Contents

A. General

1. The Concept

The concept of **socio-economic level** of the population of a geographical unit reflects a combination of basic characteristics of a specific geographical unit investigated (for example, the population of a local authority). The concept is intuitively understood in its extreme manifestations: poverty at one end of the spectrum and wealth at the other end. While financial resources are a central attribute of the socio-economic level, they are not the only one. The socio-economic level comprises other elements that are correlated to some extent with a given financial situation (and sometimes express a future financial potential), but are not identical to it.

The central aspects that comprise the socio-economic level of residents of a geographical unit are:

- Financial resources of the residents (from work, benefits, etc.)
- Housing – density, quality, and other components of this aspect
- Home appliances, e.g., air conditioner, dishwasher, personal computer, etc.
- Motorization level – quantitative and qualitative
- Education
- Employment and unemployment characteristics
- Various types of socio-economic distress
- Demographic characteristics

There may be additional aspects from the socio-economic sphere, although it may be impossible to create a uniform, formal list of them. Similar indices are constructed by various agencies in the world. The following are several examples: The Office of National Statistics of **Great Britain** devises the socio-economic index for areas within local authorities, by means of principal component analysis, based on population censuses. The **Australian** Bureau of Statistics produces five socio-economic indices that measure various socio-economic aspects of geographical areas, based on the population census. Current surveys are used for updating the index in the periods between population censuses. In **New Zealand** similar indices are devised, as well as a socio-economic index based on occupational status. **The World Data Bank** constructs three types of development indices for comparison between different countries.

In **Israel**, the Central Bureau of Statistics produces socio-economic indices for various types of geographical units. The purpose of each index is to characterize and rank these units relative to other geographical units of the same type for a specific time period. For example, the socio-economic index for local authorities, as presented in this publication, characterizes each local authority by the socio-economic level of the population consisting of its residents relative to the socio-economic level of the populations in all other local authorities in 2017.

The units studied here fall into three categories:

(a) local authorities: municipalities, local councils and regional councils;

(b) localities within regional councils;

(c) statistical areas within municipalities and local councils.

The study presented here was performed in **four main stages**:

1. Receiving data files from departments within the Central Bureau of Statistics and from outside administrative sources: the National Insurance Institute, the Ministry of Finance, the Ministry of Defense, the Ministry of Education, the Ministry of Transport and Road Safety, and the Population and Immigration Authority. The index was calculated based on the same variables that were used to calculate the 2013 and 2015 indices, with minor changes regarding the ages of the reference population in the definition of four variables. The variables for the index calculation were selected to reflect the largest possible number of the socio-economic aspects for all the units under study, while considering their reliability both at the level of local authorities and at the level of localities within regional councils. This was done in order to allow basing of all the rankings, both those between the local authorities and those within the local authorities, on the same variables. The variables refer to 2017 and are described in Chapter B, Section 3.
2. Building the data file including the various variables for each of the geographical units.
3. Statistical processing of the data for the local authorities. The processing was based on factor analysis, a reliable and accepted statistical technique for combining the values of a number of variables into one quantitative scale – the index. The statistical analysis was conducted for all the local authorities of the various sectors (Jewish, Arab, and Druze), resulting in a common index for all of the sectors. Cluster analysis was used to classify the local authorities into clusters as homogeneous as possible with respect to the socio-economic index. The statistical methods are described in Chapter C.
4. Calculating the index values for localities within regional councils and for statistical areas within municipalities and local councils. The index values were used to allocate these geographical units to the clusters of the local authorities. The statistical methods are described in Chapter E and F.

2. Previous Studies on the Subject

The following is a brief list of previous studies on the socio-economic characterization of local authorities at different points in time:[1]

1. **Characterization and Classification of Geographical Units by the Socio-Economic Level of the Population**, conducted by S. Ben-Tuvia, 1987. This research, based on data from the 1983 Census of Population and Housing, made a unique contribution by relating to statistical areas within localities as well as to the locality as a whole.
2. **Characterization of Local Authorities by the Socio-Economic Level of the Population**, conducted by S. Ben-Tuvia, Y. Daichev, and I. Dor, 1988, commissioned by the Ministry of the Interior and performed by the Central Bureau of Statistics. The research was based to a large extent on data from the 1983 Census of Population and Housing, the National Insurance Institute, and the Ministry of Health. The study included all municipalities and local councils except for local councils that had a population under 1,000 in 1983. The research results elicited separate socio-economic indices for the Jewish and Arab-Druze sectors.
3. **Characterization and Ranking of Local Authorities by the Socio-Economic Level of the Population in 1992**, conducted by I. Dor and S. Heimberg (Shitrit), August 1993. This study, a joint project of the Ministry of the Interior and the Ministry of Construction and Housing, updated the two previous studies based on the 1983 Census. The data on local authorities' population in 1991–1992 were obtained from many ministries and institutions. This research also produced separate indices for each of the sectors – Jewish and Arab-Druze.
4. **Characterization and Ranking of Regional Councils in Israel by the Socio-Economic Level of the Population**, conducted by L. Applebaum, I. Dor, and S. Heimberg in 1996. For the first time, this study – a joint project of the Jewish Agency and the Centre for Development Studies in Rehovot – presented a ranking of regional councils by socio-economic level of the population. The research was based on data from 1992–1994 obtained from many ministries and institutions.
5. **Characterization and Ranking of Local Authorities According to the Socio-Economic Level of the Population in 1995**, conducted by L. Burck and Y. Kababia in 1996, commissioned by the Ministry of the Interior and performed by the Central Bureau of Statistics. The data on local authorities' population for 1993–1994 were obtained from numerous ministries and institutions. For the first time, the results were used to generate a uniform socio-economic index for all local councils and municipalities in both sectors (Jewish and Arab-Druze).

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[1] See Bibliography (Chapter H).

6. **Characterization and Ranking of Local Authorities According to the Socio-Economic Level of the Population in 1999, Based on the 1995 Census of Population and Housing**, conducted by L. Burck and Y. Kababia in 1999, commissioned by the Ministry of the Interior and performed by the Central Bureau of Statistics. The project was the first part of the next study and focused only on local councils and municipalities.
7. **Characterization and Classification of Geographical Units by the Socio-Economic Level of the Population, Based on the 1995 Census of Population and Housing**, conducted by L. Burck and Y. Feinstein in 2000, commissioned by the Ministry of the Interior and performed by the Central Bureau of Statistics. The study included the previous project as well as some additional components, as follows: (a) an index for local councils and municipalities, (b) an index for regional councils, and (c) an index for statistical areas. This study has a unique contribution by relating to statistical areas, which are similar in size to neighbourhoods, within localities as well as to the locality as a whole.
8. **Characterization and Classification of Local Authorities by the Socio-Economic Level of the Population 1999**, conducted by L. Burck and N. Tsibel in 2003, commissioned by the Ministry of the Interior, and performed by the Central Bureau of Statistics. The project included: (a) a socio-economic index for local councils and municipalities, (b) a socio-economic index for regional councils, (c) a conversion table to link the clusters of regional councils to the clusters of local councils and municipalities, and (d) dispersion measures for regional councils.
9. **Characterization and Classification of Local Authorities by the Socio-Economic Level of the Population 2001**, conducted by L. Burck and N. Tsibel in 2004, commissioned by the Ministry of the Interior, and performed by the Central Bureau of Statistics. The project included: (a) a socio-economic index for local councils and municipalities, (b) a socio-economic index for regional councils, (c) a conversion table to link the clusters of regional councils to the clusters of local councils and municipalities, (d) dispersion measures for regional councils, and (e) an examination of the influence of the union of local authorities which became effective during 2003.
10. **Characterization and Classification of Local Authorities by the Socio-Economic Level of the Population 2003**, conducted by L. Burck and N. Tsibel in 2006, commissioned by the Ministry of the Interior, and performed by the Central Bureau of Statistics. The project included: (a) a socio-economic index for local councils and municipalities, (b) a socio-economic index for regional councils, (c) a conversion table to link the clusters of regional councils to the clusters of local councils and municipalities, and (d) dispersion measures for regional councils.
11. **Characterization and Classification of Local Authorities by the Socio-Economic Level of the Population 2006**, conducted by L. Burck and N. Tsibel in 2009, commissioned by the Ministry of the Interior, and performed by the Central Bureau of Statistics. The project included: (a) a socio-economic index for local

councils and municipalities, (b) a socio-economic index for regional councils, (c) a conversion table to link the clusters of regional councils to the clusters of local councils and municipalities, and (d) dispersion measures for regional councils.

