially in exports. In general, the global internet revolution in recent decades has accelerated the development of this industry all over the world, providing it with an opportunity to reach anywhere in the world that has Internet. In Israel over the past few years, there has been a steady increase in the number of companies and employees engaged in the industry. Because productivity in the industry is high and significant, the average salary in the industry is among the highest in Israel. Due to all these reasons, the choice of the PPI sector in Israel to first develop an index for this industry is a logical and reality-based decision. The use of the industry index will be substantial, and will have great value in terms of the coverage rate of its gross value added out of the total gross value added of the total trade and service industries in Israel. Thus, the field of national accounts will be able to use it for the purpose of calculating its gross value added in real terms and for other uses, and it will improve their statistical series. In addition, it will be used for research, it will serve as an economic indicator and it will be used for international comparisons. We hope that we will succeed in creating an accurate index that optimally represents the changes in all the products and services provided by the various companies that are classified in it to the various customers around the world.