12. **Characterization and Classification of Local Authorities by the Socio-Economic Level of the Population 2008**, conducted by L. Burck and N. Tsibel in 2013, commissioned by the Ministry of the Interior, and performed by the Central Bureau of Statistics. The research was based on data from the 2008 Population Census. The project included: (a) a socio-economic index for local authorities: municipalities, local councils and regional councils, (b) a socio-economic index for statistical areas within municipalities and local councils, and (c) dispersion measures for regional councils.
13. **Characterization and Classification of Geographical Units by the Socio-Economic Level of the Population 2013**, conducted by L. Burck and N. Tsibel in 2017. The project included: (a) a socio-economic index for local authorities: municipalities, local councils, and regional councils, and (b) a socio-economic index for localities within regional councils.
14. **Characterization and Classification of Geographical Units by the Socio-Economic Level of the Population 2015**, conducted by L. Burck and N. Tsibel in 2019. The project included: (a) a socio-economic index for local authorities: municipalities, local councils, and regional councils, and (b) a socio-economic index for localities within regional councils.
15. **Characterization and Classification of Statistical Areas Within Municipalities and Local Councils by the Socio-Economic Level of the Population 2015**, Media Release 2019. This project complements the project in number 14, and includes a socio-economic index for statistical areas within municipalities and local councils.

3. Goals and Applications of the Socio-Economic Index

Over the years, the use of socio-economic indices has contributed to the implementation of the differential policies of the central government relating to local authorities. In the past decade, Israel has undergone changes that require an updated socio-economic index that can contribute to the design of current policies of various ministries and other central government agencies, including various procedures of resource allocation to local authorities. The current publication includes three indices: a) index for local authorities (municipalities, local councils and regional councils); b) index for localities within the regional councils; and c) index for statistical areas within the municipalities and local councils.

The main applications of the products of this study are:

- **Applications by the Ministry of the Interior**

  Of all the government ministries, the Ministry of the Interior is the most important one for local authorities, because it is responsible for many matters, e.g., regular budgets, development budgets, personnel in local authorities, areas of jurisdiction, municipal-owned enterprises, organizational development, and physical planning. In each of these areas, the socio-economic characteristics of the population of the local authority, as well as the variability of the socio-economic index within the local authority, must be considered. It is also important to adapt the manner and extent of this consideration to the matter at hand.

  The subject of regular budgets includes a formula through which local authorities have been given "balancing allowances". During the 1990s, this formula was discussed by two separate committees appointed by the Ministers of the Interior at the time: first at the committee chaired by Prof. Yitzhak Soari (the Soari Committee Report) and later at the committee chaired by Mr. Yaacov Gadish.[2] In their reports, both of the committees advised using the socio-economic index as one of the components in the formula for the allocation of the regular allowance to the local authorities. As of the 2004 budget year, the Ministry of the Interior has been allocating the balancing allowance according to criteria determined by the Gadish Committee Report, applying the updated socio-economic indices presented here.

- **Additional Applications**

  (1) Other ministries dealing with socio-economic issues, such as the Ministry of Education, the Ministry of Construction and Housing, the Ministry of Social Affairs and Social Services, use the indices both at the local authority level and at a lower level for various purposes related to budget allocation (e.g., for the neighbourhood rehabilitation and renewal project).

  (2) The local authorities may use the socio-economic index in their on-going activities.

  (3) The socio-economic indices are used by the Israeli academic and research system (universities, colleges, research institutes, etc.), as a basis for further studies on different municipal issues.

  (4) Individuals and private entities are interested in the characteristics of the population within localities and various neighbourhoods, in order to estimate the attractiveness of the area in terms of residential environment and potential for investment.

[2] See Items 15 and 18 in the Bibliography (Chapter H).

B. Geographical Basis and Variables

1. General Definitions and Explanations

- **Locality –** A permanently inhabited place that meets the following criteria:

  a. It is usually inhabited by 40 or more adult residents;

  b. It has self-administration;

  c. It is not included within the municipal boundaries of another locality;

  d. Its establishment was approved by the planning institutions.

  Locality code – The locality coding system (a 4 digit-code assigned to each locality in Israel) was created in the 1950s by the Ministry of Interior and is maintained today by the Population and Immigration Authority, mainly to aid in the computerized operations of the Population Register system and in the recording of the addresses of the residents in Israel. The system is dynamic and is updated in coordination with the CBS.

  Changes in the localities – Each year, the list of localities of the CBS undergoes changes due to a number of reasons (in addition to the establishment of new localities):

  a. Merging of a number of small localities into one locality. For example, Bu'eine and Nujeidat were merged into one locality, Bu'eine-Nujeidat.

  b. Linkage of one or more small localities with a large locality. For example, Nahalat Yehuda was linked with Rishon Leziyyon, Moza Tahtit was linked with Jerusalem, and Zur Yig'al was linked with Kokhav Ya'ir.

  c. Splitting of localities. For example, Ilut was split from Nazareth; Isifya was split from Daliyat Al-Karmel; and Majd Al-Kurum, Deir Al-Asad, and Bi'ne were split from Shagor.

  d. Elimination of localities: localities that do not meet the definition of a locality, or localities that were eliminated according to government decisions. For example, since 2005, the Israeli localities that were located in Gaza and four more localities in Northern Samaria are no longer included in the list of localities due to the evacuation of those localities under the implementation of the Disengagement Law, 2005.

  The changes result from decisions approved by the Minister of Interior.

  Type of locality – Classification of the localities into urban and rural, in accordance with the number of residents in the locality. The type of locality is determined, as far as possible, according to the actual situation and according to

the following definitions. The localities are divided into two major groups: **urban** localities and **rural** localities. The distinction between them is based on the size of the locality.

a. **Urban localities** include all localities with 2,000 or more residents, and are classified by size groups.

b. **Rural localities** include all localities with fewer than 2,000 residents, and are sub-divided as follows:

Moshav – A rural locality organized as a cooperative society, which has the right to agricultural farm land (as defined by the Israel Land Administration). These localities consist of family units, each of which is an independent economic entity. Part of the production and economic administration is carried out by the cooperative association, the degree of cooperation being determined by the members.

Collective moshav – A rural collective locality where production and marketing are collective and consumption is private.

Kibbutz – A collective rural locality where production, marketing, and consumption are collective.

Institutional locality – An institution that has the characteristics of a locality and is not located within the municipal boundaries of another locality.

Communal locality – A locality organized as a cooperative society, which has no right to agricultural farm land, and where the extent of cooperative activities (production, consumption, municipal and social activities) is determined by the members.

Other rural locality – A locality with less than 2,000 residents, which is not included in any of the categories described above.

Living outside localities – Population groups living outside the boundaries of the recognized localities. In the places inhabited by this population, not all the definitions that characterize a locality (presented above) apply. Populations living outside localities also include the populations of places (see definition below), of Bedouin tribes, and the populations of prisons located outside the municipal area of the locality.

Place – A new area that has begun to be populated, but still does not meet the criteria for being defined as a locality, or an area that was once a locality and was removed from the list of localities.

Bedouin tribes – The Bedouin tribes are not included in the count of localities, although they are listed in the File of Localities published by the

CBS each year. The Bedouin tribe population is included in the summary tables of the population living outside localities.

- **Municipal status of localities –** in accordance with legislative and administrative regulations, local authorities are divided into three types:

  a. Municipality – Refers to one local authority only, which has received the status of a municipality.

  b. **Local council –** A local authority of one locality only, which has not received the status of a municipality.

  c. **Regional council –** Includes several rural localities. Sometimes, urban localities are also included, e.g., Qesaryya (included in the regional council Hof HaKarmel), Kefar Habad (included in the regional council Emek Lod). Some of these urban localities are later granted the status of a local council.

  Included in regional councils are localities which have a representative on the council, as well as localities that are within the municipal jurisdiction of the council but are not represented on it.

In addition to the above, there are localities **with no municipal status**, i. e., located in an area that does not belong to any municipal authority.

The **municipal status of a locality may change** over the years. A local council may receive the status of a municipality, a locality within a regional council may receive the status of a local council, and it is even possible for a locality to transfer from one regional council to another.

Changes in the list of regional councils over the years can occur due to the following reasons:

a. Merging of regional councils – For example, the regional council Lev HaSharon merged the former regional councils Hadar HaSharon and HaSharon HaTzefoni.

b. Elimination of regional councils – For example, the regional council Merkaz HaGalil was eliminated in 1990, and all of the localities in that regional council were granted the status of local councils. In 2008 the regional council Ef'al was eliminated, and all of the localities in that regional council were annexed to nearby localities.

c. Splitting of regional councils – For example, the regional council Nof HaGalil was split in 2000 into two regional councils: Bustan El-Marj and Al-Batof.

d. Creation of new regional councils – New regional councils are usually established in areas that had no municipal status. In some cases, localities within existing regional councils are transferred to the new regional councils. For example,

Jewish localities in the Golan Heights and the Judea and Samaria Area had no municipal status in the past. Later, they were ascribed to the new regional councils established in those regions.

2. Geographical Basis of the Study

The study includes **three separate analyses**:

a) for the local authorities overall: municipalities, local councils and regional councils;

b) for localities within regional councils;

c) for statistical areas within municipalities and local councils.

The following is a description of the geographical units (geographical basis) for all stages of the study.

2.1. Local Authorities

The basic units of analysis are municipalities, local councils, and regional councils.

The list of local authorities is according to their municipal status at the end of 2017, and includes **255 local authorities, of which 201 are municipalities and local councils, and 54 are regional councils**.

The calculation of the index includes most of the residents of the institutions. Excluded are nursing homes, penitentiary institutions, and similar.

We emphasize that the data used in the analysis are aggregative, and refer to the whole population of the local authority by means of proportions or averages. Consequently, the calculated index reflects the socio-economic level of the local authority as a whole, and does not reveal the variance within the authority.

2.2. Localities Within Regional Councils

Most of the localities within the regional councils are too small to allow for reliable estimates of socio-economic characteristics for each locality. Therefore, in the publications that preceded the 2013 socio-economic index, only dispersion measures that describe the differences between the localities within the regional councils were presented, and not the index values for each locality. Due to growing user demand and government requirements, methodological changes were made that enabled publication of the index values for localities within regional councils as well, beginning with the 2013 socio-economic index.

Table A presents the distribution of localities within the regional councils by population size. More than 32% of the localities number less than 500 residents and 73% of the localities number less than 1,000 residents.

Table A. Distribution of Localities within Regional Councils by Population Size, 2017

Number of residents	Number of localities	Percentage of localities	Cumulative percentage of localities
Up to 300	121	11.97	11.97
300–499	207	20.47	32.44
500–999	410	40.55	73.00
1,000 or more	273	27.00	100.00
Total	**1,011**	**100.00**	-

In the current study, the index was derived for **990 (of 1,011) localities within 54 regional councils.** Calculation of the index was based on the model used to calculate the index for the local authorities (see detailed explanation in Chapter E), in such a way that the index value for each locality does not depend on the total number of localities included in the calculation, nor on the data accuracy of other individual localities within the regional councils.

The index population did not include the residents of nursing homes, penitentiary institutions, and similar. The index was not calculated for certain types of institutional localities, localities with fewer than 120 residents (after deducting the residents of institutions), **and/or for localities with some variables missing**.

We emphasize that **the population living outside localities** (places or miscellaneous codes) **was not included in the processing for the localities within the regional councils, but was included in the processing for the local authorities**.

2.3. Statistical Areas Within Municipalities and Local Councils

Statistical area is a geographical unit, which is as small and homogeneous as possible to reflect the unique characteristics of areas within a locality. Localities with more than 10,000 residents are divided into statistical areas (continuous areal units), generally numbering 3,000-5,000 residents.

In the studies that preceded the 2015 socio-economic index, the indices for statistical areas within municipalities and local councils were calculated solely based on the population census data (1995 and 2008). The methodology of calculating these indices is described in the corresponding publications of the Central Bureau of Statistics.[3] In the periods between the population censuses the index at a level of statistical area was not calculated due to lack of socio-economic data at the required

[3] See Items 4 and 11 in the Bibliography (Chapter H).

level of detail. The reason for that is lack of anchoring[4] the population to statistical areas in Arab and Druze localities, since the administrative data sources do not contain residential addresses for these localities.

Starting with the 2015 socio-economic index, the methodology of calculating the index for statistical areas has been changed, so that it can be calculated for the **part of municipalities and local councils** where the anchoring of population to statistical areas exists.

The present study is based on the **Layer of Statistical Areas 2011**, which has been defined by GIS–Geography sector of the CBS according to the Population Census 2008 and updated in 2011 for statistical areas in East Jerusalem. This layer is updated each year in accordance with new construction added to existing statistical areas. **The list of main streets and neighbourhoods by statistical area** is presented in the publication of the Population Census 2008 on the website of the Central Bureau of Statistics.[5] The Conversion Key from statistical areas of 2008 to statistical areas of 2011 in East Jerusalem is presented in the publication: Socio-Economic Index 2008.

Table B presents the division of municipalities and local councils into statistical areas, and the status of anchoring the population. There are 117 municipalities and local councils divided into statistical areas, including 79 Jewish and mixed localities, and 38 Arab and Druze localities. Anchoring the population into statistical areas (linking the addresses to the space) exists for all the 79 Jewish and mixed localities and for only two of the Arab localities (Nazareth and Rahat). Therefore, the index was calculated for 1,629 statistical areas within 81 municipalities and local councils only.

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4 Anchoring is the linking of an alphanumeric record (data record consisting of letters and numbers) to a geographical (spatial) entity based on spatial identifiers. That is, associating an item to its exact location in the field using its characteristics. The characteristics must include at least one statistic about its location in the space, such as the address of the building, block and plot, locality symbol, street symbol and / or house number, etc.

5 See The 2008 Census of Population (in Hebrew) https://www.cbs.gov.il/he/subjects/Pages.2008-מפקד-האוכלוסין/aspx.

Table B. Division of Municipalities and Local Councils Into Statistical Areas, 2017

-	Number of localities divided into statistical areas	Number of localities where the population is anchored into statistical areas	Number of statistical areas for which the socio-economic index was calculated
Jewish and mixed localities	79	79	1,600
Arab and Druze localities	38	2	29
Total	**117**	**81**	**1,629**

Calculation of the index was based on the model used to calculate the index for the local authorities (see detailed explanation in Chapter F), in such a way that the index value for each statistical area does not depend on the total number of statistical areas included in the calculation, nor on the data accuracy of other individual statistical areas within the municipalities and local councils. Moreover, there was no need to combine the statistical areas with less than 2,000 residents as it was done in the calculation of the 2008 index.

The index population did not include the residents of nursing homes, penitentiary institutions, and similar. The index was not calculated for statistical areas with fewer than 120 residents (after deducting the residents of institutions), **and/or for statistical areas with some variables missing.**

3. Variables Included in the Calculation of the Index

3.1 Selection of Variables

The present index was based on the set of variables that were selected during the construction of the 2013 socio-economic index, when the transition was made from the population census data of 2008 to data based on administrative sources. The selection of variables was carried out in two stages. The first stage included preliminary sorting of a large number of variables relevant to the subject under study, based on the **database accessible from the administrative sources**. The second stage included elimination of variables based on various statistical criteria.

- **Preliminary Sorting**

  Preliminary sorting of the relevant variables was carried out in accordance with the following considerations:

  a. **Relevance to the population's socio-economic content area**.

b. **Availability of reliable data for all the geographical units** mentioned above. Availability of data for **all** the units is important for maintaining consistency between the various geographical units.

c. **Consistency with previous studies**. It is important to include the maximum number of variables which were used in previous studies, to enable comparisons over the years.

At this stage, consultations were held with officials at the Central Bureau of Statistics and outside the Bureau, and data were investigated from diverse fields such as demography, schooling and education, employment and benefits, and standard of living (financial income, motorization level, etc.).

- **Elimination of Variables (Descriptive Analysis)**

Descriptive analysis that was carried out for the original list of variables (a large number of variables) included statistics used to examine the distribution of each variable separately, from the following perspectives: (a) parameters of location; (b) parameters of dispersion; (c) symmetry of distribution; (d) evaluation of extreme cases. In addition, the correlation between each pair of variables was calculated. All this was done in order to reduce the number of variables, and to avoid including variables that had too much influence or those that were strongly correlated with each other. When the Pearson correlation between two variables exceeded 0.8, the possibility of not including one of the variables in the calculation of the index was considered. Variables reflecting different socio-economic phenomena were included in the calculations, even if they were strongly correlated with each other. When several variables reflected the same social phenomenon, preference was given to variables with symmetric distribution, high variance (i.e., considerable differences between the units under study), and smaller correlation with the other variables related to that phenomenon. In addition, variables were eliminated according to the **Kaiser's Measure** of Sampling Adequacy calculated both for the entire set of variables and for each variable separately. This measure is of multiple use. On one hand, it enables examining whether the variables belong to the same content area. On the other hand, it enables an examination of the contribution of a single variable to the group in which it is included. Regarding each group of experimental variables, the measure was always greater than 0.5, which indicates that the entire set of variables belong to the same content area (index values range from 0 to 1). Regarding each separate variable, an attempt was made to include those with measure values greater than 0.5. The final decision was based on the extent to which the variable contributed toward explaining the overall variance in the factor analysis, as well as on how the factors for other variables would be affected if that variable was not included.

The following is an example of this kind of analysis. The correlation coefficient between the "percentage of persons aged 0–17 in the total population of the local authority" and the "median age of the population of the local authority" (two

demographic variables related to the same phenomenon) was 0.94. According to the descriptive analysis of the two variables, the variable "median age of the population of the local authority" would be preferable, because of the symmetric distribution and the lack of extreme values. This variable was selected due to its relatively large contribution to explaining the general variance in the factor analysis.

The considerations that led to the final choice of the set of variables were as follows:

a. **Balanced coverage** of the characteristics related to the aspects that comprise the socio-economic level of the population.

b. **Degree of adequacy of the variables for factor analysis.** Inclusion of variables highly correlated with each other may artificially inflate the variance and influence or even change the relative weights of the variables. However, the variables should be sufficiently correlated with each other, in terms of belonging to the same content area.

c. A small number of factors must **account for a substantial amount of the variance** of the socio-economic variables for greater distinction between the units under study. The greater the amount of variance explained by the factors, the greater the distinction between the geographical units.

After all the stages of selection given in detail above, a list of **14 variables used in computation of the socio-economic index for each geographical unit** was formed. Some of the variables were direct alternatives to the variables from the 2008 Population Census that were included in the calculation of the 2008 index. Others were new variables. The data sources were: the Central Bureau of Statistics, the National Insurance Institute, the Ministry of Finance, the Ministry of Education, the Ministry of Transport and Road Safety, and the Population and Immigration Authority. It should be mentioned that the main goal was to attain an integration of the variables, and not to draw far-reaching conclusions related to the content area of one specific variable.

- **Changes in the Definitions of Variables**

During the construction of the 2017 socio-economic index presented in the current publication, it was decided to make changes in the ages of the reference population in the calculation of four variables, following the recommendations of the Steering Committee and after consultations with professionals.

The exact definitions of the variables are given in Section 3.2. The changes in the definitions are presented in **Table C**.

Table C. Changes in Definition of Variables Used to Calculate the Index, 2017

Variable	Reference population in 2013 and 2015 indices	Reference population in 2017 index
Percentage of academic degree holders	Of persons aged 25-54	Of persons aged 27-54
Percentage of wage and income earners	Of persons aged 15 and over	Of persons aged 25-54
Percentage of recipients of income support and income supplement to old-age pension	Of total population	Of persons aged 20 and over
Number of owned vehicles	Per 100 residents	Per 100 residents aged 17 and over

3.2 List of Variables

Demography

1. **Median age** – the value that one-half of the population of the geographical unit is aged above, and one-half is aged below, computed on the basis of individual ages.
   Source of data: **Central Bureau of Statistics – Population Estimates 2017.**
2. **Dependency ratio** – the ratio between persons aged 0–19 (young population) and 65+ (mature population), to those aged 20–64 (working-age population), multiplied by 100.
   Source of data: **Central Bureau of Statistics – Population Estimates 2017**.
3. **Percentage of families with 4 or more children –** percentage of families with four or more children out of the total number of families receiving child allowances in 2017.
   Source of data: **National Insurance Institute**.

Schooling and Education

4. **Average years of schooling, of persons aged 25–54 –** total years of schooling of persons aged 25–54, divided by the total population aged 25–54 (prime working ages). The calculation includes the number of years of study (according to diploma) in educational institutions at all levels (from primary school to academic education), in Israel and abroad.
   Source of data: **Central Bureau of Statistics – Education Register 2017**.
5. **Percentage of academic degree holders, of persons aged 27–54 –** percentage of persons holding a first, second or third academic degree out of

the population aged 27–54 (prime working ages, adjusted for the median age of receiving the first academic degree in the population).
Source of data: **Central Bureau of Statistics – Education Register 2017**.

Employment and Benefits

6. **Percentage of wage and income earners, of persons aged 25–54 –** percentage of persons with income from work as an employee and/or from self-employed work in 2017, out of the population aged 25–54 (prime working ages).
Source of data: **Ministry of Finance (Tax Authority)**.
7. **Percentage of women aged 25–54 with no income from work –** percentage of women aged 25–54 with no income from work as an employee and/or from self-employed work in 2017, out of all women aged 25–54 (prime working ages).
Source of data: **Ministry of Finance (Tax Authority).**
8. **Percentage of wage and income earners above twice the average wage –** percentage of earners of more than twice the average wage (for 2017: NIS 9,388 per month in a year)[6] from work as an employee and/or from self-employed work, out of total wage and income earners in 2017.
Source of data: **Ministry of Finance (Tax Authority)**.
9. **Percentage of sub-minimum wage earners –** percentage of earners of up to minimum wage (for 2017: NIS 5,025 per month of work)[6] from work as an employee and/or from self-employed work, out of total wage and income earners in 2017.
Source of data: **Ministry of Finance (Tax Authority)**.
10. **Percentage of recipients of income support and income supplement to old-age pension, of persons aged 20 and over –** percentage of recipients of income support benefit from the National Insurance Institute in 2017, including income supplement to the old-age pension, out of the population aged 20 and over (eligibility ages).
Sources of data: **National Insurance Institute and Ministry of Education**.

[6] See National Insurance Institute. (2019). *Wage and Income by Settlement and by Various Economic Variables 2017*. Periodical Surveys 309. Jerusalem: Author.

Standard of Living

11. **Average monthly income per capita –** total yearly income from employee work and/or self-employed work (based on Tax Authority data), as well as total benefits from the National Insurance Institute, income-support benefit from the Ministry of Religious Services (transferred by the Ministry of Education), and total payments to disabled IDF veterans and to bereaved families from the Ministry of Defense, in 2017, divided by 12 months and by the number of residents in the geographical unit.
    Sources of data: **Ministry of Finance (Tax Authority), National Insurance Institute, Ministry of Education, and Ministry of Defense.**

12. **Number of owned vehicles per 100 residents aged 17 and over –** total number of private vehicles and trucks up to 3.5 tons[7] in private ownership, and total imputed number of vehicles in use (based on Tax Authority data), in 2017, divided by the total population aged 17 and over (eligibility ages for obtaining a driving licence), multiplied by 100.
    Sources of data: **Ministry of Transport and Road Safety and Ministry of Finance (Tax Authority)**.

13. **Average vehicle licence fee (vehicle valuation) –** total fee paid for private vehicles and trucks up to 3.5 tons[7] in private ownership, and the imputed fee paid for vehicles in use (based on Tax Authority data), in 2017, divided by the number of vehicles.
    Sources of data: **Ministry of Finance, Ministry of Transport and Road Safety, and regulations of the Ministry of Justice**.

14. **Average number of days abroad –** total number of days spent abroad by persons aged 2 or over in 2017, divided by the total population aged two or over. The count of days abroad includes departures via air and/or sea for a period of three days to three months.
    Source of data: **Population and Immigration Authority**.

[7] See definitions in Central Bureau of Statistics. (2018). *Motor Vehicles 2017*. Pub. No. 1726. Jerusalem: Author.

C. Statistical Methodology

- The statistical technique used to calculate the socio-economic index for **local authorities** was **factor analysis**. The **value of the index** is a continuous value computed as a weighted sum of the standardized values of the selected variables. The weights were obtained from the factor analysis model as described below. The value of the index was standardized, so that the average value of the index for all the local authorities is zero, and the value of the index for each local authority is the distance from the national average in units of standard deviation.

  According to their index values, the **local authorities were allocated to 10 homogeneous groups** (clusters**)** which were not equal in size, using **cluster analysis.**

- The values of the socio-economic index for **localities within regional councils** and for **statistical areas within municipalities and local councils** were calculated by using the weights obtained for the local authorities. These weights were multiplied by the standardized values of the variables for the localities and for the statistical areas, where the standardization was carried out by using the mean and the standard deviation of the variables for the local authorities (i.e, the nationwide mean and standard deviation).

  The **allocation** of the localities within regional councils and of the statistical areas within municipalities and local councils **to the 10 clusters of the local authorities** was carried out on the basis of the index value of each locality and of each statistical area separately, according to the range of the index values of the local authorities in each cluster.

  As a result, **the index values and clusters computed for the localities within regional councils and for the statistical areas within municipalities and local councils are comparable to the index values and clusters derived for the local authorities.**

The following is a detailed review of factor analysis and cluster analysis methods, together with a description of the way they were applied.

1. Factor Analysis

Factor Analysis[8] is a group of statistical techniques aimed to express a large number of variables on the basis of a smaller number of factors and thus to characterize the units of analysis (in our case, local authority) in a synthesized way that can be conveniently used.

[8] See Item 16 in the Bibliography (Chapter H).

Factors are essentially new variables, calculated as linear combinations (weighted averages) of the original standardized variables (i.e., each variable has a mean of 0 and a variance of 1). The need to standardize variables stems from the differences in the measuring units: the value of a variable can be expressed as a number, quotient or percent, and can be measured for example, by NIS or by years of schooling. Standardization makes it possible to convert the variables into a uniform scale ("standardized value" in Table 1) and furthermore to combine them into one synthetic score. The weights of the original standardized variables are determined mathematically so as to attain maximum distinction between the geographical units, subject to some normalization restrictions. For *p* variables, there exist *p* factors that can explain all of the variance of these variables. Since the variables are standardized, the total variance of the original variables is equal to the number of variables.

The factors are determined sequentially one after another, so that the first factor is the linear combination that accounts for a maximum amount of the variance of the variables. Hence, the first factor has a maximum power of discrimination between the geographical units. The second factor accounts for a maximum amount of the variance not accounted for by the first factor, etc. The next step is to find the minimal number of factors that explain a considerable amount of the variance. The optimal number of factors is determined by statistical testing that examines the amount of information added by a factor versus increasing the number of factors. The addition of an extra factor, beyond the optimal number, increases the dimension that the index is based on, while its contribution to explaining the variance is negligible.

The factors described above define an orthogonal set of axes in the multidimensional variable space (since each factor is a linear combination of the original variables, and the factors are orthogonal). This type of factor analysis is called **principal components analysis**.

In the study and interpretation of the derived factors, an important concept is that of **factor loadings**. These are the correlation coefficients between the original variables and the factor. Their size is a measure of the relative importance of each variable in differentiating between the geographical units. In particular, if a variable has a low loading on all factors, this is an indication that it can be removed from the analysis. It should be mentioned that for the sake of convenience, some of the original variables were multiplied by (–1), in order to obtain positive correlation coefficients, so that a higher standardized value would signify a higher socio-economic level (see note to Table 1).

Various options are available in factor analysis, including a rotation of axes (factors) with the aim of strengthening the relationship between each variable and one factor only, while weakening the relationship between the same variable and the rest of the factors. In that way, it is often possible to reach a situation where each factor is significantly associated with a well-defined set of variables that belong to a specific domain, such as level of education or standard of living. It is important to bear in

mind, in the attempt to interpret the meaning of the different factors, that specific interpretation is one of many possible explanations that may be obtained in another rotation.

After the rotation, the first factor is no longer the linear combination having a maximum variance. Moreover, in a non-orthogonal rotation, the overall variance explained by the variables is reduced. In the present study, the orthogonal rotation was used (the same total amount of variance explained as before the rotation), which may cause some loss in the explanatory power of the first factor.

The **index value,** which expresses the socio-economic level of the local authority, was calculated as a weighted average of the factors, where the weighting was based on the percentage of variance explained by each factor.

2. Cluster Analysis

Cluster analysis is a technique for allocating items (such as the local authorities) to groups or clusters that are as homogeneous as possible with respect to a set of variables. For a given number of clusters, the variance within clusters is minimized and the variance between clusters is maximized, i.e. two items belonging to the same cluster are similar to each other, and two items belonging to different clusters are different from each other. Allocation is based on a measure of distance (similarity) between clusters. The current analysis used only one variable, the socio-economic index value, and the distance between two clusters was calculated on the basis of Ward's distance.

D. Findings for Local Authorities: Municipalities, Local Councils, and Regional Councils

1. Results of Factor Analysis

The factor analysis yielded three factors. The three factors used to calculate the index explained approximately 87% of all of the information contained in the original set of variables. This amount (total variance) is equal to the number of variables, i.e.,14. The first factor accounted for 40% of the variance, and this percentage of the explained variance decreased as a result of rotation (it was 61% before the rotation).

Table D presents the variance, the percentage of variance, and the cumulative percentage of variance explained by each of the factors.

Table D. Variance and Percentage of Variance Explained by the First Three Factors in the Model of the Socio-Economic Index for Local Authorities

Factor	Variance Explained	Percentage of Variance Explained	Cumulative Percentage of Variance Explained
1	5.61	40.07	40.07
2	3.46	24.71	64.78
3	3.10	22.14	86.92
Total	**12.17**	**86.92**	-

Table E presents the correlation coefficients between the factors and the variables included in the model of the socio-economic index. The variables are arranged according to the size of their correlation coefficient with each one of the factors, so that the first set of variables (8 variables) has the highest correlation with the first factor, the second set (3 variables) has the highest correlation with the second factor, and the last set (3 variables) has the highest correlation with the third factor. The set of variables strongly correlated with the first factor (0.66–0.93) reflect the level of employment, education and income. The set of variables strongly correlated with the second factor (0.66–0.92) reflect standard of living. The variables "average vehicle licence fee" and "average number of days abroad" have the highest correlations with the second factor. The set of variables strongly correlated with the third factor (0.81–0.94) reflect the demographic situation.

The last column in **Table E** presents the final communality estimates for the variables used in the model of the socio-economic index. These estimates reflect the correlation between the variable and the index calculated. It should be mentioned that the sum of the communality estimates is equal to the total variance explained by the factors, as presented in Table D. The variables included in the model have final

communality estimates over 0.65. The communality estimate of the variable "average monthly income per capita" is the highest (0.96).

It should be noted again that the socio-economic index value of each local authority was calculated as the weighted mean of the three factors described above, where the weighting was carried out according to the percentage of variance explained by each factor.

Table E. Correlation Coefficients Between Variables and Factors, and Final Communality Estimates of Variables in the Model of the Socio-Economic Index for Local Authorities

Variable	Factor 1	Factor 2	Factor 3	Final Communality Estimate
Percentage of women aged 25–54 with no income from work	0.93	-0.09	0.22	0.92
Average years of schooling, of aged 25–54	0.88	0.36	0.07	0.91
Percentage of wage and income earners, of aged 25-54	0.88	-0.05	0.39	0.92
Percentage of academic degree holders, of aged 27–54	0.80	0.51	0.06	0.89
Percentage of wage and income earners – below the minimum wage	0.74	0.37	0.40	0.84
Percentage of recipients of income support and income supplement to old-age pension of aged 20 and over	0.73	0.34	-0.06	0.65
Percentage of wage and income earners – above twice the average wage	0.68	0.67	0.16	0.93
Average monthly income per capita	0.66	0.62	0.37	0.96
Average vehicle licence fee	-0.08	0.92	0.09	0.86
Average number of days abroad	0.52	0.75	0.24	0.89
Number of owned vehicles per 100 residents aged 17 and over	0.42	0.66	0.33	0.71
Dependency ratio	0.02	0.03	0.94	0.88
Percentage of families with 4 or more children	0.16	0.24	0.93	0.94
Median age	0.35	0.28	0.81	0.85

Note: Loadings greater than 0.5 are shaded in grey.

The values of the socio-economic index are standardized so that the mean of index values of the local authorities is zero, and the index value of each local authority is the distance from the nationwide mean measured in the units of standard deviation. For example, the socio-economic level of the population of an authority that received an index value -1.000 is one standard deviation lower than the mean. A positive index value indicates that the socio-economic level of the population of an authority is greater than the mean, and the highest value indicates the highest socio-economic value.

The index values of the local authorities in 2017 range from -2.815 for the regional council Neve Midbar to 2.320 for Savion. The index value is negative (under the mean) for 126 local authorities inhabited by 46% of the total population. The index value is positive (above the mean) for 129 local authorities inhabited by 54% of the total population.

Table F presents the weights of the variables obtained from the model of socio-economic index for local authorities for 2017 data.

Table F. Weights of Variables in the Model of the Socio-Economic Index for Local Authorities

Variable	Weight
Percentage of wage and income earners – below the minimum wage	8.82
Average monthly income per capita	8.73
Percentage of wage and income earners, of aged 25–54	8.70
Average years of schooling, of aged 25–54	8.42
Percentage of women aged 25–54 with no income from work	8.21
Percentage of academic degree holders, of aged 27–54	8.08
Percentage of wage and income earners – above twice the average wage	8.06
Average number of days abroad	7.36
Median age	7.29
Number of owned vehicles per 100 residents aged 17 and over	6.69
Percentage of recipients of income support and income supplement to old-age pension of aged 20 and over	6.51
Percentage of families with 4 or more children	6.21
Dependency ratio	4.59
Average vehicle licence fee	2.35
Total	**100.00**

Based on their index values, the local authorities were allocated to 10 homogeneous groups (clusters) which were not equal in size. The allocation was produced by means of cluster analysis (see Chapter C, Section 2), so that the variance of the index values within clusters would be minimal, and the variance of the index values between clusters would be maximal. Cluster 1 indicates the lowest socio-economic level, and Cluster 10 indicates the highest socio-economic level.

Table G presents the number of local authorities and the index population size in each cluster.

Table G. Number of Local Authorities and Population Size in Each Cluster, 2017

Cluster	Number of local authorities	Total population	Percentage of population
1	11	310,971	3.58
2	25	643,200	7.40
3	44	1,632,544	18.78
4	32	846,251	9.74
5	29	947,367	10.90
6	23	755,770	8.70
7	40	1,786,078	20.55
8	21	1,174,625	13.51
9	26	575,308	6.62
10	4	19,693	0.23
Total	**255**	**8,691,807**	**100.00**

2. Description of Tables, Diagrams and Maps

Table 1 presents the 255 local authorities, which include 201 municipalities and local councils and 54 regional councils, in alphabetical order of the Hebrew names of the local authorities, along with the values of the 2017 socio-economic index, ranks (1 to 255) and clusters (1 to 10). In addition, the values of the 14 original variables are presented for each local authority, along with their standardized values and ranks. Two additional values, calculated for the local authorities overall, are presented for each variable: a simple average in which each local authority was given the same weight, and a nationwide value calculated for the total population of the local authorities. The values of the variables and their standardized values are not presented for local authorities with less than 2,000 residents.

Table 2 presents the 255 local authorities in ascending order of values of the 2017 socio-economic index, with ranks and clusters. The code of the district and the index population size are presented as well. Among the largest cities, with over 200,000 residents, Jerusalem is in cluster 3, Tel Aviv-Yafo in cluster 8, Haifa, Rishon LeZiyyon, and Petah Tiqwa in cluster 7, Netanya in cluster 6, Be'er Sheva in cluster 5, and Ashdod in cluster 4. In addition, the changes in ranks and in cluster allocations compared to the previous index are presented.

Table 3 presents the means of the 14 original variables in every cluster, and the variable values calculated for the local authorities overall: a mean value in which each local authority is given the same weight, and a nationwide value calculated for the total population of the local authorities. This table reveals the changes in the means of the variables across the clusters, as well as the gaps between the low and high clusters. The local authorities in cluster 10 (the highest socio-economic level) are characterized by a high level of average income per capita (the mean value is 5.7 times greater than the mean value in cluster 1), by a high average number of days abroad (the mean value is 18.5 times greater than the mean value in cluster 1), by a high percentage of academic degree holders (the mean value is 6 times greater than the mean value in cluster 1), by a high median age (a mean value of 37.75 compared to a mean value 15.45 in cluster 1), and by a low dependency ratio (a mean value of 94.72 compared to a mean value of 161.25 in cluster 1).

Table 4 presents the minimum and the maximum index values, as well as the standard deviation of the index values in each cluster. These data reflect the variability of the socio-economic index values of local authorities within each cluster.

Table 5 presents the distribution of local authorities by clusters and by six population size categories.

- 36.4% of all the local authorities are allocated to the three lowest clusters, 1 to 3. Most of these local authorities (69 out of 80) are characterized by a population size below 40,000.
- Most of the local authorities with over 90,000 residents (14 out of 19) are classified in the middle to high clusters, 5 to 8.

Table 6 presents the distribution of local authorities by cluster and district.

- In the Northern District, 60 out of the 93 local authorities are allocated to the low to middle clusters, 2 to 4. Most of these local authorities are Arab and Druze authorities, and they also constitute the majority of Arab and Druze authorities in the Northern District (52 out of 57).
- The Haifa District consists of 11 Arab and Druze local authorities and 19 Jewish and mixed local authorities. All the Arab and Druze authorities are allocated to the low to middle clusters, 2 to 4, whereas most of the Jewish and mixed authorities (18 out of 19) are allocated to the middle to high clusters, 5 to 9.
- The Central District consists of seven Arab and Druze local authorities and 45 Jewish and mixed local authorities. All the Arab and Druze authorities are

allocated to the low to middle clusters, 3 and 4, whereas most of the Jewish and mixed authorities (34 out of 45) are allocated to the high clusters, 7 to 9.

- In the Tel Aviv District, the absence of local authorities in clusters 1 to 4 is noteworthy (with the exception of Bene Beraq).
- The Southern District includes nine Arab and Druze local authorities. All these authorities are classified in cluster 1. Among the 30 Jewish authorities, 26 are classified in clusters 3 to 7, and four are classified in clusters 8 to 10: the regional council Yo'av and the three suburbs of Be'er Sheva – Metar, Omer and Lehavim.

Diagram 1 presents the distribution of population of the local authorities by cluster. Clusters 7 and 3 are the largest in terms of population size: 1.8 and 1.6 million residents, respectively (21% and 19% of the total population in the local authorities). Clusters 8 and 5 include 14% and 11% of the total population, respectively.

Diagram 2 presents the distribution of the number of local authorities by cluster. Clusters 3 and 7 include the highest number of local authorities, 44 and 40 respectively.

Diagram 3 displays the local authorities whose cluster changed, compared to the 2015 classification. Out of the 255 local authorities, 187 (73%) remained in the same cluster, 11 authorities moved down one cluster, 56 authorities moved up one cluster, and one authority (Harish) moved up two clusters. Among the local authorities that moved up one cluster, 20 moved from cluster 8 to cluster 9, 17 moved from cluster 2 to cluster 3, and eight moved from cluster 3 to cluster 4.

The **attached map** illustrates the distribution of local authorities by socio-economic cluster of their population. The 10 clusters were combined into five groups, consisting of two clusters each, solely due to technical constraints, and this does not indicate homogeneity within the groups.
Each local authority is represented by a square. The size of the square represents the population size, according to three size groups: a) up to 9,999 residents; b) from 10,000 to 99,999 residents; c) 100,000 residents or more.

E. Findings for Localities Within Regional Councils

1. Method of Calculating the Index for Localities Within Regional Councils

The socio-economic index for the population of localities within regional councils is based on the same 14 variables that were used to derive the socio-economic index for the population of local authorities.

The **index value** of a locality within a regional council is a continuous value computed as a weighted sum of the standardized values of the variables, where the standardization was carried out by using the mean and the standard deviation of the variables of the local authorities. The weighting was carried out **by using the weights obtained for the local authorities**, see Table F.

The **allocation of the localities to the 10 clusters of the local authorities** was carried out on the basis of the index value of each locality separately and according to the range of the index values of the local authorities in each cluster.

As a result, **the index values and clusters computed for the localities within regional councils are comparable to those derived for the local authorities.** Notably, the index value and the cluster obtained for a locality within a regional council do not depend on the other localities in regional councils included in this analysis.

The analysis was carried out for 990 (of 1,011) localities within 54 regional councils. The index was not calculated for certain types of institutional localities, localities with less than 120 residents (after deducting the residents of institutions), and/or for localities with some variables missing.

2. Description of Tables and Diagrams

Table 7 presents 990 localities within the regional councils for which the socio-economic index 2017 was calculated, in ascending order of the index values, along with ranks (1 to 990) and clusters (1 to 10). In addition, the clusters of the regional councils are presented, as well as the changes in cluster allocation compared to the previous index.

Table 8 presents the 990 localities, along with index values, ranks, and clusters, in alphabetical order of the Hebrew names of the localities. In addition, the clusters of the regional councils are presented, as well as the changes in cluster allocation compared to the previous index.

Table 9 presents the 990 localities, along with index values, ranks, and clusters, in alphabetical order of the Hebrew names of the regional councils, and within each regional council by ascending index values. In addition, the clusters of the regional councils are presented, as well as the changes in cluster allocation compared to the previous index.

Table 10 presents a list of the 21 localities within the regional councils for which the index was not calculated due to the reasons described in Section 1 above. This list does not include places or miscellaneous codes.

Diagrams 4 and 5 present the distribution of the population and of the number of localities within the regional councils by cluster, respectively. Clusters 7 and 9 contain the largest number of localities (251 and 200, respectively), and include 198,960 and 192,210 residents, respectively (together, these clusters include 44% of the total population of localities within the regional councils for which the index was calculated).

Table 11 presents two dispersion measures for each regional council: **(a) the standard deviation** of the index values of the localities weighted by the size of population; and **(b) the interquartile range** of the index values of the localities weighted by the size of the population. The first measure is not a robust estimate of the dispersion, because it is sensitive to extreme observations. The second measure is defined as the distance between the first and third quartile, and it is not affected by the extreme values. Therefore, it is a more robust estimate. To enable a comparison between the two measures, an adjusted interquartile range was computed. The **adjusted interquartile range** is the interquartile range that would have been obtained if the distribution were normal with the given variance. Note that for the standard normal distribution, the interquartile range is between -0.674 and 0.674, i.e., it is equal to 1.35, whereas the standard deviation is equal to 1. Thus, in order to obtain the interquartile range adjusted to the normal distribution, the standard deviation should be multiplied by 1.35.

Diagram 6 presents a comparison between the rankings of regional councils by the two dispersion measures, namely, ranking by the weighted standard deviation, and ranking by the weighted interquartile range. Note that the adjusted interquartile range retains the ranking by the weighted standard deviation. There are regional councils such as Gan Rawe, which were ranked relatively high by the weighted standard deviation but were ranked low by the weighted interquartile range. In contrast, there are regional councils such as Ramat Negev, that were ranked low by the weighted standard deviation but were ranked relatively high by the weighted interquartile range. The regional councils with the highest dispersion of the socio-economic index values by both measures are Zevulun and Misgav.

Diagram 7 presents the weighted interquartile range, the weighted median, and the number of localities included in the index calculation within each regional council, in ascending order of the weighted median.

F. Findings for Statistical Areas Within Municipalities and Local Councils

1. Method of Calculating the Index for Statistical Areas

Starting with the socio-economic index 2015, the computation of the index values for statistical areas within municipalities and local councils and their allocation to clusters are carried out by the same methodology that is used for localities within the regional councils.

The **index value** of a statistical area within a municipality or a local council is a continuous value computed as a weighted sum of the standardized values of the 14 variables, where the standardization was carried out by using the mean and the standard deviation of the variables of the local authorities. The weighting was carried out **by using the weights obtained for the local authorities**, see Table F. The **allocation of the statistical areas to the 10 clusters of the local authorities** was carried out on the basis of the index value of each statistical area separately and according to the range of the index values of the local authorities in each cluster.

As a result, **the index values and clusters computed for the statistical areas within municipalities and local councils are comparable to those derived for the local authorities and for the localities within regional councils.** Notably, the index value and the cluster obtained for a statistical area within a municipality or a local council do not depend on the other statistical areas in municipalities and local councils included in this analysis. Moreover, **they are not affected by the lack of the index at the level of a statistical area in the authorities where the population is not anchored to statistical areas.**

This methodology is different from the methodology used to derive the 2008 index for statistical areas. Therefore, **the allocation of statistical areas to 20 clusters in the 2008 index cannot be compared to the allocation to 10 clusters starting with the 2015 index**.

The analysis was carried out for 1,629 statistical areas within 81 municipalities and local councils where the population is anchored to statistical areas in 2017. The index was not calculated for statistical areas with less than 120 residents (after deducting the residents of institutions), and/or for statistical areas with some variables missing.

2. Description of Tables, Diagrams and Maps

Table 12 presents 1,629 statistical areas within 81 municipalities and local councils for which the socio-economic index 2017 was calculated, in alphabetical order of the Hebrew names of the localities, and within each locality – by ascending codes of statistical areas. The table presents the index values of the statistical areas, ranks (1 to 1629) and clusters (1 to 10), as well as the values of the 14 original variables, their standardized values (based on the mean and the standard deviation of the variables

of the local authorities) and ranks (1 to 1629). In addition, the nationwide value calculated for the total population of the local authorities is presented for each variable. The values of the variables and their standardized values are not presented for statistical areas with less than 2,000 residents.

Table 13 presents the 1,629 statistical areas, their index values, ranks, and clusters, in alphabetical order of the Hebrew names of the localities, and within each locality – in ascending order of the index values. In addition, the clusters of the localities are presented, as well as the changes in cluster allocation compared with the previous index.

Table 14 presents two dispersion measures for each of the 81 municipalities and local councils: **(a) the standard deviation** of the index values of the statistical areas weighted by the size of population; and **(b) the interquartile range** of the index values of the statistical areas weighted by the size of the population. The first measure is not a robust estimate of the dispersion, because it is sensitive to extreme observations. The second measure is defined as the distance between the first and third quartile, and it is not affected by the extreme values. Therefore, it is a more robust estimate. To enable a comparison between the two measures, an adjusted interquartile range was computed. The **adjusted interquartile range** is the interquartile range that would have been obtained if the distribution were normal with the given variance. Note that for the standard normal distribution, the interquartile range is between -0.674 and 0.674, i.e., it is equal to 1.35, whereas the standard deviation is equal to 1. Thus, in order to obtain the interquartile range adjusted to the normal distribution, the standard deviation should be multiplied by 1.35.

Diagram 8 presents a comparison between the rankings of municipalities and local councils with 30,000 residents or more, by the two dispersion measures, namely, ranking by the weighted standard deviation, and ranking by the weighted interquartile range. Note that the adjusted interquartile range retains the ranking by the weighted standard deviation. There are localities such as Akko, which were ranked relatively high by the weighted standard deviation but were ranked low by the weighted interquartile range. In contrast, there are localities such as Elat, that were ranked low by the weighted standard deviation but were ranked relatively high by the weighted interquartile range. The localities with the highest dispersion of the socio-economic index values by both measures are Jerusalem, Bet Shemesh and Haifa.

Diagram 9 presents the weighted interquartile range, the weighted median, and the number of statistical areas included in the index calculation within each municipality and local council with 30,000 residents or more. The localities are presented in ascending order of the weighted median.

The **attached maps** for the three major cities – **Jerusalem, Tel Aviv-Yafo and Haifa** – illustrate the distribution of statistical areas by socio-economic cluster of the population in each city.

Note the lack of statistical areas allocated to clusters 1 and 2 in Tel Aviv-Yafo (only one statistical area in cluster 1), and the few statistical areas allocated to cluster 1 in

Haifa (three statistical areas only). Statistical areas from the two highest clusters are concentrated in the northern parts of Tel Aviv-Yafo and in the high-elevation areas in Haifa.

In Jerusalem, note the lack of statistical areas allocated to cluster 10 and the many statistical areas allocated to cluster 1.

G. Evaluation of the Socio-Economic Index

The key question addressed here is whether the socio-economic index derived in this study reflects the true and updated socio-economic level of the population in a geographical unit in 2017.

First, let us mention the limitations of the present study:

a. There were multiple data sources: The Central Bureau of Statistics, the National Insurance Institute, the Ministry of Finance, the Ministry of Defense, the Ministry of Education, the Ministry of Transport and Road Safety, and the Population and Immigration Authority. These administrative databases serve the needs and purposes of the institutions that hold the data, but do not necessarily serve statistical needs. As a result, the quality and accuracy of these data as well as the quality of the analyses presented here are subject to certain limitations that do not exist when using a single, comprehensive, and reliable source of data such as the population census.

b. In several areas, no reliable data were available, for example, data on real estate value and living conditions, as well as data on the combination of education with employment (e.g., the percentage of academic professionals or managers). Moreover, data at the household level were not available – as opposed to a broad range of updated Population Census data on demographic, and socio-economic characteristics of individuals and households at a given point in time.

In addition, the present analysis is subject to the basic constraints inherent in any attempt to reduce a vast set of multidimensional data on complex socio-economic phenomena relating to a heterogeneous population of geographical units to a one-dimensional ranking.

Notwithstanding the above-mentioned limitations, it is worthwhile to highlight **the advantages of the current analysis and the improvements made, compared with previous studies**:

1. The present study was based on the variables from the same socio-economic content area, and employed the same statistical methodology used to derive the previous socio-economic indices that reflected the data from 1995 to 2015. Retention of the same content area of variables and the same types of data analysis enables, **to some extent**, a comparison with previous studies. Therefore, it is possible to observe the following changes over time: (a) changes in the values of variables for the geographical units, (b) changes in the correlation coefficients between the variables and the factors, and (c) changes in the ranking and clusters of the geographical units. It is important to emphasize that a **change in the rank and/or cluster reflects the relative change in a given geographical unit compared to all of the geographical units in the country, and not necessarily the change in the socio-economic data of the geographical unit itself**.

2. There are **advantages to using an administrative database** as opposed to using Population Census data:
   a. The data relate to all residents of the country, so that there is no need for a census sample and data collection from the field. This prevents sampling errors (variance and nonresponse), as well as non-sampling errors (respondent errors and mistakes in filling out the questionnaires).
   b. The data are available each year with a delay of two years, whereas the census data are available only once in a decade.
   c. Some data are difficult to collect directly from the population such as income, unemployment and other sensitive data.
3. The Ministry of Finance provided data on the income of employees and self-employed persons. The National Insurance Institute provided data on benefits, and the Ministry of Defense provided data on payments. Therefore, the income estimates include income from work as well as income from sources other than work, and reflect aspects of economic distress such as reliance on income support benefits and unemployment compensation.
4. In the computation of the number of vehicles in previous indices based on the administrative databases (2006 and earlier indices), the total number of privately owned private vehicles and light trucks were counted. Starting with the 2013 index, for each geographic unit the number of vehicles in use was imputed according to the Tax Authority data as well, in order to reflect the usage of vehicles that are not privately owned.
5. In order to assess the value of the vehicles, the average vehicle licence fee was computed – the total fee paid for privately owned private vehicles and trucks up to 3.5 tons plus the imputed fees paid for vehicles in use (according to the Tax Authority data), divided by the number of vehicles. This assessment is based on the regulations of the Ministry of Justice[9], in which the license fee for vehicles is determined by the value of the vehicle at the time of registration (fee category) and the year of production or year of registration. Imputation of the licence fee for vehicles in use was based on the distribution of leasing vehicles by fee category and on the fee for vehicles manufactured or registered in the last three years.
6. In order to best reflect the standard of living of the population in the modern world, the average number of days abroad was calculated. The number of days abroad was counted for persons aged two and over who departed via air and/or sea for a period of three days to three months.
7. In the computation of the 2017 index, the definitions of the reference population's ages were improved for four variables. The variable "percentage of

[9] See: Ministry of Justice, Regulation file no. 7776, 11.2.2017 (in Hebrew) https://www.nevo.co.il/law_word/law06/tak-7776.pdf

wage and income earners” was calculated for persons aged 25-54, similar to the variables in the field of education and in the field of employment: “average years of schooling” and “percentage of women with no income from work. This age range was defined by the Labour and Wages Unit as the main employment age group. In the computation of the variable “percentage of academic degree holders,” the age group was changed to 27-54, in order to take into account the median age of attaining an academic degree in the population. The “percentage of recipients of income support and income supplement” was calculated for persons aged 20 and over, which reflects the eligibility ages for these benefits. The “number of owned vehicles” was calculated for persons aged 17 and over, which reflects the eligibility ages for obtaining a driving licence.

8. Starting from the socio-economic index 2013, the index was published for localities within regional councils. This index was calculated using the weights obtained from the model for the local authorities. The allocation of the localities to the 10 clusters of the local authorities was carried out according to the index value of each locality separately and to the range of index values of the local authorities in each cluster. As a result, the index values and clusters of localities within regional councils are comparable to the index values and clusters of the local authorities. In addition, the index value and the cluster of a locality in a regional council do not depend on the other localities in the regional councils included in this processing.
9. Starting from the socio-economic index 2015, the index based on the administrative data was published for statistical areas within municipalities and local councils – for the localities where the population was anchored to statistical areas. This index was calculated using the weights obtained from the model for the local authorities. The allocation of the statistical areas to the 10 clusters of the local authorities was carried out according to the index value of each statistical area separately and to the range of index values of the local authorities in each cluster. As a result, the index values and clusters of statistical areas within municipalities and local councils are comparable to the index values and clusters of the local authorities. In addition, the index value and the cluster of a statistical area in a municipality or a local council do not depend on the other statistical areas in the municipalities and local councils included in this processing.

The same set of variables was used for the index calculation in the current and the previous study (the 2015 index), with the slight modifications described above. Therefore it is possible to compare the models used to derive the socio-economic index based on data from different time periods. **Table H** presents the correlation coefficients between the variables and the factors obtained in the two models of the socio-economic index for local authorities: the model based on administrative data 2017, and the model based on administrative data 2015.

Table H. Correlation Coefficients Between Variables and Factors in the Models of the Socio-Economic Index for Local Authorities, Based on the 2017 Administrative Database and on the 2015 Administrative Database

Variable	Factor 1 (2017)	Factor 2 (2017)	Factor 3 (2017)	Factor 1 (2015)	Factor 2 (2015)	Factor 3 (2015)
Percentage of women aged 25–54 with no income from work	0.93	-0.09	0.22	0.88	0.05	0.32
Average years of schooling, of aged 25–54	0.88	0.36	0.07	0.82	0.45	0.13
Percentage of wage and income earners ,of aged 25–54	0.88	-0.05	0.39	0.87	0.07	0.34
Percentage of academic degree holders, of aged 27–54	0.80	0.51	0.06	0.68	0.63	0.14
Percentage of wage and income earners – below the minimum wage	0.74	0.37	0.40	0.64	0.49	0.43
Percentage of recipients of income support and income supplement to old-age pension of aged 20 and over	0.73	0.34	-0.06	0.72	0.40	-0.17
Percentage of wage and income earners – above twice the average wage	0.68	0.67	0.16	0.58	0.75	0.20
Average monthly income per capita	0.66	0.62	0.37	0.55	0.70	0.42
Average vehicle licence fee	-0.08	0.92	0.09	-0.02	0.93	0.09
Average number of days abroad	0.52	0.75	0.24	0.41	0.81	0.27
Number of owned vehicles per 100 residents aged 17 and over	0.42	0.66	0.33	0.39	0.63	0.54
Dependency ratio	0.02	0.03	0.94	0.10	0.01	0.94
Percentage of families with 4 or more children	0.16	0.24	0.93	0.16	0.23	0.93
Median age	0.35	0.28	0.81	0.32	0.24	0.87

Notes
1) Loadings greater than 0.5 are shaded in grey.
2) Names of the variables where the ages of the reference population were changed, are shaded in grey.

Table I presents the changes in the classification of the local authorities into clusters according to the 2017 index values as opposed to the 2015 index. Note that the classification of a local authority into a cluster is not absolute. Rather, it is relative to the other local authorities. Moreover, the distribution of the local authorities between clusters varies.

Table I. Changes in the Distribution of the Local Authorities by Socio-Economic Cluster, 2017 Compared to 2015

Cluster	Number of local authorities 2015	Moved down one cluster	Remained in the same cluster	Moved up one cluster	Moved up two clusters (Harish)	Number of local authorities 2017
1	11	0	11	0	0	11
2	42	0	25	17	1	25
3	36	0	27	8	0	44
4	19	0	17	2	0	32
5	31	7	22	2	0	29
6	29	4	21	4	0	23
7	37	0	36	1	0	40
8	40	0	29	20	0	21
9	8	0	6	2	0	26
10	2	0	2	0	0	4
Total	**255**	**11**	**187**	**56**	**1**	**4**

In conclusion, the socio-economic index value and the cluster allocation should be considered as summary measures that attempt to reduce the variety of characteristics of the geographical unit's population to one dimension. The following points need to be taken into account when applying these measures:

1) The socio-economic index is derived on the basis of the entire population of each geographical unit, hence it is appropriate to use for a general comparison among those units.
2) Local authorities with similar socio-economic index values may differ in terms of the size of discrepancies between their sub-populations (e.g., localities within regional councils, and statistical areas within municipalities and local councils), and these discrepancies may have additional implications for the entire local authority.

The index calculated in the present study is based on statistical methods that are accepted throughout the world. The overall contribution of the index to planning and implementation of policies is substantial, despite the practical limitations listed above.

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